

# **Harrisburg University Of Science and Technology**

## **Undergraduate Catalog**

**2020-2021**

The provisions of this Catalog, and its electronic version at [www.HarrisburgU.edu](http://www.HarrisburgU.edu), are not to be considered as an irrevocable contract between Harrisburg University of Science and Technology and the student. The University reserves the right to change any policy, provision, or requirement at any time. This right to change a policy, provision, or requirement includes, but is not limited to, the right to revise, reduce, or eliminate course offerings in academic programs, and to add requirements for graduation. The student is responsible for adhering to the requirements, rules, policies, and procedures, whether published in this Catalog, the Student Handbook, or other official media.

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# Contact Information

## Harrisburg University of Science & Technology

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Harrisburg, PA 17101  
www.HarrisburgU.edu  
717.901.5100  
717.901.5150 (fax)

## Undergraduate Admissions

717.901.5101  
UndergraduateAdmissions@HarrisburgU.edu

## Graduate Admissions

717.901.5101  
Admissions@HarrisburgU.edu

## Advancement Office

717.901.5103  
Connect@HarrisburgU.edu

## Financial Aid

717.901.5115  
FinancialAid@HarrisburgU.edu

## Information Technology

717.901.5106  
OISHelp Student Portal

## Online Bachelor's Degree Program

717.901.5109  
<http://AdultDegrees.HarrisburgU.edu>

## Finance & Administration

717.901.5105  
Business Office Student Portal

## Veterans School Certifying Official

717.901.5136  
RegHelp Student Portal

## Additional Location:

1500 Spring Garden Street, Suite 101  
Philadelphia, PA 19130  
717.901.5100, ext. 0127

## Office of the President

717.901.5104  
President@HarrisburgU.edu

## Library

717.901.5188  
Library@HarrisburgU.edu

## Professional Development

717.901.5190  
ProfessionalEd@HarrisburgU.edu

## International Student Office

717.901.5154  
ISOHelp Student Portal

## Records and Registration

717.901.5136  
RegHelp Student Portal

## Student Services

717.901.5173  
StudentServices@HarrisburgU.edu

## Graduate Student Services

GradStudentServices@HarrisburgU.edu

## Harrisburg University Security

717.901.5180  
HUSecurity@HarrisburgU.edu

# About the Catalog

This University Catalog is updated annually and made available in electronic form on the Harrisburg University website (<http://harrisburgu.edu/records-registration/>). The University website at <https://harrisburgu.edu/> also contains updated lists of courses, course descriptions, textbook adoptions, and other important information. Should you require a paper copy of the catalog, please contact Records and Registration at the RegHelp Student Portal or 717-901-5136.

Harrisburg University has made every effort to make this catalog accurate; however, all policies, procedures, or charges are subject to change at any time by appropriate action of the faculty, administration, or Board of Trustees. Each edition of the University's catalog is archived in the library.

# The University

## History

The University was incorporated in the Commonwealth of Pennsylvania on December 12, 2001, making it the first science- and technology-focused, non-profit, comprehensive university to be established in Pennsylvania in more than 100 years. Originally founded to address the Capital Region's need for increased educational opportunities in science, technology, engineering, and mathematics (STEM) careers, Harrisburg University represented a major step to attract, educate, and retain Pennsylvania's diverse 21st-century knowledge-based workforce. A grand concept that was championed by business leaders, government officials, and the regional news media, Harrisburg University was built from concept to reality in less than a decade. The Pennsylvania Department of Education granted the University its charter in 2005.

An independent institution, the University offers academic and research programs initially designed to meet the needs of the region's youth, workforce, and businesses. The University continues to serve as a catalyst for creating, attracting, and expanding economic development and opportunities in Central Pennsylvania, and now, well beyond by aligning traditional undergraduate, graduate, and doctorate degrees with science and technology-based experiential learning.

## Mission Statement

The Harrisburg University of Science and Technology offers innovative academic and research programs in science and technology that respond to local and global needs. The institution fosters a diverse community of learners, provides access and support to students who want to pursue a career in science and technology, and supports business creation and economic development.

*Approved by the Board of Trustees on September 17, 2015.*

## Vision

Originally founded to address the need of Pennsylvania's Capital Region for increased educational opportunities in applied science and technology-related fields, the vision of Harrisburg University of Science and Technology is to provide academic programs at undergraduate and graduate levels for a diversity of learners, using student-centered, technologically advanced, and experiential learning designs that emphasize student success, with a sharp focus on specific interdisciplinary competencies and strong linkages to career development. The desired outcome is the emergence of well-qualified, technically expert graduates whose understanding of applied science and technology-related fields is honed by direct industry experience and rounded by a sound, cross-disciplinary liberal education.

## Accreditation and Approvals

Harrisburg University of Science and Technology was re-accredited on March 3, 2016 by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104, (267) 284-5000. The Middle States Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation. The Doctor's Research Scholarship degree program, Ph.D. in Data Sciences, was granted by Middle States in January 2017, and the Ph.D. in Information Systems Engineering and Management in July 2018.

Program offerings are authorized by the Pennsylvania Department of Education, Division of Higher and Career Education, 333 Market Street, Harrisburg, PA 17126.

Approved to participate in the federal Title IV, HEA student assistance programs by the U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202.

Approved by the Pennsylvania Department of Education for veterans and eligible dependents to obtain education benefits through the Veteran's Administration (VA).

Approved by the Veterans Administration to participate in the "Yellow Ribbon" program. Authorized under federal law by the Department of Homeland Security - U.S. Immigration and Customs Enforcement (DHS-USCIS-SEVP) as an eligible institution for the Student and Exchange Visitor Information System (SEVIS) to enroll non-immigrant students.

An articulation agreement with another institution of higher education permits students enrolled in certain associate degree programs to transfer credits into specific degree programs at the University.

The University has an articulation agreement with the following institutions of higher education:

Alvernia University  
Community College of Baltimore County  
Community College of Philadelphia  
Harrisburg Area Community College  
Hussain College - School of Art  
Lackawanna College  
Lake Erie College of Osteopathic Medicine  
Lehigh Carbon Community College  
Montgomery College  
Philadelphia College of Osteopathic Medicine  
Rosemont College

The University has an articulation agreement with the following secondary schools:

Camelot Education  
Camp Hill School District  
Capital Area School for the Arts  
Carlisle Area School District  
Central Dauphin School District  
Chester County Technical College High School  
Coatesville Area School District  
Cumberland Perry Area Vocational Technical School  
Cumberland Valley School District  
Dauphin County Technical School  
Dover Area High School  
Harrisburg Academy  
Harrisburg School District  
Juniata County School District  
Lancaster Mennonite School - Hershey Campus  
Lower Dauphin School District  
Mechanicsburg Area School District  
New Day Charter School  
Philadelphia School District-Roxborough High School  
Reach Cyber Charter School  
Steelton-Highspire School District  
Susquehanna Township School District  
Warwick Area School District  
West Perry School District  
West Shore School District

Harrisburg University also has course articulation agreements with the following secondary schools:

Beaver County Career and Technology Center  
Berks Career and Technology Center  
Bethlehem Area Vocational-Technical School  
Bucks County Technical High School  
Central Montco Technical High School  
Crawford County Career and Technology Center  
Delaware County Technical High School  
Fayette County Career and Technical Institute  
Greater Johnstown Career & Technology Center  
Hunterdon Co Polytech Career & Technical School  
Lancaster County Career and Technology Center  
Lebanon County Career and Technology Center  
Lehigh Career and Technical School  
McKeesport Area High School  
Middle Bucks Institute of Technology  
Middlesex Co Vocational & Technical Schools  
Mon Valley Career and Technology Center  
Murrell Dobbins Career & Technical Education High School  
Northern Westmoreland Career & Technology Center  
Reading Muhlenberg Career & Technology Center  
York County School of Technology

A consortium agreement with another institution of higher education allows a student to remain enrolled at the University while also taking credits at the visiting institution. The University has a consortium agreement for certain nanobiotechnology courses with the following institution:

The Pennsylvania State University - University Park Campus

and, the University has a consortium agreement for certain computer science courses with the following institution:

Saint Francis University

## Student Responsibility Statement

A student has the responsibility to engage fully in assigned work, to be interactive in academic discussion, and to develop professional competencies both in the classroom and at internship sites. The University is new in both thought and ideas. The student should be a partner in this endeavor, now and in the future.

It is the student's responsibility to be engaged in the University's community of learners and to develop a strong professional and ethical foundation as a community member. Failure to uphold HU's rules and policies, as well as federal, state, or local laws and/or regulations, may result in disciplinary action by HU pursuant to its Code of Student Conduct (Code).

## Statement of Community Standards

Underlying the University's mission are the following basic values:

- the importance of personal integrity, honesty, and ethical decision making;
- the right of every individual to be treated with respect and dignity as a member of a learning organization;
- the freedom of intellectual inquiry in the pursuit of truth, even if it defies commonly understood theories;

- the acceptance and appreciation of human diversity regarding race, gender, religion, sexual orientation, age, ability, ethnicity, and political views;
- the freedom from violence or harassment that would interfere with or disrupt university activities; and
- the recognition that civic engagement is a component of the intellectual development of a student and provides a path for knowledge and personal development in the service of the community.



# Admission

The University has a centralized Admissions Office to serve all prospective student applicants - undergraduate, graduate, and non-degree. This centralized structure honors the University's commitment to lifelong learning and to offer a more fluid and comprehensive service for those seeking access to a quality educational experience.

## Degree-seeking Admission

### Philosophy

Harrisburg University of Science and Technology seeks to admit students from a variety of backgrounds. Many factors are considered in the review of applicant files. The student's motivation and interest in science or technology and academic potential, which is generally assessed by the courses completed and grades earned in secondary school, are the key elements in considering the applicant for acceptance. The applicant's interest in science and technology is evaluated by reviewing educational records and reading the goal statement that each applicant must submit as part of the application process.

## Undergraduate Admission Process

There is no application deadline. A high school student is encouraged to apply during the fall or early spring of the senior year in high school. An adult learner is encouraged to apply at least two months prior to the start of any semester. This application process allows ample time to be accepted, develop an academic schedule, and to process financial aid applications (if applicable).

## Undergraduate Admission Requirements

Each applicant's candidacy is evaluated once all admissions materials have been received. Offers of admission are made to qualified candidates on a rolling basis. The undergraduate admission process requires the applicant to:

- complete the application online at [www.HarrisburgU.edu/Apply](http://www.HarrisburgU.edu/Apply) or a paper application;
- submit an official high school transcript or equivalent (required of applicants transferring less than 30 semester hours; encouraged of applicants transferring more than 30 semester hours). A student who has successfully completed the General Educational Development (GED) test may submit an official copy of the scores in lieu of the high school transcript. Documentation of successful completion of high school must be received prior to the end of the first semester of enrollment;
- submit official college transcript(s), if applicable, for any and all college, university or career/trade schools attended (whether or not academic credit was earned);
- to respond to all portions of the application process honestly and accurately;
- submit a personal goal statement: "I am interested in science and technology because..." This statement may be handwritten, emailed or typed, and should be two to four paragraphs in length, or approximately one full page; and,
- submit scores from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) when the applicant's native language is not English. For specific score requirements, see TOEFL and IELTS section at the end of this chapter.
- High school students applying for admission to the University should have a minimum high school grade point average of 2.75 or higher.

Optional materials:

- be interviewed - preferably in person during a campus visit or by telephone;

- submit results of standardized test scores from the SAT or ACT (optional, but recommended for those in high school); and,
- submit a letter of recommendation (preferably from someone who can attest to the student's work ethic, motivation and strengths, or from a teacher in a subject area tied to the student's academic field of interest).

## Required Placement Testing

In order to give the student the best opportunity for success, completion of the University's placement testing program is required of all new undergraduate students - degree-seeking, nondegree-seeking or dual enrollment, regardless of full-time or part-time status. Placement tests are not an entrance examination. The tests measure skills in English, mathematics, and reading.

At the sole discretion of the University, a student who has demonstrated satisfactory achievement via college transcripts or the equivalent is exempt from the placement tests. A non-native speaker of English must substitute the completion of the English placement test with the Test of English as a Foreign Language (TOEFL).

## Non-Degree Admission

### Philosophy

The University offers various non-degree programs at both the undergraduate and graduate levels, in the form of individual courses, a specialized series of courses, and advanced studies. Semester hours earned become part of the student's academic record and can be applied to a degree as defined by the appropriate policy and program requirements.

The University also offers professional development experiences in the form of certificate options, workshops, and seminars, which can be taken on a non-credit or audit basis.

In some cases, courses may have prerequisites that must be met prior to registration.

## Undergraduate Non-Degree Admission Process

There is no application deadline. An applicant is encouraged to apply at least two months prior to the start of a session or course to allow ample time to develop a finalized course registration. Each applicant's candidacy is evaluated once all admissions materials have been received.

The undergraduate non-degree admission process requires the applicant to:

- complete the non-degree application online at [www.HarrisburgU.edu/Apply](http://www.HarrisburgU.edu/Apply) or a paper application; and,
- submit scores from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) when the applicant's native language is not English. For specific score requirements, see TOEFL and IELTS section at the end of this chapter.

If required by a specific advanced study or non-degree program, submit official college transcript(s) for any college, university or career/trade schools attended (whether or not academic credit was earned). Some non-degree programs may require evidence of completion of an associates or bachelor degree program. A candidate who has not yet earned at least an associate degree may be asked to take and successfully pass the required placement tests.

## Undergraduate Non-Degree Policies

A student may enroll in up to 21 semester hours under the non-degree status when taking individual courses. Beyond 21 semester hours, a student must apply for full degree status. Non-degree admission does not guarantee admission into a degree-seeking program.

A non-degree student must maintain a 2.00 grade point average to continue from semester to semester.

## Dual Enrollment Admissions

A student may enroll in courses at the University to earn college credit while still in high school. This program provides the student with an opportunity to be introduced to the college environment, explore majors, and get a head start on a Bachelor of Science degree.

The University has a dual enrollment team to serve all prospective student applicants. The Dual Enrollment Program at the University offers diversified options for students to engage in college courses while they are in high school. Depending on the secondary school partnerships, students will have access to college courses at either of the University Campuses, at their high school through the College in the High School Program, and online with University Faculty.

Upon completion and submission of a dual enrollment application, the student will receive notification of receipt. Additional information regarding the courses available for registration will follow soon thereafter. Any questions regarding registration can be directed to the Dual Enrollment and Special Programs Coordinator at Records and Registration.

A dual-enrolled student may enroll in as many courses as the sending district approves; however, only 11 semester hours per semester may be taken at a time. An applicant desiring to enroll full-time, 12 or more semester hours, must apply under the Early College Program policy.

A Parent Consent Form must be signed by the student and a parent or guardian, which provides various required releases protecting the University's interests.

For students attending dual enrollment courses at either of the University locations, students must follow all policies and procedures as outlined in the Undergraduate Catalog to include the University schedule, laptop requirements, textbooks, Campus ID Card, etc.

### Courses at the University (Harrisburg and/or Philadelphia Locations)

There is no application deadline. The applicant is encouraged to apply as soon as possible and coordinate the application with the appropriate high school personnel (often the Guidance Office) prior to high school course selection for the appropriate semester.

All applications must be completed online by going to Dual Enrollment and clicking Apply Now.

### College in the High School

College in the High School is a Program based on a formal agreement with a School District. The Program requires that the University interview teachers in the high school to ensure that the teachers can be approved as Corporate Faculty. Once a teacher at the high school has been vetted as Corporate Faculty, students are able to take dual enrollment courses in the high school as a part of the formal agreement with the District. The vetted teacher can teach University courses and/or courses that have been aligned and approved by the University. If applicable, curriculum reviews are conducted to align courses at the high school with courses at the University.

Under the terms of the formal agreement with the School District, the teachers and the college courses will be identified and approved by the University and the District. This agreement will be documented in the Educational Agreement developed and approved by the University and the District.

All applications must be completed online by going to Dual Enrollment and clicking Apply Now.

The application deadline is based on the format of the high school courses, therefore the deadlines for each College in the High School Program will be different. Please refer to the College in the High School Brochure for your School District for information on when to apply.

### **Online**

The University offers opportunities for students to take dual enrollment courses via online with a University instructor. All policies for taking courses at the University Campus apply when taking courses online.

All applications must be completed online by going to Dual Enrollment and clicking Apply Now.

There is no application deadline. The applicant is encouraged to apply as soon as possible and coordinate the application with the appropriate high school personnel (often the Guidance Office) prior to high school course selection for the appropriate semester.

An applicant wishing to enroll full-time, 12 or more semester hours, must apply under the Early College Program policy.

## **Early College Program (ECP)**

A high school student who wishes to attend college on a full-time basis prior to receiving a high school diploma must be admitted under the Early College Program policy. The applicant must show strong academic preparation and personal maturity as exhibited by the high school transcript, placement test scores, and a personal interview to qualify for the Early College Program.

Any questions regarding the Early College Program can be directed to the Director of Secondary School Services, Programs and Partnerships.

### **Early College Program Requirements**

The Early College Program admission process requires the applicant to:

- complete the early college program application;
- provide documentation as requested by the University for eligibility to the Early College Program
- submit an official high school transcript showing a minimum cumulative grade point average of 3.30 on a 4.00 scale;
- successfully complete the placement examination administered by the University.
- submit written approval from the school district or diploma program describing the remaining courses required for high school graduation; and
- schedule an interview for admission;

### **Early College Program Policies**

Participation in the Early College Program is contingent upon results of the placement test and the availability of the course(s) in which the applicant plans to enroll.

Early College Program students are eligible for merit-based scholarships only. Students must maintain at least 12 semester hours per semester in order to remain in the Early College Program.

Early College Program students must review and adhere to all other undergraduate policies and procedures; therefore you must review the Undergraduate Catalog as a part of your enrollment in the Program.

## **International Students**

An international student planning to attend the University on a student (F-1) visa must satisfy the appropriate undergraduate admissions requirements and procedures, demonstrate proficiency in the English language, and provide an affidavit of financial support. Academic records should include courses studied, grades earned, diplomas, certificates, and results of comprehensive national examinations. International students must request an evaluation of their international transcripts through the World Education Services (WES) or Educational Credential Evaluators (ECE) to determine authenticity and degree equivalency.

A demonstration of English language proficiency is required of any student who is not a United States citizen. Acceptable demonstrations would include one of the following:

- completing a college degree program from a regionally accredited United States institution of higher education,
- earning a score of 4.0 or higher on the Analytical Writing section of the Graduate Record Examination (GRE);
- earning a Test of English as a Foreign Language (TOEFL) score of 80 or higher on the web-based version, 200 on the computer version, or 520 on the paper version; or
- earning an International English Language Testing System (IELTS) score of 6.0 or higher.

Harrisburg University of Science and Technology is approved by the Department of Homeland Security - U.S. Customs and Immigration and Enforcement (DHS-USCIS) as an eligible institution for the Student and Exchange Visitor Information System (SEVIS).

This approval allows an international student to apply for entry into the United States for study on an F-1 visa only after an "Affidavit of Financial Support" is deemed sufficient by the University and a tuition deposit payment of at least \$1,000 toward the first semester's tuition has been received. A USCIS Form I-20 is then certified and submitted to SEVIS. The SEVIS application fee of \$200 is then paid by the student directly to SEVIS.

Following entry into the United States and arrival at the University, the student will be required to provide a copy of the passport, I-20 Certificate of Eligibility, and the Form I-94 departure record to confirm all identification information in SEVIS. An international student is obligated to notify HU should their status change during enrollment from F-1 to any other immigration status. HU will revoke a student's I-20 for failure to remain eligible as required by the F-1 visa.

An international student does not qualify for Federal or State aid awards. Private education loans through participating lenders may be available, if eligible.

## Admission of Undocumented Students

Undocumented students\* who meet HU's academic qualifications are eligible for admission to HU. HU will maintain the confidentiality of student citizenship and immigration status, in accordance with the provisions of the Family Educational Rights and Privacy Act (FERPA). HU will not voluntarily share a student's citizenship or immigration status unless compelled to do so by court order.

\* International students admitted to HU from foreign countries must obtain a visa from the U.S. State Department before they can travel to this country. Accordingly, this policy statement relates exclusively to domestic students at HU who are entirely undocumented, who have been temporarily paroled under a Federal program or are in pending asylum status.

## Readmission

The Readmission Application Form is available at Records and Registration and must be completed and submitted to that office at least one week prior to the start of the semester. A student who was in good academic standing had satisfied all financial obligations to the University at the time of withdrawal, and had no disciplinary sanctions imposed will be considered for readmission. A student who left the University on academic probation or dismissal can only apply for readmission after an absence of one year. The application will be reviewed by a committee appointed by the Provost, who will make the readmission decision. A student who leaves the University and returns from an absence of one year or more will be subject to the Catalog edition in effect during the year of return.

# Tuition Charges, Refund Policies and Business Office Policies

All undergraduate tuition, charges and policies listed in this publication are effective as of July 1, 2020 and are subject to change, without notice, by the University's Board of Trustees.

## Admission Application Charge

There is no charge to apply for admission to the University.

## Tuition Deposit

A non-refundable tuition deposit of \$100 must be paid in advance of final course registration for the initial semester of attendance. A tuition deposit made for the Fall Semester is non-refundable after May 1. A deposit for the Spring Semester is non-refundable after November 1.

## Tuition - Semester Schedule

Tuition payment or satisfactory arrangement to pay tuition is due generally one week prior to the beginning of the semester. Tuition is charged at the per semester hour rate shown below. Full-time tuition charges are for 12 to 17 semester hours. A student who registers for more than 17 semester hours is subject to additional tuition costs at the per-semester hour rate (for example, tuition charged for 18 semester hours will be \$11,950 + \$1,000 or \$12,950). A student who registers for 11 semester hours or fewer is charged the per semester hour rate multiplied by the number of registered semester hours.

### Undergraduate Registration Schedule per Semester

| Full-Time Tuition<br>(12 - 17 Semester Hours) | Semester Hour Rate<br>(1 - 11 semester hours or each semester hour over 17) |
|---|---|
| \$11,950                                      | \$1,000   |

## Financial Aid Counseling and Financial Clearance Date

The student is encouraged to apply for federal and state grant program funding to determine the student's eligibility. A student seeking federal or state financial aid program assistance is required to contact the Office of Financial Aid at least 30 days prior to the start of a semester to complete the application process, submit all required documents and materials requested, and finalize a financial assistance plan by the end of the Add/Drop Period. A student whose financial assistance plan is not finalized by the end of the Add/Drop Period will not be allowed to attend class.

## Tuition Payments

Payments may be made in the Business Office by cash, check, or money order. Electronic payment options including credit card, debit card, and electronic check/ACH are available online via the Finance page of MyHU. A preregistered student can view account information online.

A convenience fee of 2.75% will be added for any credit/debit card transactions involving student tuition payments or other services. Online ACH/electronic check payments will not incur a convenience fee.

## Tuition Payment Plans

A monthly, interest-free payment plan is offered to the student and or parent to make four (4) monthly installment payments during the semester. There is an enrollment fee of \$50 per semester for this service. A student may enroll in a payment plan via the Finance page of MyHU.

Many employers offer employees a tuition reimbursement benefit. Because reimbursement is usually dependent upon the employee's proof of grade completion, an Employee Deferred Payment (EDP) plan permits a student's allowable tuition payment to be deferred until the end of the semester. The service fee for the plan is \$50 per semester. The application form is available online at the Finance page of MyHU.

## Laptop Computer

A laptop computer with wireless capability and access to the internet is required for attendance in all programs of study and should be obtained prior to the first day of class. Minimum requirements are listed on the University's website at <https://harrisburgu.edu/it-resource-center/>. The cost is approximately \$700 to \$1,200.

## Textbooks

Textbooks and other supplies (if specified for a course) must be obtained by the student prior to the first day of class. Textbooks may include both hard- and soft-bound books, journals, CDs, or software. Supplies may include a laboratory coat, goggles, gloves or any other required item specified. The estimated cost for textbooks and other supplies per course is \$160.

## Prior Learning Assessment Charge

A student who submits an application for prior learning assessment is charged a per semester hour amount of \$225 for the number of semester hours of the course equivalent sought. This charge is imposed at the time of application. No refund will be made if the application is unsuccessful.

## Other Charges

**Tuition Payment Late Charge** - A late payment charge of \$250 will be assessed if the student fails to make payment arrangements or pay tuition on or before the payment due date.

**Returned Check Charge** - A charge of \$20 will be assessed if a check or electronic check/ACH transaction processed for payment is returned by the issuing bank.

**Campus ID Card Replacement Charge** - Upon enrollment, a student receives, at no cost, a photo-imprinted Campus ID Card to be used as an identification badge, as a library card, and for building and elevator access. A student is required to wear the Campus ID Card badge when on campus. If a student desires a photo ID, submission of a 2" x 2" photo is required and a charge of \$25 is assessed to replace the card. If a Campus ID Card is lost or stolen, a charge of \$25 is assessed to replace the card.

**Late Registration Charge** - A charge of \$50 will be assessed if the student registers for a course after the Add/Drop Period has ended.

**Pay to Print Charge** - On-campus printing is available to the student. A charge may be assessed depending upon the nature of the print job: paper size, ink color, and quantity.

**Transcript Requests** - The official transcript request form is available on the Harrisburg University website or electronically submitted via MyHU. Each official transcript requested will be charged \$10.00 per transcript for standard domestic delivery.

## Enrollment Status Determination and Financial Aid Payments

A student's enrollment status is determined at the end of the Add/Drop Period. The student is charged the applicable tuition rate for the number of semester hours in which the student is enrolled. Federal student financial aid program assistance for which the student may be eligible is then calculated and paid, in accordance with regulations, based on the student's enrollment status. Direct student loans and PLUS loans for first-time students are scheduled for disbursement on or after the 31st calendar day from the first day of the semester. University merit and need-based grants and scholarships, if any, are credited to the student's account in week 4 or thereafter during the semester. Advance payment of an estimated credit balance resulting from anticipated institutional financial aid awards is prohibited.

## Refund Policy for Traditional Semesters

A student who withdraws from the University prior to the end of the third week of the semester may be due a credit for the unearned portion of the tuition charge.

The rate of tuition refund for withdrawal from the University is as follows:

- prior to the first day of a semester 100%
- during the first week 75%
- during the second week 50%
- during the third week 25%
- after the third week 0%

See the Academic Calendar at <https://harrisburgu.edu/records-registration-academic-resources> for withdrawal deadlines.

## Tuition Refund Policy

Tuition for the semester is considered fully-earned at the end of the third week of classes. For refund purposes, the semester begins on the first day of class for that semester, regardless of the student's first class day of attendance during week one. The period of time used to calculate the tuition refund is the first day of class of the semester to the University's determination date of official or unofficial withdrawal.

There will be no refund or additional charges for a student who adds and drops an equal number of semester hours within the same semester prior to the end of the Add/Drop Period.

If a student reduces the number of courses and/or semester hours during the published Add/Drop Period, a tuition adjustment for that course or semester hour reduction will be made, except when the student maintains full-time enrollment status with 12 semester hours or more.

There is no tuition refund when a student withdraws from one or more courses after the Add/Drop Period but remains enrolled in one or more other scheduled courses.



A scholarship payment received from a company or organization is applied to the student's tuition balance. The refund policy does not apply separately to the various types of payments credited to the student's account.

## **Official Withdrawal from University Procedure**

A student is encouraged to contact the Financial Aid and Business Offices in advance of any decision to withdraw from the University to obtain an explanation of the tuition and financial aid adjustments that will occur, if any, as the result of withdrawal from the program of study.

A student who intends to officially withdraw is encouraged to contact Records and Registration by telephone (717.901.5136), RegHelp Student Portal, or in person. It is recommended that a Withdrawal Form be completed or the student will be unofficially withdrawn.

The determination date for withdrawal purposes shall either be the actual date of formal notification by the student or some future date specified by the student as the intended last date of attendance. The determination date is used to calculate the tuition refund, if any, and the student financial assistance program refund, if applicable.

## **Unofficial Withdrawal**

A student who discontinues attendance in all courses during a semester and does not officially withdraw from the University is considered to have unofficially withdrawn. The determination date for unofficial withdrawals shall be the end of the semester, unless other evidence is provided to Records and Registration. There are serious federal student financial aid program implications for a student who unofficially withdraws, as explained below.

## **Federal Student Financial Aid Program Refund Calculation**

Refunds are calculated upon official withdrawal from all classes and, if the student was deemed eligible for Title IV, Higher Education Act (HEA) student financial assistance program funds, any refund due will be paid within 45 days from the date the student is determined to have withdrawn.

A student who officially withdraws up to the 60 percent point in time of the semester will incur an adjustment to the amount of financial aid program funds awarded and/or disbursed for the term based on the percentage of time attended from the first day of class to the University's determination date of withdrawal. If a student officially withdraws after the 60 percent point in time of the 14-week semester, 100 percent of the student's financial assistance program awards are considered earned and will be applied to the total amount of institutional charges due for the term. The refund order of Title IV, HEA program funds (as applicable to the student) is: Unsubsidized Direct Loans; Subsidized Direct Loans; Direct PLUS Loans; Federal Pell Grants; and, Federal Supplemental Educational Opportunity Grant (FSEOG).

For a student who unofficially withdraws during a semester, the withdrawal date shall be the end of the semester. The student is then responsible for all tuition charges due resulting from this reduction in awards and/or payments previously credited to the student's account.

## **Institutional Financial Assistance Awards, Payments and Refunds**

Merit- and need-based financial aid assistance awarded by the University for a semester are earned ratably through week 9 of the 14-week academic term, similar to the federal student assistance program refund calculation described above.

While payments of institutional aid may be credited to the student's account on or after week 4 of a semester, the student must remain enrolled through week 9 of the semester to fully earn the award.

For example, a student with a merit award of \$2,000 who officially withdraws in week 6 of the 14-week semester would only have \$800 of institutional financial aid assistance applied toward tuition due for the term [ $\$2,000 \times 6/14 = \$857$ ]. The difference of \$1,143 is rescinded and the student is responsible for any remaining tuition balance due.

## Veteran Student Tuition and Fees Policy

Pursuant to Section 103 of the Veterans Benefits and Transition Act of 2018, a student who is entitled to education assistance under chapter 31-Vocational Rehabilitation and Employment, or chapter 33-Post 9/11 GI Bill benefits will be permitted to attend and participate in the course of education during the period beginning on the date in which the student submits a written request to use such entitlement and ending on the earlier of the following dates:

- The date on which payment from the Veterans Administration is made to the institution
- 90 days after the date the institution submitted a certification of enrollment/tuition and fees to Veterans Administration

Harrisburg University will not impose any penalty, including late fees, limited access to university resources, or require additional borrowed funds on any eligible student due to the inability to meet their financial obligation to the university based on delayed disbursement of Veterans Administration funding.

A student who is entitled to education assistance under any of the available Veterans Administration Education Benefits is expected to provide the Certificate of Eligibility or Statement of Benefits to the Certifying Official no later than the start of the initial semester in which the entitlement is intended to be used. In addition, each semester the student must submit a written request (VA Benefits eForm) as confirmation of their intention to use the entitlement before the Enrollment/Tuition and Fees Certification can be reported by the Certifying Official to Veterans Administration for processing.

# Student Financial Aid Programs and Policies

The Office of Financial Aid assists qualified applicants who, without assistance, would otherwise be unable to pursue a post-secondary education. The Free Application for Federal Student Aid (FAFSA) and resulting need analysis is used to apply for federal, state and institutional award consideration for payment of tuition, housing, or other charges.

A student must apply each year to renew financial aid eligibility. The amount of financial aid awarded will reflect changes in tuition, housing, or other costs and updates to the financial profile of the student and family.

All students are encouraged to apply for federal and state grant program funding to determine the student's eligibility. A student seeking federal or state financial aid program assistance is required to contact the Office of Financial Aid at least 30 days prior to the start of a semester to complete the application process, submit all required documents and materials requested, and finalize a financial assistance plan by the end of the Add/Drop Period. A student whose financial assistance plan is not finalized by the end of the Add/Drop Period will not be allowed to attend class.

Financial aid awards are based on the enrollment status of the student during a semester as of the conclusion of the Add/Drop Period, defined as:

|                     |                             |
|---------------------|-----------------------------|
| Full-time           | 12 or more semester hours   |
| Three-quarter time  | 9 through 11 semester hours |
| Half-time           | 6 through 8 semester hours  |
| Less than half-time | 1 through 5 semester hours  |

Required enrollment status for federal, state and university financial aid awards:

| <b>Program</b>      | <b>Full-time</b> | <b>Half-time</b> | <b>Less than Half-time</b> |
|---------------------|------------------|------------------|----------------------------|
| Pell Grant          | Yes              | Yes              | Yes                        |
| FSEOG               | Yes              | Yes              | Yes                        |
| Direct Loan         | Yes              | Yes              | Not eligible               |
| PA State Grant      | Yes              | Yes              | Not eligible               |
| HU Merit Aid        | Yes              | Yes              | Yes                        |
| HU Gift Aid         | Yes              | Yes              | Yes                        |
| Funded Scholarships | Yes              | No               | No                         |

A non-degree or non-credit student is not eligible for financial aid.

## Progress toward a Degree

A student is classified based upon the number of semester hours completed and reported to Records and Registration. The classification is based on credits completed, not attempted, and does not include courses for which one of the following grades has been assigned: "I", "IP", "NR" or "F".

|             |  |
|-------------|--|
| First Year  | fewer than 24 credits earned                                 |
| Second Year | greater than or equal to 24 credits earned but fewer than 60 |
| Third Year  | greater than or equal to 60 credits earned but fewer than 90 |
| Fourth Year | greater than or equal to 90 credits earned                   |

## **Aid Sources**

### **Federal Pell Grant**

The Federal Pell Grant is awarded based on a federal formula using the information provided on the Free Application for Federal Student Aid (FAFSA). Awards for a full-time student vary from \$639 - \$6,345 for the 2020-2021 academic year, depending on financial need.

### **Federal Supplemental Educational Opportunity Grant (SEOG)**

A limited amount of funds from the SEOG program are available to supplement a Pell-eligible student with exceptional need. Awards vary depending on need and fund availability.

### **Federal Direct Loan**

There are two types of Federal Direct Loans: subsidized and unsubsidized. The subsidized loan is interest-free while the student is in school and is awarded based on financial need. Interest accrues on the unsubsidized loan while the student is enrolled in school. The borrower may opt to pay it as it accrues or allow it to accrue and capitalize. The unsubsidized loan is a non-need based loan program.

The maximum subsidized Direct Loan per academic year is \$3,500 for first-year students, \$4,500 for second-year students, and \$5,500 for third-year students and beyond. A dependent student may borrow an additional \$2,000 unsubsidized per year. An independent student may borrow an additional \$6,000 unsubsidized loan per year as a first-year and second-year student, and an additional \$7,000 per year as a third-year student and beyond.

### **Federal Parent Loan for Undergraduate Students (PLUS) Loan**

The PLUS is available for parents of an undergraduate student through the Direct Loan program. A parent may borrow up to the cost of attendance less any other financial aid received. Repayment begins 60 days after this loan is fully disbursed unless the parent requests the in-school deferment option.

### **Federal Work-Study**

An eligible student can seek part-time employment either on-campus or in community service positions off-campus. A student may work up to 20 hours per week during a semester and up to 35 hours per week when classes are not in session.

## **Pennsylvania Higher Education Assistance Agency (PHEAA) State Grants & Special Programs**

PHEAA State Grants are awarded to eligible Pennsylvania residents based on need. Estimated awards will vary from \$250 to \$3,688\* for the 2020-2021 academic year. A student applies for the State Grant by completing the FAFSA. Renewal applicants must apply before PHEAA's May 1 deadline. Information from the FAFSA is automatically submitted to PHEAA. After the initial application is filed, students and parents should respond directly to the PHEAA Grant Division if additional information is required to process the state grant award. (\*as of March, 2020)

Other special programs are offered to eligible applicants as determined by PHEAA. An official high school transcript, or equivalent, may be required to evaluate an applicant's eligibility for these programs.

### **Other Programs**

The following federal, state or private financial aid sources are available to a student based upon the individual's affiliations or experiences.

Veterans Administration Education Benefits  
Pennsylvania Office of Vocational Rehabilitation  
Job Training Agencies  
Employer Sponsorship

### **Institutional Grant and Scholarship Programs**

The University offers a variety of merit- and need-based grant assistance programs for full-time enrollment status during a semester. First-year student merit awards are determined using the record of high school achievement. An official high school transcript, or equivalent, is required to evaluate an applicant's eligibility for these programs. Renewal provisions apply to merit-based awards for subsequent year funding.

Need-based grants may be awarded to a student who has remaining need after receiving available federal and state grant sources of aid and borrowing a Federal Direct Student Loan for the academic year. Award amounts are discretionary and may change from year to year. Although a student may meet the criteria for multiple gift aid grant awards, receiving any particular award is not assured.

Several scholarship awards are made through funded programs coordinated by the Office of Financial Aid.

### **Satisfactory Academic Progress for Financial Aid Recipients**

Satisfactory academic progress (SAP) for federal Title IV, HEA student financial aid program assistance is defined as the minimum progress required toward the completion of a degree, and must be maintained in order to receive federal and institutional financial aid. The Pennsylvania State Grant Program, administered through PHEAA, has different criteria to determine academic progress.

Federal regulations require the University to establish standards of academic progress in both of the following areas:

- the student's cumulative grade point average, the qualitative measure; and,
- the maximum time limit for completing the program of study, the quantitative measure.

Satisfactory academic progress is evaluated at the end of each semester. Financial aid recipients must maintain the standards in both areas, regardless of whether aid was received in the past. A student who does not meet one or both of the standards is not making satisfactory progress until the standards are met.

A student who is academically eligible to continue enrollment at the University, but does not meet the standards of academic progress, may remain enrolled without financial aid until eligibility to receive financial aid is reestablished. A student should contact the Office of Financial Aid to discuss strategies for meeting the standards and to inquire about options for financial assistance that are not subject to the satisfactory academic progress requirements.

Transfer credit hours from another institution that are accepted toward a program of study are counted as both attempted semester hours and earned semester hours in the program pursuit calculation to determine satisfactory academic progress for Title IV, HEA student assistance program purposes. Grades for transfer credit hours are not included in the calculation of the cumulative grade point average.

Semester hours for a grade of Incomplete (I) are counted in the total attempted semester hours in the program pursuit calculation of satisfactory academic progress for Title IV, HEA student assistance program purposes.

Semester hours for a Withdrawal grade (W) are considered attempted semester hours in the calculations of satisfactory academic progress for Title IV, HEA student assistance program purposes.

When a course is repeated, the attempted credit hours are used to determine the student's enrollment status for the semester (i.e., full-time, half-time, less-than-half-time), but the repeated hours are not counted a second time as attempted credit hours in the cumulative grade point average calculation. Earned semester hours and quality points for a grade used in the cumulative grade point average calculation for a course repeat are taken from the most recent grade.

## **Academic Standing and Financial Aid Eligibility (qualitative)**

A student with a cumulative grade point average of 2.00 or higher is in satisfactory academic standing. If a student has a cumulative grade point average below 2.00 at the end of a semester, the student has failed to meet the minimum satisfactory academic progress standard and is subject to the warning, probation or dismissal sanction, as applicable, as stated below.

After the initial semester, if at any time the cumulative grade point average falls below 1.00 the University reserves the right to dismiss the student.

## **Program Pursuit - Maximum Timeframe for Completing the Program of Study (quantitative)**

A full-time student must successfully complete a program of study within one- and one-half times the normal time frame in semester hours attempted to continue to receive Title IV, HEA student financial aid program assistance. More simply stated, program pursuit requirements for a normal 4-year, 8 semester program consisting of 120 semester hours must be completed successfully within 6 years (i.e., 12 semesters, 180 semester hours) to maintain eligibility for federal financial aid program assistance throughout the program of study.

A student who is enrolled less than full-time will have the policy applied on a pro-rata basis in accordance with enrollment status.

The quantitative measure of satisfactory academic progress is measured using the following calculation:

Total Earned Semester Hours ÷ Total Attempted Semester Hours = a percentage (%)

The calculated percentage each semester is compared to the following chart to determine if the student has achieved satisfactory academic standing:

| Semester | Minimum Percentage of Earned Credit Hours Required |
|----------|--|
| 1        | 25%  |
| 2        | 40%  |
| 3        | 40%  |
| 4        | 50%  |
| 5        | 50%  |
| 6        | 60%  |
| 7        | 60%  |
| 8        | 75%  |
| 9        | 75%  |
| 10       | 85%  |
| 11       | 85%  |
| 12       | 100%   |

This chart shows the need to complete an average of semester hours each semester to complete a full-time 120 semester hour degree program of study within one- and one-half times the normal time frame:

| Normal Time Frame                      | Number of Semesters | Avg. # of Sem. Hrs. Per Semester | Maximum Attempted Sem. Hrs. | Maximum Number of Semesters | Avg. # of Sem. Hrs. Must Be Completed Per Semester |
|--|---------------------|----------------------------------|-----------------------------|-----------------------------|--|
| Degree Programs:<br>120 semester hours | 8                   | 15                               | 180                         | 12                          | 10   |

## Failure to Meet One of the Required Satisfactory Academic Progress Standards

A student who fails to meet either the qualitative or quantitative measure of satisfactory academic progress at the end of a semester is subject to the following policy:

### First Occurrence - Warning

Following the first semester in which the student does not meet the satisfactory academic progress standard, the student will automatically be placed in a financial aid warning status for the next semester. A letter will be issued advising the student of their financial aid warning status. No appeal is needed, but in coordination with the Office of Student Services, an academic plan may be required. The student remains eligible for financial aid program assistance during the warning semester.

## **Second Consecutive Occurrence - Probation**

If, by the end of the warning semester, the student is not able to achieve satisfactory academic progress status, the student will not be able to receive financial aid for the next period of enrollment unless the student successfully appeals. A letter will be issued advising the student of their financial aid status, the effect of this status on the student's financial aid eligibility, and the steps the student must take to submit an appeal. If the appeal is approved, the student will be placed in a financial aid probation status for the next semester and will be eligible for financial aid during that semester. An academic plan will also be required during this semester.

## **Appeals**

A student who becomes ineligible to participate in the financial aid programs as a result of failure to meet satisfactory academic progress after the warning semester, may file an appeal by submitting a letter outlining the nature of the appeal to the Financial Aid Office. An appeal will be considered only if the student's failure to meet the standards of academic progress is determined to be due to events beyond the student's control. Examples of circumstances for which an appeal may be considered include military obligation; death of a relative; injury or illness of the student; unusual personal hardship or other extenuating circumstance. Written documentation of the circumstances of why the student failed to make satisfactory progress and what has changed that will allow the student to make satisfactory progress by the next evaluation must be submitted with the appeal and should reference the student's name and student ID number. In addition, evidence must be received documenting that the required academic plan was completed, the cumulative grade point average has improved, and the required satisfactory progress grade point average can potentially be achieved to complete a program of study within the maximum timeframe limitation. Appeals submitted without documentation will not be considered. A timely determination will then be made and documented in the student's file.

If the financial aid appeal is denied, a second notice will be sent to the student advising them of the denial. If the appeal is approved, a semester of financial aid probation will be awarded. The student will be notified in writing their appeal was approved. The student must achieve satisfactory academic progress by the end of the financial aid probation semester.

If after the financial aid probation semester a student is still not making satisfactory academic progress, but is meeting the requirements of the academic plan, the student is eligible to continue to receive financial aid as long as the student continues to meet those requirements and is reviewed according to the requirements specified in the academic plan. A student becomes ineligible to receive federal funds when the student does not meet the requirements of the academic plan.

## **Academic Standing and Satisfactory Academic Progress Review and Notification**

The University evaluates academic standing and satisfactory academic progress at the end of each semester. All students who receive federal and state financial aid must meet the standards for satisfactory academic progress in order to establish and retain student financial aid program eligibility. The University may establish academic policies that may be different than the policies governing academic warning, probation, and dismissal for institutional grant and scholarship aid and state student assistance program purposes. Written notification of financial aid ineligibility is mailed to a student at the most recently reported permanent address.

## **Re-establishing Eligibility for Federal Student Assistance Programs**



Following a dismissal action, a student may re-establish eligibility by earning course credit successfully at another institution that will directly transfer into the University's program of study and the required cumulative grade point average and maximum timeframe percentage for minimum satisfactory progress is achieved by the transfer credit and grades accepted.

# Student Services

## Overview

The Office of Student Services provides educational, personal, and professional support to promote student development and success. The Office of Student Services, in collaboration with other staff and faculty, enhances the mission of the University by providing an inclusive campus community, promoting leadership opportunities and providing resources and programming to facilitate academic success.

## Student Life

### Housing and Residence Life

Harrisburg University does not own housing facilities. However, there are a variety of housing options available through local housing partners. These facilities vary from the more traditional college-style apartment setting with shared living space to the more independent, fully furnished high-rise apartment. The majority of these facilities are within a few blocks of the University. The Office of Student Services can assist the student to find optional housing, if necessary.

## Student Activities

Student activities promote and enhance leadership, involvement, and engagement with the campus community. The student can create, attend, and lead programs or clubs of specific interest with assistance and guidance of the Office of Student Services.

### Student Government Association (SGA)

The SGA serves as the liaison to various campus constituent groups and advocates for the student body. The SGA encourages the student to be more active in the community, to help maintain a positive image for relationships to grow within the community, and to give direction for programs or clubs to prosper.

## Student Success

### Academic Advising

Academic advising can be a critical component in educational progress. A Success Coordinator is assigned to each undergraduate student. The Success Coordinator guides the student to explore academic goals and assists in course selection for their academic program. The Office of Student Services supports the faculty's role in advising; in addition, it also supports the student to access resources and develop strategies when non-academic factors affect a student's ability to achieve. Individual student advising is provided for the student throughout the period of enrollment. This advising is focused on academic success strategies such as time management, study skills, career aptitude, decision making, and goal setting.

### Orientation and First-Year Experience

Orientation and Welcome Weekend provide the student an opportunity to become familiar with the University and housing facilities; technology services; academic support services; policies; and local entertainment, food, and transportation options.

Most importantly, these programs provide the opportunity to meet other new students and other members of the University community.

Orientation begins with enrollment in our Student Orientation Portal through Canvas, and students navigate their way through the resources available to them, learn about the HU curriculum, and what it means to be a part of the HU community. Following this, on the day after Move-In day, Welcome Weekend provides students the opportunity to engage with the incoming class of new students through various activities. Activities include acclimating to the campus and surrounding area, discovering student resources, and learning the tools to be prepared for the upcoming semester. This is also when students will meet their Connection Leaders, who will help them acclimate into the HU community through their first year.

The first-time undergraduate student is enrolled in many of the same courses as other first-year students in the initial academic year. This creates a learning community in which the student develops a bond with other students and faculty. Additionally, the student obtains the necessary foundational skills needed for academic achievement in the program. SEMR 100 - Cornerstone is designed to help the student transition to the University setting and to provide resources and guidance on how to responsibly manage all the major components of University life.

## **One-on-One Advising and Counseling**

Individual student advising is provided for the student throughout the period of enrollment. This advising is focused on academic success strategies such as time management, study skills, career aptitude, decision making, and goal setting. If Student Services staff determine that a student would benefit from personal counseling, referrals are available. For more information, contact the Office of Student Services.

## **Tutoring Program**

A student may request the assistance of a tutor to supplement classroom instruction. The tutor usually meets individually with the student. A tutor may be requested by selecting "Tutoring" on the home page of MyHU or contacting the Office of Student Services. Additionally, group tutoring sessions are sometimes available; the student can attend without an appointment. A student who is interested in becoming a tutor should contact the Office of Student Services. For more information, contact [tutoring@HarrisburgU.edu](mailto:tutoring@HarrisburgU.edu).

## **Online Tutoring**

Smrthinking™ is an online tutoring service that is free to the student. A student may submit an essay to a professional tutor for review or feedback, complete a mock interview, attend video sessions, and review resumes. This site is accessed directly through Canvas, the University's course management system.

## **Technology Literacy Program**

Technology literacy tutorials at [www.Lynda.com](http://www.Lynda.com) are available to a student if technology skill improvement is needed. This site is accessed directly through Canvas, the University's course management system.

## **Connection Leader and Mentoring Program**

The Connection Leader program is a peer mentor program that aids in the successful transition of new students to collegiate life and expectations. First-year students are assigned a peer mentor who engages with the student in orientation, Welcome Weekend, and throughout the student's first-year at HU. Peer mentors are returning students who serve as leaders and mentors by guiding a group of new students. The selection of peer mentor candidates is completed during the spring semester for the fall semester of the following academic year.

## Health and Mental Health Services

### Health Services

Medical services are not provided on any campus location. Local medical facilities are listed on the Student Services Sharepoint site: <https://myharrisburgu.sharepoint.com/sites/StudentServices/SitePages/Resources.aspx>

### Mental Health Services

For students in the Harrisburg area that can commute to campus and reside in Pennsylvania, short-term mental health services are available. Students should contact [counseling@harrisburgu.edu](mailto:counseling@harrisburgu.edu) or call 717-901-5100 ext. 1727.

For students that do not reside in Pennsylvania or in a commutable distance to the physical campus, students may contact [counseling@harrisburgu.edu](mailto:counseling@harrisburgu.edu) or 717-901-5100 ext. 1727 for referral services in the student's location. More information can be found at the Student Services Sharepoint site:

<https://myharrisburgu.sharepoint.com/sites/SSCounseling/Sitepages/counseling.aspx>.

HU also provides 24/7 support for students through a Student Assistance Program offered by BHS. BHS provides in-the-moment support for students in crisis or referrals for various services such as mental health care, medical care, legal advice, and food assistance. The BHS website also has a list of valuable resources. For more information, go to the Student Services Sharepoint site: <https://myharrisburgu.sharepoint.com/sites/SSCounseling/Sitepages/counseling.aspx> or call 800-327-2251 or online resources at <https://portal.bhsonline.com>.

### Student Concerns and Complaints

The Office of Student Services offers guidance to the student when uncertainty exists about the appropriate process to address a topic, concern, or problem. A request for assistance may be submitted to obtain clarification of a policy or procedure. The request is then reviewed and a recommended course of action is provided in a timely manner.

### Accessibility Support Services

Harrisburg University of Science and Technology welcomes diversity among its students and, in accordance to the Americans with Disabilities Act of 1990, seeks to provide reasonable and effective support services. The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 prohibit discrimination on the basis of disability and require the University to make reasonable accommodations for those otherwise qualified individuals with a disability who request accommodations. The applicant must provide recent documentation (within 3 years) of any disability that may affect learning to ensure that appropriate accommodations are considered. Please reach out to [ADA@harrisburgu.edu](mailto:ADA@harrisburgu.edu) for questions regarding proper documentation as well as support services provided.

### Textbook Services

Textbooks are made available at the time of registration for student purchase through the services of MBS Direct, which has an online store at <http://bookstore.mbsdirect.net/harrisburgu.htm> for new and used textbook purchase or rentals. A complete textbook listing is available on MBS Direct. Textbooks and other supplies (if specified for a course) must be obtained by the student prior to the first day of class.

Additional online textbook purchase and rental options are available through companies such as Amazon. Book retailers carry a small selection of texts but may also have the ability to process online textbooks orders.

## University Library

The mission of the Harrisburg University Library is to support the mission of the University by enabling excellence in teaching and learning by providing robust access to information resources, integrating information literacy skills throughout the curriculum, and providing physical and virtual spaces for free intellectual curiosity, learning, collaboration, and knowledge sharing and creation. Library services include:

- collaboration between the librarians and faculty to integrate information literacy skill development and use of information resources into the curriculum;
- access to a wide range of information sources selected to enhance course-based and independent learning, such as:
  - online databases of articles from newspapers, magazines, and scholarly journals;
  - streaming multimedia such as documentaries and video learning courses;
  - electronic books; and
  - a self-service library located in the Learning Commons offering physical-format books, games, and periodicals;
- research guidance for students by phone, e-mail, chat, or in person consultation;
- partnerships with other libraries to provide access to their information sources, free of charge to our students and faculty; and
- group study rooms which may be reserved in advance through a librarian.

For more information including reporting of lost or damaged items and replacement charges see the Student Handbook.

For more information, visit the library's website at <http://library.harrisburgu.edu>. Electronic content is available on the website 24 hours a day from on- or off-campus. Off-campus use requires authentication with valid University credentials.

## Technology Services

Information Technology Services is responsible for connecting students, faculty, and staff to technology resources in support of the University's mission. Technology services include:

- a robust and reliable infrastructure to enable excellence in learning;
- a required laptop program and an entirely wireless campus to facilitate mobile computing and access to content;
- high-end classroom technologies to enhance interactivity and the capture and distribution of classroom content;
- access to enterprise software applications such as our course management system;
- MyHU; Office365 email and productivity suite; and many other course-related software programs;
- the Harrisburg University Campus Card services, which enables building access, pay-forprint, and book checkout from the library while serving primarily as the official university identification; and,
- training, orientation, and support for all university technology services.

For more information, contact the IT Helpdesk.

## Experiential Education

Harrisburg University is committed to the benefits provided by experiential learning. To realize this commitment all Harrisburg University students - regardless of major - complete an internship as well as two semester long projects of at least 135 hours in their field. An internship and projects allow the student to apply classroom experiences to the workplace at an off-site placement and in projects, where students test ideas and develop competencies and skills. These requirements provide practical and applied experience with their program goals and learning objectives as they are implemented in the working world. Students collaborate with partners external to the University for their internship experiences and are highly encouraged to engage with external partners on their projects as well. Students also enroll in a 1 credit seminar course each year. These seminar courses are designed to guide students through their competency development and experiential learning requirements. For more information, contact [explearning@harrisburgu.edu](mailto:explearning@harrisburgu.edu)

Experiential Education Advising - The student should meet with the academic advisor and the Office of Experiential Learning during the second year for information about experiential programs. The student should also obtain a recommended sequence of experiences for the program of study selected.

## Career Services

Career advising begins during the first year of study. The student obtains career counseling from the academic advisor, the Office of Experiential Programs, and the Office of Workforce Development, through classroom instruction in the seminar courses and on-site experience during the internship and project process. The following services are offered for enrolled students and alumni: career counseling, assessment inventories, career exploration, professional development resources, events and programs, graduate and professional school advising, mock interviews, resume review, and mentoring. All of these efforts are available to encourage the student to begin planning early for eventual entry into the workplace. The University partners with private sector and public sector employers and staffing agencies to provide support and resources for the student during a career search. For more information, contact [CareerServices@HarrisburgU.edu](mailto:CareerServices@HarrisburgU.edu).

# Academic Policies

## Calendar, Credit System and Final Examinations

The University operates on a semester calendar and uses the semester hour credit system. There are three semesters per twelve-month period: Fall Semester, Spring Semester, and Summer Semester. Each semester consists of fourteen weeks of classes with final examinations occurring during the two or three final examination days. Within each semester, there are two subterms listed on the Academic Calendar at <https://harrisburgu.edu/academic-calendar>.

## Credit Hour Policy Program Instructional Equivalencies

A wide variety of course delivery is utilized. "Learning hours" are assigned to each course. Each "learning hour" represents one hour per week of student engagement, including both instructional and outside of class activities. The University reserves the right to change the delivery method of a course due to administrative needs, the health and safety of the University community, or government mandates.

Traditional 14-week semesters are offered, plus subterms and an accelerated format. Regardless of the format or delivery, all programs whether online, blended/hybrid, executive weekend, accelerated, subterms or traditional classrooms, must meet the 126-learning hour requirement for a 3-credit course (3 credits \* 3 hours/credit \* 14 weeks = 126 hours). Adherence to these regulations enhances the quality and rigor of the academic programs and is achieved by utilizing the "instructional equivalencies" detailed below.

Faculty establish the learning-based interactions (when, where, how, and why) including frequency, duration, evaluation, and assessment techniques. These guidelines recognize the need for the faculty to actively manage the learning space, both inside and outside the classroom. This policy is extremely important in helping faculty in the design and teaching of courses and in student learning. It is the responsibility of the faculty to deliver academic quality regardless of delivery format.

Provided below is an outline of acceptable "Instructional Equivalencies":

|   | Description  | Rate of Equivalency  |
|---|--|--|
| Blogs, Journals, Logs                         | Students' opportunity to apply learned concepts or for reflection on learning experiences; to be shared with instructor and/or classmates for thoughtful analysis, feedback, and assessment. | 1 private online posting= ½ learning hour<br>1 shared online posting (required to read all classmates' postings) = 1 learning hour |
| Case studies & problem-solving scenarios      | In-depth analysis requiring utilization of higher-order analytical skills that relate to course objectives and is shared with instructor and/or classmates for feedback and assessment.      | 1 case study analysis & posting = 1-3 learning hour  |
| Required Online Chat rooms for group projects | Instructor-led opportunities for collaborative, synchronous learning with specific expectations for participation & feedback. (Chats are posted for review.)                                 | 1-hour online chat = 1 learning hour   |
| Conference calls                              | Instructor-led opportunities for collaborative, synchronous learning with specific expectations for participation & feedback. (When possible, calls to be recorded for review.)              | ½ hour call = ½ learning hour  |

|   |  |  |
|---|--|--|
| Discussion Board  | An instructor-guided or mediated threaded discussion that directly relates to course objectives and which has specified timeframes, expectations for participation, and thoughtful analysis.   | 1 posting (requires reading all postings) = ½ learning hour<br>1 posting (requires reading all postings and reply to a minimum of 2) = 1 learning hour |
| Field trips, tours and experiential learning (to include virtual tours) | Students participate as individuals or in groups in analyzing an activity & preparing a paper or presentation, to be shared in whole or in part with instructor and/or classmates.   | (Instructor-Led)- 1- hour tour= 1 learning hour<br>(Student(s) alone without instructor)- 1-hour tour plus reflection paper = 1 learning hour          |
| Group projects  | An instructor-mediated culminating activity with specific learning objectives; students collaborate via e-mail, chat rooms, discussion boards, wikis, and/or face-to-face contact to research, analyze, synthesize, & prepare the project with instructor receiving periodic updates & providing guidance to the group.  | 1 hour = 1 learning hour   |
| Guided Project/Thesis   | An instructor-mediated culminating individual project/thesis with specific learning objectives; student and instructor collaborate via email, chat, discussion boards, and/or face-to-face to research, analyze & prepare project/thesis with instructor receiving periodic updates and providing guidance and feedback. | 1 hour = 1 learning hour   |
| In-Class Instruction, Presentations, Tests                              | Instruction, presentations, and tests provided in person in a live classroom setting.  | 1 hour = 1 learning hour   |
| Instructional CDs, PowerPoints, Videos                                  | Instructor-mediated to expand upon and clarify course concepts and objectives.   | Reviews & posts response to 1 unit= 1 learning hour  |
| Lecture activity-written or audio                                       | Opportunity for students to develop questions, comments, or observations, to be shared with classmates & instructor through discussion board postings or participation in chat rooms.  | Reviews 1 lecture & posts response = 1 learning hour   |
| Library Research (instructor-led)                                       | In-depth instructor-led opportunity for students to research scholarly articles or professional journals that relate to course objectives; to be shared with the class in a designated manner.   | Research for 1 five-page project = 1 learning hour<br>Research for 1 3-5-page paper = 1-2 learning hours   |
| Online Quizzes  | Opportunity for the instructor to assess students' subject knowledge and provide feedback on students' progress.   | 1-hour test = 1 learning hour  |
| Reflection Paper or Article Review                                      | Instructor-guided activity for students to apply learned concepts and relate practices to personal experiences or apply higher-order analytic skills in assessing scholarly articles or professional journals.   | 1 private posting = ½ learning hour<br>1 shared posting (required to read all classmates' postings) = 1 learning hour                                  |



|  |  |                                      |
|--|--|--------------------------------------|
| Service Learning Project; Jr and Sr projects, capstone | An instructor-led service project with specific learning objectives that integrates community service with academic study; faculty provides guidance, support, and feedback to students and student shares experience and reflection with fellow classmates via emails, chats, discussion boards, and/or face-to-face. | 1 hour = 1 learning hour             |
| Web-conferencing                                       | Instructor-led desktop to desktop or classroom video streaming instruction for collaborative, synchronous learning with specific expectations for participation and feedback. (i.e., Canvas, Adobe Connect, Skype, etc.)   | 1 hour = 1 learning hour             |
| Web-Quest (Internet Research)                          | Instructor-guided opportunity for students to research information on the Internet that enhances student learning and addresses specific course outcomes; findings shared with the instructor and classmates.  | 1 in-depth posting = 1 learning hour |

\*Researching, PowerPoint/video reviews, WebQuest activities, reading articles, etc. are considered "homework" assignments. The Rate of Equivalency denoted pertains to posting, reviewing, sharing, and providing student-to-student and/or instructor-to-student feedback.

*Adapted from Misericordia University, Dallas, PA, and modified for Harrisburg University.*

## Catalog in Effect

A new student entering the University during the 2020-2021 academic year will be subject to the academic program requirements contained in this Catalog edition unless the student elects to complete a revised set of program requirements published in a future edition of the Catalog.

A student who elects to complete a revised set of program requirements must notify Records and Registration of this intent by completing a Change of Program form.

A student who leaves the University and returns from an absence of one year or more will be subject to the Catalog edition in effect during the year of return.

## Enrollment Status

Student enrollment status is defined as either full-time or part-time. The minimum full-time undergraduate student enrollment is 12 semester hours in a semester. Part-time status is any number of credits fewer than 12 semester hours. The full-time course load is 12 through 17 semester hours. A course load average of 15 earned semester hours is needed to complete the program within 4 years. A full-time degree-seeking student must complete the program requirements within 8 years from the date first enrolled in that program. Requests for a course load greater than 17 semester hours must be submitted to Records and Registration. Students must have a minimum GPA of 3.0 or higher to request an overload.

Part-time status is sometimes defined further using one of the following terms:

|                     |  |
|---------------------|--|
| Three-quarter time  | fewer than 12 semester hours but greater than or equal to 9 semester hours |
| Half-time           | fewer than 9 semester hours but greater than or equal to 6 semester hours  |
| Less-than-half time | fewer than 6 semester hours but greater than none                          |

## Registration Process

Course registration is completed for first-time and transfer students by Records and Registration. If a student considers a course registration change or increase or reduction in semester hour load, the student should meet with the faculty advisor and complete the Add/Drop procedure.

For subsequent semesters and for students in the online program, the student registers online at MyHU/Academics to indicate course selections. The selections are then reviewed by the student's faculty advisor and finalized when the student and the advisor agree to the selections. The start and end dates for registration appear on the Academic Calendar and Registration Instructions which are posted on MyHU/Academics and [www.HarrisburgU.edu](http://www.HarrisburgU.edu). Students who require an Americans with Disability Act accommodation to complete registration should contact the Office of Student Services at [ADA@HarrisburgU.edu](mailto:ADA@HarrisburgU.edu).

## Experiential Learning

A student who intends to enroll in an experiential project (298 or 498) or internship (365) is required to submit a learning contract to the Office of Experiential Programs in advance of starting the experience. Once the student's learning contract receives the designation of an appropriate academic advisor and a site supervisor (if applicable), and is executed by the Office of Experiential Programs, the student will be enrolled in the appropriate academic course. If a student begins an experience without an approved learning contract in place, the student will not receive academic credit for the course.

## Directed Studies

A student requesting a directed study for a course from this catalog must obtain a Directed Study Request form from Records and Registration. The student must provide a rationale for requesting the directed study before approval can be granted by Records and Registration. The following guidelines are required for a directed study:

1. Directed studies are only open to juniors and seniors.
2. Directed studies must be necessary. Directed studies are deemed necessary if a student needs a specific course in their program in order to graduate that can only be met through a directed study.
3. A student must have a minimum GPA of 2.25 in order to request a directed study.
4. A student may not take more than 6 credits of independent study or directed study from one faculty member.
5. The program lead and the student's faculty advisor must agree to offer the directed study.

## Add/Drop Period and Course Withdrawals

The Add/Drop Period begins on the first day of the semester or subterm and ends after 6 days of classes have occurred (this includes Saturday). A student may make schedule adjustments during the add/drop period on MyHU, or in the Records and Registration office. No course may be added after the end of this period. If a student withdraws from any course after the conclusion of this period and up until the last day to withdraw from a course with a "W", a final grade of "W" will appear on the permanent record. After that period, a "WF" will appear on the permanent record. The withdrawal deadlines appear on the Academic Calendar posted on MyHU for both semesters and subterms.

## Enrollment Status Determination

A student's enrollment status is determined at the end of the Add/Drop Period (same as census date per the academic calendar). The student is charged the applicable tuition rate for the number of semester hours in which the student is enrolled as of the census date.

A degree-seeking student must complete their program of study within 8 years from the date first enrolled in that program or the student may be required to change to the current catalog's program requirements.

## Audit Policy

The student may choose to participate in a course on an audit basis. The student who elects this option is expected to attend and participate in class regularly and complete all course requirements. The course that is being audited carries no academic credit but is recorded on the student's academic record and will receive a Pass (P) or No Pass (NP) grade at the conclusion of the course. The student who wants to audit a course must notify Records and Registration in writing no later than the end of the Add/Drop Period. The semester hour tuition rate applies to audited courses. An audited course cannot be subsequently taken for credit.

## Class Attendance

Attendance is a critical part of a student's education. The student is expected to attend class regularly and participate fully in the activities of each course. The instructor is responsible to set forth the attendance requirements in the syllabus.

If, in the judgment of the instructor, a student is excessively absent from class or fails to complete the requested participatory assignments:

1. the instructor will notify the student of this determination;
2. the student will have one week to meet with the instructor to address the situation;
3. if the student fails to do so, the instructor will notify Records and Registration to recommend withdrawal of the student from the course; and
4. notify the Office of Student Services for consideration of academic sanctions

## Advanced Standing

A student may earn advanced standing at the University in a variety of ways: transfer of credit from another institution, the awarding of credit for armed services training, successful prior learning assessment, or by examination.

A student without a degree who has earned advanced standing is classified on the basis of total semester hours accepted by the University.

A student who has earned a baccalaureate degree and is working toward a second degree is classified as a fourth-year student.

## Articulation Agreements or Transfer Credit

The maximum number of semester hours that may be transferred to the student's record is 87; no more than 70 may have been earned at a two-year institution. A student must take 33 semester hours (of which a minimum of 15 hours are within the major) at Harrisburg University to meet residency and earn a degree from Harrisburg University. Unofficial or student copies of transcripts may be used to initiate the transfer credit evaluation process. However, official final transcripts from the institution of origin are required before the transfer evaluation process can be finalized by Records and Registration and academic credit is posted to the student's permanent record.

Certain 2-year associate degree programs covered under an existing articulation agreement are accepted into the University's baccalaureate degree programs that satisfy the coursework requirements of the first and second year of study. An unofficial transcript may be used to initiate this transfer credit process. The official final transcript from the institution of origin reflecting the degree name and the date the degree was conferred is required to finalize the awarding of coursework credit or exemption.

**Domestic** - In lieu of articulation agreements, academic credit earned at another accredited U.S. higher educational institution for college-level work is awarded when:

- a final grade of "C" (not "C-") or higher is earned;
- a course is a reasonable substitute for a University course;
- the course is a reasonable substitute for competencies associated with one of the general education requirements; and,
- the course is considered college-level work, worthy of elective credit in the student's intended program of study and the student has sufficient unsatisfied elective credit requirements to which this course may be applied.

**International** - a World Education Services (WES) transcript evaluation or Educational Credential Evaluation (ECE) transcript evaluation is required. If the original evaluation received by Records and Registration from one of these evaluators deems the student's prior work to be at the college level and the quality of the completed work is assessed to be at the "C" or higher level, credit is awarded for the courses that apply to the student's intended program of study at Harrisburg University, as indicated above for domestic transfer credit. If the prior work was earned under an educational system that did not assign credit values, the Harrisburg University semester hour value is assigned for each course being accepted. If the student completed courses that are evaluated to be at the college level, but Harrisburg University has no comparable course(s), the student is granted elective credit unless all required elective credit hours have been satisfied.

**Massive Open Online Courses (MOOC)** - a massive open online course is an online course targeting large-scale interactive participation and is delivered via open access on the web. A MOOC that is successfully completed will be reviewed and considered for transfer credit.

**Coursework at Other Institutions** - A student may study at other institutions and transfer the credit to the student's record at Harrisburg University.

Process for Approval - The student must complete a Course Approval form at the Office of Records and Registration notifying the University of the student's intention to enroll on a visiting basis at another higher educational institution. The request will be reviewed by Records and Registration, which may consult with an appropriate member of the University's faculty. Prior to enrollment, a written response will be sent to the student stating whether or not the proposed course is acceptable.

Process for Awarding of Credit - The student must arrange for an official transcript from the other college or university to be sent to Records and Registration. If the approved course was completed with a final grade of "C" or higher, the semester hours earned from the course will be posted to the student's record as transfer credits and not calculated in the student's GPA.

## American Council on Education (ACE)

HU works with ACE recommendations to provide services for adult learners. Within the ACE Center, the College Credits Recommendation Service (CREDIT), connects workplace learning with colleges and universities. CREDIT does this by helping students get academic credit, whenever possible, for courses and examinations taken outside traditional channels.

## Armed Services Training Programs

Under the following conditions, a student may receive academic credit for training programs completed while serving in the U. S. Armed Services: 1) the student must present a copy of the discharge notice (completed DD-214 form); 2) the veteran's military occupational specialty (MOS) designation must appear on the discharge; and, 3) the student's MOS is described in the American Council on Education's Educational Experiences in The Armed Services volumes 1-3. Credit is awarded based upon the ACE recommendation and the closeness of the match between the training program and a University course.

## Prior Learning Assessment

The University may award undergraduate academic credit for prior knowledge, skills, and abilities acquired through non-accredited and work-related learning experience equivalent to:

- the outcomes of a specific course; or,
- the outcomes of college-level work not currently offered at the University.

The experience and evidence provided should have a direct relation to the material taught in a course in the University's curriculum and should extend over a sufficient period to provide substantive knowledge in the relevant area. A baccalaureate degree-seeking student who is in good academic standing, has completed a minimum of 6 semester hours in a program of study at Harrisburg University and demonstrates the qualities to receive such credit may petition the Provost through the academic advisor for consideration of prior learning assessment.

The petition must include the following:

- a detailed description of the relevant experience;
- appropriate supporting evidence directly linked to course objectives;
- the equivalent University program, course number, and title; and,
- the number of semester hours sought.

A student may receive a maximum of 18 semester hours of credit for prior learning. However, not more than 6 semester hours of that credit may be substituted for core courses in the program of study.

The prior learning assessment process is a way to demonstrate to a mentor, who is an expert in the field, college-level knowledge in a particular course area. These college-level skills and knowledge may be from applicable work experience, volunteer activities, training programs, hobbies, religious activities, homemaking skills, prior independent reading, or special accomplishments. This process is not an independent study.

Working with a mentor, the student is guided to develop an online, electronic portfolio to demonstrate prior college-level learning. The student can choose between standard prior learning assessment and individualized prior learning assessment. Standard prior learning assessment is an option when existing course descriptions and learning objectives match the college-level learning that the student wants to demonstrate. Individualized prior learning assessment occurs when the student proposes a course description and learning objectives that do not currently exist in the course catalog for Harrisburg University.

Prior learning assessment cannot be awarded for physical education courses, field experiences, student teaching, cooperative education, practicum courses, internships, projects, seminars, independent study, or laboratories. It is important for the student to understand that life and learning experiences alone are an inadequate basis for the award of prior learning credit. To be eligible for prior learning assessment, the outcomes of the non-collegiate learning experience must be documented, be applicable to the student's program of study, be directly related to a course's learning objectives, and be assessed as being similar to or meeting the requirements of learning gained through college-level learning experiences.

Approval of prior learning credit must be made in writing from the academic advisor, the appropriate faculty member, and the Provost. A per semester hour charge of \$225.00 is incurred by the student for the number of semester hours sought under prior learning assessment.

For more information about prior learning assessment, contact Records and Registration.

## Credit by Examination

A student is limited to earning no more than 18 semester hours of credit via standardized tests: 1) successful performance on an Advanced Placement (AP) examination; 2) successful performance on a College Level Examination Program (CLEP) examination; or 3) successful performance on a challenge examination created by the Harrisburg University faculty.

**Advanced Placement (AP)** - a student who participates in the College Entrance Examination Board's program in association with secondary schools may earn college credit for this work by 1) completing the course offered in the secondary school, 2) sitting for the Advanced Placement examination offered in May of each year, and 3) arranging for an official AP score report from College Entrance Examination Board (CEEB) to be forwarded to Records and Registration at the University. See the AP chart indicating the required minimum score for each discipline and the University's course equivalencies for which credit may be awarded.

| <u>AP<br/>Subject Examinations</u> | <u>Minimum<br/>Score</u> | <u>Harrisburg University Course Granted<br/>2020-21 Curriculum</u>  | <u>Semester<br/>Hours</u> |
|------------------------------------|--------------------------|---|---------------------------|
| Art History                        | 3                        | Art history portion of GEND 300 - The Cultured Mind   | 6                         |
| Art/Studio                         | 3                        | elective  | 3                         |
| Biology                            | 3                        | BIOL 102 - General Biology and BIOL 103 - General Biology Laboratory  | 4                         |
| Biology                            | 5                        | BIOL 102 - General Biology and BIOL 103 - General Biology Laboratory & biology elective   | 8                         |
| Calculus AB                        | 3                        | MATH 220 - Calculus I   | 3                         |
| Calculus BC                        | 3                        | MATH 260 - Calculus II  | 3                         |
| Chemistry                          | 3                        | CHEM 151 - General Chemistry I Lecture & CHEM 152 - General Chemistry I Laboratory  | 4                         |
| Chemistry                          | 5                        | CHEM 151 - General Chemistry I Lecture & CHEM 152 - General Chemistry I Laboratory and CHEM 161 - General Chemistry II Lecture & CHEM 162 - General Chemistry II Laboratory | 8                         |
| Chinese Language and Culture       | 4                        | elective  | 9                         |
| Computer Science A                 | 3                        | CISC 120 - Programming I  | 4                         |
| Computer Science Principles        | 3                        | Computer Science Elective   | 4                         |
| Economics - Macro                  | 3                        | Macroeconomics portion of GEND 201 - The Civic Mind   | 3                         |
| Economics - Micro                  | 3                        | Microeconomics portion of GEND 351 - Organizational Mind  | 3                         |
| English Language                   | 3                        | ENGL 105 - College Composition  | 3                         |
| English Literature                 | 3                        | GEND 103 - The Creative Mind II or elective   | 3                         |
| Environmental Science              | 3                        | ENVS 101 - Introduction to Environmental Science  | 4                         |
| French Language and Culture        | 3                        | elective  | 6                         |
| French Language and Culture        | 5                        | elective  | 9                         |
| Geography - Human                  | 3                        | elective  | 12                        |
| German Language and Culture        | 3                        | elective  | 3                         |

|                                     |   |   |    |
|-------------------------------------|---|---|----|
| German Language and Culture         | 4 | elective  | 6  |
| German Language and Culture         | 5 | elective  | 9  |
| Government & Politics-Comparative   | 3 | Political Science/Policy portion of GEND 201 - The Civic Mind or elective | 12 |
| Government Politics - US            | 3 | Political Science/Policy portion of GEND 201 - The Civic Mind or elective | 3  |
| History - European                  | 3 | History portion of GEND 201 - The Civic Mind or elective                  | 3  |
| History - US                        | 3 | History portion of GEND 201 - The Civic Mind or elective                  | 6  |
| History - World                     | 3 | History portion of GEND 201 - The Civic Mind or elective                  | 6  |
| Italian Language and Culture        | 3 | elective  | 6  |
| Italian Language and Culture        | 4 | elective  | 9  |
| Italian Language and Culture        | 5 | elective  | 12 |
| Japanese Language and Culture       | 4 | elective  | 9  |
| Latin                               | 3 | elective  | 3  |
| Music Theory                        | 3 | elective  | 3  |
| Physics B                           | 3 | GEND 112 - The Scientific Mind: Physical Sciences                         | 3  |
| Physics C-Electricity and Magnetism | 3 | elective  | 4  |
| Physics C-Mechanics                 | 3 | elective  | 4  |
| Physics 1                           | 3 | PHYS 210 - General Physics I  | 4  |
| Physics 2                           | 3 | PHYS 260 - General Physics II   | 4  |
| Psychology                          | 3 | GEND 130 - General Psychology   | 3  |
| Spanish Language and Culture        | 3 | elective  | 6  |
| Spanish Language and Culture        | 4 | elective  | 9  |
| Spanish Language and Culture        | 5 | elective  | 12 |
| Spanish Language and Culture        | 4 | elective  | 3  |

|            |   |                                    |   |
|------------|---|------------------------------------|---|
| Statistics | 3 | MATH 280 - Introductory Statistics | 3 |
|------------|---|------------------------------------|---|

**College Level Examination Program (CLEP)** - The University awards academic credit to a student who has performed satisfactorily on a College Entrance Examination Board CLEP general or subject examination when the test is a reasonable substitute for a requirement of the student's program of study under the following conditions:

- The optional essay portion of a subject examination has been completed successfully:
- For all subjects (with the exception of Level 2 French, German, and Spanish) representing the performance of the student who has earned a grade of "C" in the corresponding course, a minimum score of 50 per the American Council on Education's (ACE) credit-granting recommendations:
- For Level 2 (four-semester) foreign language examinations representing the performance of the student who has earned a grade of "C" in the corresponding course: 60 for German Language; 59 for French Language; and 63 for Spanish Language per the American Council on Education's (ACE) credit-granting recommendations.

Official score reports must be sent to Records and Registration before credit can be awarded.

| CLEP exam  | Equivalent HU Course(s)   | Credits |
|--|---|---------|
| <b>Business</b>                                    |   |         |
| Financial Accounting                               | MEBA 225 - Accounting   | 3       |
| Information Systems                                | Elective  | 3       |
| Introductory Business Law                          | MEBA 335 - Business Law and Ethics                                | 3       |
| Principles of Management                           | MEBA 220 - Principles of Business Management                      | 3       |
| Principles of Marketing                            | MEBA 230 - Marketing  | 3       |
| <b>Composition and Literature</b>                  |   |         |
| American Literature                                | GEND 103 - The Creative Mind II; or ½ GEND 150 - The Learned Mind | 3       |
| Analyzing and Interpreting Literature              | GEND 103 - The Creative Mind II; or ½ GEND 150 - The Learned Mind | 3       |
| College Composition or College Composition Modular | ENGL 105 - College Composition                                    | 3       |
| English Literature                                 | GEND 103 - The Creative Mind II; or ½ GEND 150 - The Learned Mind | 3       |
| Humanities   | ½ GEND 300 - The Cultured Mind                                    | 3       |
| <b>World Languages</b>                             |   |         |
| World Languages (French, German, Spanish)          | Level 1- GEND 300 - The Cultured Mind                             | 6       |
|  | Level 2- GEND 300 - The Cultured Mind                             | 6       |
| <b>History and Social Sciences</b>                 |   |         |
| American Government                                | ½ GEND 201 - The Civic Mind                                       | 3       |



|  |  |   |
|--|--|---|
| History of the United States I: Early Colonization to 1877 | ½ GEND 201 - The Civic Mind  | 3 |
| History of the United States II: 1865 to Present           | ½ GEND 201 - The Civic Mind  | 3 |
| Human Growth and Development                               | Elective   | 3 |
| Introduction to Educational Psychology                     | Elective   | 3 |
| Introductory Psychology                                    | GEND 102 - The Creative Mind I; or GEND 130 - General Psychology                         | 3 |
| Introductory Sociology                                     | GEND 103 - The Creative Mind II; or GEND 120 - Self & Society: Introduction to Sociology | 3 |
| Principles of Macroeconomics                               | ½ GEND 201 - The Civic Mind  | 3 |
| Principles of Microeconomics                               | ½ GEND 351 - Organizational Mind   | 3 |
| Social Sciences and History                                | ½ GEND 201 - The Civic Mind  | 3 |
| Western Civilization I: Ancient Near East to 1648          | ½ GEND 201 - The Civic Mind  | 3 |
| Western Civilization II: 1648 to Present                   | ½ GEND 201 - The Civic Mind  | 3 |
| <b>Science and Mathematics</b>                             |  |   |
| Biology  | GEND 113 - The Scientific Mind: Life Sciences  | 6 |
| Calculus   | MATH 220 - Calculus I  | 4 |
| Chemistry  | GEND 112 - The Scientific Mind: Physical Sciences  | 6 |
| College Algebra  | MATH 120 - College Algebra   | 3 |
| College Mathematics  | Elective   | 6 |
| Natural Sciences   | GEND 113 - The Scientific Mind: Life Sciences  | 6 |
| PreCalculus  | MATH 140 - Precalculus   | 3 |

\*\* To receive full credit for GEND 201 - The Civic Mind (6 credits), students must have courses from two different subject areas (history, macroeconomics or government/politics).

**Challenge Examination** - The University awards academic credit to a student who has performed satisfactorily on a challenge examination created by a member of Harrisburg University's faculty. A student may do so by obtaining a Challenge Examination Form from Records and Registration, obtain the signature of the sponsoring instructor from the appropriate discipline, pay a fee equal to one-third the normal tuition charge for the course, and return the form to Records and Registration which will schedule a time and location for the examination. If successfully completed, the student will receive a "P" on the transcript.

## Off-Campus Study Program

**Pennsylvania Nanofabrication Manufacturing Technology Partnership Capstone Semester** - This program is comprised of a 6 course, 18 semester hour, one-semester experience at The Pennsylvania State University's Center for Nanotechnology Education and Utilization on the University Park Campus focusing on nanofabrication manufacturing technology.

Policy - Any biotechnology student who is a Pennsylvania resident may choose to participate if the following criteria are met: (1) has earned a minimum of 60 semester hours; (2) has achieved a minimum 2.50 cumulative grade point average; and (3) be in satisfactory financial standing. The student is enrolled at The Pennsylvania State University during the Capstone Semester, so all registration, financial aid awards, and tuition payments must be coordinated with The Pennsylvania State University. If final grades of "C" or higher are earned at Penn State, the academic credit will be posted to the student's academic record at Harrisburg University.

Procedure - The student should express an interest to participate in this program at least one semester in advance of the desired semester of attendance. The application form is available on MyHU>Academics>Forms. The student registers for these courses in Harrisburg University's Office of Records and Registration after a letter of acceptance from The Pennsylvania State University has been received.

Additional information is available in Records and Registration.

## Dual Programs

A student may elect to complete a second program while earning a Bachelor of Science degree. The student must satisfy all of the requirements of both programs. Courses may simultaneously satisfy the requirements of both programs, but at least 36 semester hours must be completed unique to the core and concentration of the second program. Biotechnology with a General Biology concentration and Integrative Sciences with a Biology concentration may not be dual programs. The student must complete one additional experiential course, either an Internship or a Project II, in the second program of study. The student is required to have a minimum GPA of 3.2 and notify Records and Registration in writing of the intention to complete two programs. Dual programs cannot be completed within the minimum 120 semester hours required for a Bachelor of Science degree.

## Dual Concentrations

A student may elect to complete a second concentration within the program of study. The student must complete both the primary and secondary concentration requirements. The student may simultaneously use one or more courses to satisfy requirements of both concentrations, but at least four unique courses (a minimum of 3 semester hours each) must be completed toward the second concentration. The Chemistry concentration and the Biochemistry concentration in the Integrative Sciences program may not be dual concentrations. The student is required to have a minimum GPA of 3.2 and notify Records and Registration in writing of the intention to complete two concentrations.

## Graduation Requirements

A student must satisfy all of the following requirements to receive a Bachelor of Science degree:

1. At least 120 semester hours must be successfully completed.
2. A student must successfully complete all of the requirements of the declared program of study for which the degree is to be awarded.
3. A cumulative grade point average of at least 2.00 in all course work completed at the University is required for graduation from a baccalaureate degree program.
4. The program required courses must be completed with a minimum GPA of 2.00.
5. A student must earn a minimum of 33 semester hours in residence toward a baccalaureate degree from Harrisburg University of Science and Technology: 9 semester hours must be completed in experiential courses, 18 semester hours must be completed in required program courses, and 6 other semester hours. The maximum number of semester hours that may be transferred to Harrisburg University is 87; no more than 70 may have been earned at a two-year institution.

Verification that the student has met these requirements is made by Records and Registration. A candidate for graduation must complete all requirements for the degree to be eligible to participate in Commencement.

A candidate must apply for graduation after registering for the last semester of the anticipated completion date by submitting an Application for Graduation via MyHU.

## Requirements for Earning a Second HU Bachelor's Degree

A person who has earned a bachelor's degree from HU or another accredited college or university may earn a second bachelor's degree by meeting the following requirements:

1. A student may not pursue a second degree under the same program of study (e.g., if a student already has earned a B.S. in Computer and Information Systems, he or she cannot pursue a second B.S. in Computer and Information Systems). If a student intends to pursue a different concentration under the same degree, please refer to the "Dual Concentrations" section of the catalog.
2. The student must satisfactorily meet all graduation requirements for the second-degree program unless there is an exception listed below.
3. Graduates from HU shall not be required to repeat any general education, foundation, or seminar course requirements of HU. Graduates who earned their first degree from another accredited college or university must submit transcripts for audit to determine if prior coursework meets the General Education and Foundation requirements.
4. A minimum of 30 additional undergraduate course semester hours and an additional 6 experiential learning semester hours (i.e., Project II and Internship) must be successfully completed at HU.
5. Coursework completed successfully as part of the first degree program may be used to satisfy the graduation requirements of the second major but will not count toward the 36 required semester hours minimum.
6. A student may not repeat a course he or she already completed for credit during his or her first degree program.

NOTE: A student currently pursuing a second program at HU does not receive a second degree (please refer to the "Dual Programs" section of the catalog). A student who intends to earn a second bachelor's degree must meet all the requirements listed above for the second bachelor's degree and must submit a request for a second bachelor's degree to Records and Registration before beginning the second degree.

## Grades and Grading

Grades are awarded to each student for academic credit completed. A grade is assigned by the instructor responsible for the course in which the student is enrolled, using the following grading scale to indicate the quality of the student's academic work.

| Grade | Description               | Numerical Value |
|-------|---------------------------|-----------------|
| A     | Superior achievement      | 4.00            |
| A-    |                           | 3.67            |
| B+    |                           | 3.33            |
| B     | Above-average achievement | 3.00            |
| B-    |                           | 2.67            |
| C+    |                           | 2.33            |
| C     | Average achievement       | 2.00            |

|     |  |                |
|-----|--|----------------|
| C-  |  | 1.67           |
| D+  |  | 1.33           |
| D   | Minimum achievement                                      | 1.00           |
| F   | Fail   | 0.00           |
| AU  | Audit  | Not applicable |
| CR  | Credit   | Not applicable |
| FD  | Failure - Disciplinary                                   | 0.00           |
| I   | Incomplete   | Not applicable |
| IP  | In progress  | Not applicable |
| LB  | Laboratory   | Not applicable |
| NP  | No Pass  | Not applicable |
| NR  | Not reported   | Not applicable |
| P   | Pass   | Not applicable |
| PLA | Prior Learning Assessment                                | Not applicable |
| TR  | Transfer credit  | Not applicable |
| TA  | Transferred credit earned with superior achievement      | Not applicable |
| TA- |  | Not applicable |
| TB+ | Transferred credit earned with above-average achievement | Not applicable |
| TB  |  | Not applicable |
| TB- |  | Not applicable |
| TC+ |  | Not applicable |
| TC  | Transferred credit earned with average achievement       | Not applicable |
| W   | Withdrawal   | Not applicable |
| WA  | Administrative withdrawal                                | Not applicable |
| WF  | Withdrawal after the period to withdraw with a "W" grade | 0.00           |

Grades of "AU", "CR", "I", "IP", "NP", "NR", "P", "PLA", "TR", "TA", "TA-", "TB+", "TB", "TB-", "TC+", "TC", "W", or "WA" are not included in the calculation of a student's grade point average (GPA). They are used by the University in circumstances when grades of "A" through "F" are not appropriate. A WF and FD grades are calculated into a student's GPA.

**Audit (AU)** - The audit grade is assigned by the instructor when the student has properly registered to audit the course and has met all requirements of the University's course audit policy.

**Credit (CR)** - A grade of "CR" is used to indicate on the student's permanent record that credit has been awarded by the University for military training or successful completion of an examination. While courses with a "CR" grade are counted toward the student's degree requirements, there are no quality points associated with this grade so there is no impact upon the calculation of the student's grade point average.

**Fail - Disciplinary (FD)** - The "FD" grade can be assigned only by the Provost or other designated official. It is used for academic dishonesty violations. A request for this grade requires supporting documentation. The "FD" grade can be submitted at any time during the semester.

**Incomplete (I)** - Inability to complete coursework due to documented circumstances beyond the student's control (such as severe illness) may, at the discretion of the instructor, result in a grade of incomplete (I). However, all work must be completed by the end of the Add/Drop Period of the subsequent semester. If all work is not completed by that time, the "I" grade will convert automatically to a grade of "F." It is the responsibility of the student to contact the instructor to make the necessary arrangements for makeup work.

**In Progress (IP)** - This is a deferred grade assigned by the instructor to be used for research projects, internships, independent study, directed study, etc., when it is understood that the course will extend over more than one semester. An "IP" grade should be accompanied by a written plan and a schedule for completing the course within a specified time period to be no longer than 12 months. If all work is not completed by that time, the "IP" grade will convert automatically to a grade of "F."

**Laboratory (LB)** - This grade is assigned by Records and Registration at the conclusion of a semester to a student who is enrolled in a non-credit developmental recitation section of a course. This grade and such a course do not appear on the student's transcript.

**Withdrawal (W)** - This grade is recorded by Records and Registration when the student has withdrawn from the course according to the policy set forth by the University for withdrawing from a course.

**Administrative Withdrawal (WA)** - The "WA" grade can be assigned only by the Provost or other designated official. It is used under extenuating circumstances and when the normal withdrawal process is not available to the student. A request for administrative withdrawal with accompanying documentation will be submitted to Records and Registration. The "WA" grade can be submitted at any time during the semester.

**Withdrawal Fail (WF)** - This grade is recorded by Records and Registration when the student has withdrawn from the course after the period a student can withdraw with a "W" grade.

**Transfer (TR)** - A grade of "TR" is used to indicate on the student's transcript a block of credit that has been earned at another institution and that will count toward the degree at Harrisburg University.

**Transfer with Grade Notation (Txx)** - A grade of "Txx" is used to indicate on the student's transcript each course that has been successfully completed at another institution and that has been accepted toward the degree at Harrisburg University.

**Not Reported (NR)** - The temporary grade of "NR" is recorded by Records and Registration when the instructor does not report a grade for the student for the course. Records and Registration will advise the Provost when an "NR" grade has been recorded for the student, and will work with the student and the instructor to determine why a grade was not reported.

**Pass (P)** - The "P" grade is assigned by instructors for a student who successfully completes a course that is designated as a course that will be graded on a Pass/No Pass basis. A "P" grade indicates a grade of C or higher.

**No Pass (NP)** - The "NP" grade is assigned by the instructors for a student who does not successfully complete a course that is designated as a course that will be graded on a Pass/No Pass basis.

**Prior Learning Assessment (PLA)** - The "PLA" grade is used to indicate credit that has been awarded by the University for prior learning. Although a course completed with a "PLA" grade is applied toward the student's degree requirements, no quality points are associated with this grade so there is no impact upon the calculation of the student's grade point average.

## Grade Point Averages

A grade point average (GPA) is a statistical calculation of a student's performance in a semester. The semester grade point average summarizes the student's performance during that academic term and the cumulative grade point average (CGPA) summarizes the student's performance during all semesters completed at the University.

### Calculation of the Semester Grade Point Average

| Course   | Sem. Hrs. Attempted | Grade | Numerical Value | Quality Points |
|----------|---------------------|-------|-----------------|----------------|
| Course A | 6                   | C     | 2.00            | 12.00          |
| Course B | 4                   | B     | 3.00            | 12.00          |
| Course C | 3                   | B +   | 3.33            | 9.99           |
| Course D | <u>1</u>            | A -   | 3.67            | <u>3.67</u>    |
| Total    | <b>14</b>           |       |                 | <b>37.66</b>   |

$$\text{Total Quality Points} = 37.66/14 = \mathbf{2.69}$$

1. Compute the quality points earned for each course by multiplying the semester hours attempted for the course by the numerical value of the grade earned in the course. *Example: A student registered for a course worth 6 semester hours who earns a final grade of "C" in that course will earn 12 quality points for that course (6 semester hours x 2.00).*
2. Add quality points earned for each course in which the student is registered in the semester.
3. Add the number of semester hours attempted for all courses in which a grade of "A" through "F" and "WF" was earned.
4. Divide the total number of quality points earned by the total number of semester hours attempted. The result is the grade point average for the semester.

The cumulative grade point average (CGPA) is determined in a similar way using the cumulative attempted semester hours and cumulative quality points earned. GPA and CGPA are truncated to the hundredths.

## Early Warning

Each instructor notifies Records and Registration of a student's poor academic performance in a course by submitting early warning deficiencies of "C-", "D+", "D", "F" or "I" at the end of the fifth week of classes, as indicated on the Academic Calendar. The student is notified of the deficiency in writing. A student who receives a five-week early warning is encouraged to consult with the instructor and academic advisor and seek assistance offered from the Office of Student Services.

## Deferred Examination Policy

This section applies to all examinations, including mid-term and take-home examinations, whether or not administered during the final examination period.

## **No Right to Defer**

No student has a right to defer an examination. A student who fails to take an examination when scheduled will receive a failing grade of "F" on the examination unless the examination has been deferred according to the procedure outlined in this policy.

## **Policy on Deferral of Examinations**

Examinations will be deferred only for "good cause." "Good cause" will be determined by the instructor of the course. Examples of "good cause" include:

- serious personal injury or illness with appropriate documentation;
- serious injury, illness or death in the immediate family that can be documented; or,
- other extenuating mitigating circumstances beyond the student's control.

## **Procedure for Requesting Deferred Examination**

If a student desires to request a deferral of an examination, the student shall file a timely request with the instructor. Each student requesting deferral of an examination must provide evidence of the event or situation which the student believes is justification for the deferral request.

## **Emergency Deferral of Examination**

If a student is unable to take an examination for good cause (as defined previously) that arises within 24 hours immediately prior to the examination time, the student may appear in person, communicate by electronic mail, or telephone the instructor and the Office of Student Services to obtain permission to defer an examination.

If a student cannot appear in person, communicate by electronic mail, or by telephone, the student may miss the examination and apply for deferral after the examination date. Such an application for deferral must be made to the instructor within 24 hours of the administration of the examination for which the student seeks the deferral.

## **Timing of Make-up Examination**

The deferred examination will be taken at a time determined by the instructor, in conjunction with the student. The make-up examination must be completed in no more than five (5) business days after the original test date. Make-up examinations for documented emergencies can be arranged to be proctored through the Office of Student Services by emailing [exams@harrisburgu.edu](mailto:exams@harrisburgu.edu) or through the faculty member directly.

## **Illness During an Examination**

If a student becomes ill during an examination and is unable to continue, the student shall notify the proctor and leave all examination materials with the proctor. The student shall seek medical attention immediately and obtain medical documentation describing the illness that prevented the student from completing the examination. The student will be permitted to complete the exam at a time determined by the instructor, no more than five (5) business days after the original test date.

## **Final Examination Policy**

Final exams are administered over a two to three day period following the last day of the semester. A final exam schedule is distributed during week 8 of the semester, reflecting those courses for which a two hour final exam period was requested. Courses not listed on the final exam schedule typically have a project, oral presentation, or term paper as the final grade assessment.

## Final Grading Process

After the conclusion of a semester, each instructor notifies Records and Registration of a student's academic performance in a course by entering grades via MyHU. Records and Registration makes these grades available on MyHU according to the dates noted on the Academic Calendar posted on MyHU.

## Final Grade Appeal

A final grade is assigned by the instructor upon completion of coursework to earn credit during a semester or other term. A student who disagrees with the final grade assigned by the instructor should first contact the faculty member directly to resolve the grade dispute informally. The student that cannot approach the faculty member because of perceived discrimination, cannot reach the faculty member, or have received a response with which the student still disagrees, may seek remedy using an evidence-based argument, with any supplemental documentation, within five (5) days after grades are posted on one of the following grounds:

1. Discrimination: defined as unfair treatment or assignment of grade on the basis of race, religion, national origin, sex, age, ancestry, handicapped status, gender identity, sexual orientation, or political affiliation.
2. Capricious evaluation: defined as a significant or unjustified departure from grading procedures outlined in the course syllabus or by the University or arbitrary assignment of grades. Capricious evaluation cannot be claimed if a student merely disagrees with the subjective evaluation of the instructor.
3. Errors: including clerical errors or errors in grade calculations that can be demonstrated in an objective manner.

A student who chooses to appeal a grade must obtain a Final Grade Appeal Form from the Office of Student Success. The form must be completed with an explanation forming the basis of the appeal and returned to Records and Registration via the support portal. The student's academic record will be placed in a "hold" status during the grade appeal process. A final grade appeal must be initiated on or before the fifth (5th) business day after grades are posted or another term as specified in the Academic Calendar posted on MyHU.

The instructor must indicate and sign the form within five (5) days to either change the final grade, reaffirm the original grade assigned, or continue with the appeal process.

- If the original final grade is improved and satisfies the student's appeal, the instructor shall submit a Grade Change Form to Records and Registration, the grade will be posted, and the academic record hold status will be released.
- If the original final grade is reaffirmed and both the instructor and student agree with the grade determination, the instructor shall submit a Grade Affirmation Form signed by the student and instructor confirming the original grade to Records and Registration, the grade will be posted, and the academic record hold status will be released.
- When a student is unable to meet with the instructor because of personal differences or if the instructor denies the initial appeal (above), the student may choose to pursue a final grade appeal by submitting the completed and endorsed form, with any and all tests, grades, essays or project summaries, and a complete explanation as evidence in support of the student's position, to the Office of Student Services requesting a review and determination, with a copy to the Office of the Provost. The student may seek the assistance of the Office of Student Services to review a possible appeal and to prepare the appeal. Additional information may be requested from the student and/or the instructor during this time.
- A committee consisting of a representative of the Office of Student Services, Office of Compliance, one faculty member, and a student representative will review the appeal. The student and instructor will be offered the opportunity to participate in the appeal hearing. The committee will send a final determination to Records and Registration within five (5) days of receipt. The committee's decision is final and is not subject to further appeal. Records and Registration will then post the grade and release the academic record hold status.



- If a student would like to appeal a grade during the semester, students should approach the faculty member to resolve informally. All documentation should be saved. If at the time the final grades are insufficient, the student can file a formal appeal at that time.

## Release of Grades

In accordance with the requirements of the Family Educational Rights and Privacy Act (FERPA), reports of the student's grades are not routinely sent to the student's parents or guardians. The parent or guardian of a student in our high school programs may obtain grades by writing to Records and Registration. The grades of a student over 18 years of age will be sent to the parents only with the written consent of the student.

## Repeated Courses

A student may repeat a course in which a final grade of C- or below was received. The original grade remains on the student's academic record. After a course has been repeated, the most recent grade is used in the calculation of the student's cumulative grade point average. A student cannot repeat a course for the sole purpose of improving the overall GPA if the degree requirement has already been met.

## Academic Honors

**Honors List** A student is eligible for the Honors List at the conclusion of a semester when:

1. the semester grade point average is 3.50 or higher; and,
2. a minimum of 9 semester hours of course work was completed, excluding those courses in which final grades were earned that are not included in the calculation of the grade point average.

**Graduation Honors** A student who has earned consistently superior grades will be recognized for this achievement at graduation with the designation listed below representing the student's level of achievement. Both the student's diploma and university record will carry the appropriate honors designation as follows:

*Summa Cum Laude* for a cumulative grade point average between 3.95 and 4.00

*Magna Cum Laude* for a cumulative grade point average between 3.75 and 3.94

*Cum Laude* for a cumulative grade point average between 3.50 and 3.74

## Academic Standing Policy

A student with a cumulative grade point average (CGPA) of 2.0 or higher at the end of the semester is in satisfactory academic standing. A student with a CGPA below 2.00 at the end of a semester is not in satisfactory academic standing and is subject to warning, probation, or dismissal according to the following policy:

### First Occurrence - Warning

Following the first semester in which the student does not meet the satisfactory academic progress standard, the student will automatically be placed on academic warning for the next semester. A letter will be issued advising the student of their academic warning status. No appeal is needed, but in consultation with the Office of Student Services, an academic plan may be required.

### Second Consecutive Occurrence - Probation

If, by the end of the warning semester, the student is not able to achieve satisfactory academic progress status, a letter will be issued placing the student on academic probation status for the next semester. An academic plan is required during the probation semester. The student should work with the Office of Student Services to create the academic plan.

## **Third Consecutive Occurrence - Dismissal**

If a student after three consecutive semesters has a cumulative grade point average that remains below 2.00 or fails to meet the program pursuit percentage, a letter of dismissal will be issued.

## **Appeals**

A student who is dismissed as a result of failure to meet satisfactory academic progress may file an academic appeal by submitting a letter outlining the nature of the appeal to the Office of Student Services within five (5) days of notification. An appeal will be considered only if the student's failure to meet the standards of academic progress is determined to be due to events beyond the student's control. Examples of circumstances for which an appeal may be considered include military obligation; the death of a relative; injury or illness of the student; unusual personal hardship or other extenuating circumstances. Written documentation of the circumstances of why the student failed to make satisfactory progress and what has changed that will allow the student to make satisfactory progress by the next evaluation must be submitted with the appeal and should reference the student's name and student ID number. In addition, the evidence must be received documenting that the required academic plan was completed, the cumulative grade point average has improved, and the required satisfactory progress grade point average can potentially be achieved to complete a program of study within the maximum timeframe limitation. Appeals submitted without documentation will not be considered. A timely determination will then be made and documented in the student's file.

If the academic appeal is denied, a second notice will be sent to the student advising that their appeal was denied. If the academic appeal is approved, a semester of academic probation will be awarded, and the student will be notified in writing that their appeal was approved. The student must achieve satisfactory academic progress by the end of the probation semester.

If after the academic probation semester a student is still not making satisfactory academic progress, but the evidence is provided showing the academic plan was successfully executed, the cumulative grade point average has improved, and the required satisfactory academic progress grade point average can potentially be achieved within the maximum time frame limitation required by federal regulations then a second probation semester may be granted.

## **Withholding of Records**

Student records may be withheld by Records and Registration when directed by the appropriate University officials. The ability to register for courses or the release of academic transcripts or diplomas may be held for a period of time. More specifically, an official academic transcript or diploma will not be released, and a student cannot register for courses if tuition or other charges remain unpaid to the University. Additionally, a student cannot register for courses while the hold is on their record. The Office of Student Services determines when a student's record should be placed on hold for disciplinary reasons and the Business Office determines when a student's record should be placed on hold for financial reasons.

## **Official Withdrawal from the University Procedure**

A student is encouraged to contact the Financial Aid and Business Offices in advance of any decision to withdraw from the University to obtain an explanation of the tuition and financial aid adjustments that will occur, if any, as the result of withdrawal from the program of study.

A student on an F-1 Visa should contact the International Student Office prior to submitting a withdrawal form to understand the impact it may have on their SEVIS status.

A student who intends to officially withdraw is encouraged to contact Records and Registration at RegHelp or in person. A withdrawal form should be completed. The determination date for withdrawal purposes shall either be the actual date of formal notification by the student. The determination date is used to calculate the tuition refund, if any, and the student financial assistance program refund, if applicable. Withdrawn courses cannot be reinstated.

## **Military Personnel Called to Active Duty Policy**

If a student is called to active duty by the National Guard or the reserve forces of the United States during an active semester, they should provide documentation of their call to active duty to the Certifying Official. The below procedure will then apply:

1. Course Registration/Grades: The student will be given an option to have courses dropped or an "I" (Incomplete) grade assigned to each of their courses. The assigning of an "Incomplete" is by mutual consent of the faculty member and the student and an appropriate completion date is to be assigned. If the active duty call occurs late in the term, the faculty member also has the option of assigning a final grade rather than the "I" grade.
2. Tuition: Tuition charges will be canceled or refunded-in full- for all courses dropped. Courses in which the grade of "I" or a final grade is assigned will have applicable tuition assessed. The student must coordinate with the Certifying Official to address any overpayment or other financial considerations with Veterans Administration funding
3. Housing: If the student resides in campus housing, they should initiate a discussion with Residence Life Staff.
4. Student Record: The Student record will be kept active for one year from the later of the following dates, after which the student would be eligible for re-admission: - Effective date of the dropped course(s) - End of the final completed semester - Latest deadline of assigned "I" grade

## **Medical Withdrawal**

A student requesting to withdraw for medical reasons must complete a medical leave request through the Office of Student Services by contacting [studentservices@harrisburgu.edu](mailto:studentservices@harrisburgu.edu) or 717.901.5102. Student services will obtain official documentation from a doctor supporting the student's request. To return from medical leave, the student must provide student services with documentation from a doctor supporting the student's return. The student will have up to a year to return without having to apply for readmission.

## **Standards of Academic Integrity**

Harrisburg University expects a student to act honorably and in accordance with the standards of academic integrity. Academic integrity is grounded in mutual trust and respect. Therefore, it is expected that a student will respect the rights of others and will only submit work that is their own, refraining from all forms of lying, cheating, and plagiarism.

A violation of the Standards of Academic Integrity could result in academic consequences. Please see the Student Handbook for details about academic conduct and the procedures in cases of a violation of Harrisburg University's Standards of Academic Integrity.

## **Disciplinary/Academic Dismissal**

The University reserves the right to exclude at any time a student who has misrepresented any part of his or her admission materials, whose academic record is unsatisfactory, or whose behavior or conduct is found to be detrimental to the orderly functioning of the University. When misconduct may constitute a threat to person or property within the University community or under other circumstances, it may result in disciplinary action. The University assumes the responsibility to regulate the private conduct of the student when such conduct could constitute a hazard to or an infringement on the rights of others, a violation of the law, of University policy or instructions, or is a disruption of the legitimate academic and administrative

processes of the University. Please see the Student Handbook for details on the policies regarding the Student Code of Conduct, the Academic Code of Conduct, or Sexual Misconduct Policies.

# Curriculum Overview

## Learning at Harrisburg University

The goal of learning at Harrisburg University is to obtain the relevant knowledge, competence, and experiences to best be prepared for an enriching career. Learning is, therefore, a multi-faceted activity that occurs throughout and across the college experience; it integrates both academic learning (acquiring and applying new knowledge) and student development (learning about oneself). Competency-based learning outcomes with programs that are intentionally designed to be engaging, integrative, and experiential are emphasized. There are four inter-dependent program characteristics that help define the Harrisburg University experience:

- **Highly Available:** The University provides learning experiences to meet the student's needs. This is demonstrated through one or more team-taught general education courses, the use of technology inside and outside of the classroom, and the noncurricular or co-curricular learning opportunities available.
- **Highly Collaborative:** The student develops knowledge and skills through shared experience, as opposed to learning in isolation or in competition with each other. The faculty is responsible for creating learning environments based upon the premise that knowledge can be gained from everyone. The student has the advantage of learning from the minds and experiences of classmates, business mentors, or future employers.
- **Highly Experiential:** The University deliberately ensures that learning is highly linked to both practical and professional experience. This represents a shift from one-way (faculty to student), text-heavy content delivery to a more robust learning model that deliberately values experience, both inside and outside the classroom. Experience is emphasized through Projects I and II for undergraduates and industry-related internships and experiences for the student.
- **Highly Applied:** The learning conversation focuses on the practical application of knowledge. The intention is to shift the question from "How do I remember this information?" to "How can I act on this information in order to create knowledge that is both useful and actionable?" In this way, learning becomes an exercise in both preparation for career and readiness for life.

## Learning Assessment at Harrisburg University

Harrisburg University's model for the assessment of student learning is structured to support learning goals. The goals of the programs and courses are clearly defined and are relevant to the mission of the University. Course syllabi establish specific learning objectives, articulate the instructor's expectation of the student, and outline the standards against which the student's learning will be measured. Learning assessment of coursework and experiential learning is creative, in that it goes beyond instructor-driven evaluation through examinations and papers in most cases, and is done both inside and outside the classroom by faculty, business and academic professionals. Further, student learning around each of the University competencies is a focus of assessment activities. Student learning assessment is anchored in the use of ePortfolios throughout the student's program of study. The University is committed to improve its program offerings by comparing student assessment outcomes to the program and course goals.

## Competencies and ePortfolio

**Competency-Driven and Across-the-Curricula:** A hallmark of the Harrisburg University experience is competency-driven education. The student will be expected to demonstrate mastery of eight university-wide competencies:

## Civic Engagement

Definition: Civic engagement is "working to make a difference in the civic life of our communities and developing the combination of knowledge, skills, values and motivation to make that difference. It means promoting the quality of life in a community through both political and non-political processes." (Excerpted from Civic Responsibility and Higher Education, edited by Thomas Ehrlich, published by Oryx Press, 2000, Preface, page vi.). In addition, civic engagement is participation in personal and public activities that are both life-enriching and socially beneficial to the community.

## Written and Oral Communication

Definition: Written communication is the development and expression of ideas in writing. It involves writing in a variety of styles, genres, and technologies and mixing text, data, and images. Written communication abilities develop through repeated writing experiences across the disciplines.

## Critical Thinking

Definition: Critical thinking is the use of deliberative thought, characterized by the comprehensive exploration of topics, ideas, artifacts, or events before accepting or formulating an opinion or conclusion. Using reason and experience to form informed judgments, the critical thinker combines or synthesizes existing ideas, images, or expertise in original ways; and reacts to experience in imaginative ways, characterized by innovation, divergent thinking, and risk-taking. The critical thinker solves problems by designing, evaluating, and implementing a strategy to answer an open-ended question or achieve a desired goal. Quantitative Literacy (QL) - also known as Numeracy or Quantitative Reasoning (QR) - is a "habit of mind," competency, and comfort in working with numerical data. Individuals with strong QL skills possess the ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations. They understand and can create sophisticated arguments supported by quantitative evidence and they can clearly communicate those arguments in a variety of formats (using words, tables, graphs, mathematical equations, etc., as appropriate).

## Entrepreneurship

Definition: Entrepreneurship is the process of organizing tangible and intangible resources in order to pursue opportunities that generate value, meet an identified need, or satisfy an organizational or societal market (such as the creation of a business, organization, or laboratory). At Harrisburg University, entrepreneurship represents a "frame of mind" demonstrated by both thinking and action.

## Ethical Awareness and Reasoning

Definition: Ethical decision making actualizes the realization and inclusion of the moral dimension for personal decision-making. "Reasoning about right and wrong human conduct requires students to be able to 1) assess their own ethical values and the social context of problems, 2) recognize ethical issues in a variety of settings, 3) think about how different ethical perspectives might be applied to ethical dilemmas, and 4) consider the ramifications of alternative actions." Ethical self-identity evolves both on individual and organizational (e.g., corporate) levels.

\* Source: AAC&U / VALUE rubric

## Global Awareness

Definition: Global awareness is knowledge of the world citizenry's common interests in community, social, political, information, and financial systems of different scales; appreciation and respect for diversity, culture, and environment; and the interactions and impacts of individuals, global systems, and cultures.

## Information Literacy

Definition: Information literacy encompasses knowledge and familiarity with different media types, efficient data storage, retrieval methods, and research techniques. For the purposes of this rubric, "information" is not only text-based information, but also includes images, sounds, data sets, databases, artifacts, numerical and statistical data.

## Teamwork and Collaboration

Definition: Teamwork and Collaboration encompass the ability to work effectively with others in a concerted effort toward a common goal. "Behaviors under the control of individual team members" include efforts put into team tasks, manner of interacting with others on the team, and the quantity and quality of contributions to team discussions.

\* Source: AAC&U / VALUE rubric

Regardless of the student's program of study, employers and community leaders desire these competencies; they also serve the broader purpose of preparation for life and citizenship.

**ePortfolio Requirement:** Harrisburg University defines an ePortfolio *as an organized, mediarich collection of documents that allows the student to demonstrate competence to a multitude of audiences.* The ePortfolio will be central in how the student organizes, develops, and reflects upon learning. It will also be a lever for assisting the way in which faculty develop curricula, view teaching, and deliver content. Ultimately, the ePortfolio will be a coalescing force for making tangible and visible the University-wide competency program while serving as a key tool in evaluating student success.

## Structure of the Program

The undergraduate program structure is designed to provide the student with basic foundation knowledge, program specific knowledge, opportunities to apply new knowledge, and the flexibility to explore interesting topics. All undergraduate degree programs have the same five structural elements: 1) Foundation courses, 2) General Education courses, 3) Program Requirement courses, 4) Experiential courses, and 5) Elective courses. The number of semester hours covered by the structural elements adds up to a total of 120 semester hours needed for graduation. Each structural element has specific semester hour and course requirements associated with it. Generally, the breakdown of semester hours by structural element is 18 semester hours in Foundation courses, 30 semester hours in General Education courses, 40 - 50 semester hours in Program Requirement courses, 13 semester hours in Experiential courses, and 9 - 19 semester hours in Electives.

## Foundation

The purpose of the Foundation courses is to provide the student with mathematics and communication knowledge and skills that will be used throughout the selected program of study. More importantly, mastery of foundational knowledge and skill is required for success in science and technology careers.

Every student must complete 9 semester hours of mathematics courses:

MATH 120 - College Algebra, MATH 220-Calculus I, and MATH 280 - Introductory Statistics:

- Biotechnology
- Integrative Sciences
- Management, Entrepreneurship and Business Administration
- Environmental Science and Sustainability

MATH 120-College Algebra, MATH 210 - Discrete Mathematics I, and MATH 280-Introductory Statistics:

- Computer and Information Sciences
- Information Systems and Information Technologies

MATH 120-College Algebra, MATH 150-Applied Mathematical Reasoning, and MATH 280-Introductory Statistics:

- Advanced Manufacturing
- Geospatial Technology
- Interactive Media
- Esports Management, Production, and Performance

MATH 140-Precalculus, MATH 210-Discrete Math I, and MATH 280-Introductory Statistics

- Applied Mathematics

MATH 081 - Prealgebra may not be used to satisfy any portion of this requirement because it is a developmental course. The course is included in the student's semester course load, which determines the student's enrollment status. The final grade earned is calculated in the student's term and cumulative grade point averages. The credit value associated with the course is not applicable toward the minimum 120 semester hours needed for graduation.

Additionally, every student must complete 9 semester hours of English and Communication:

- ENGL 105-English Composition or ENGL 106-Academic Writing and Critical Thinking
- COMM 110-Speech
- ENGL 200-Advanced Composition and Technical Writing

## General Education

The purpose of general education is to offer the undergraduate student a dynamic platform for both foundational and skill-based learning to prepare them for a well-rounded life during which they will make informed decisions, contribute to society, and become lifelong learners. General education is a degree requirement for each undergraduate student.

Given the sheer vastness of knowledge and the rate at which new knowledge is developed, the student typically cannot command mastery or deep expertise in the broad areas known as the sciences, social sciences, humanities, or applied knowledge domains such as entrepreneurship or leadership. The purpose of general education is not to produce experts. Instead, the goal is to integrate contributions from multiple fields to give the student more comprehensive explanations and understandings of the world. In essence, general education - and all academic work at the University, begins within a framework of applied and self-directed learning.

The Mind courses are cross-disciplinary, applied courses. The student is required to successfully complete at least 30 semester hours of general education, 24 of which must be the Mind courses.

Four courses totaling 12 semester hours are part of the first-year program.

- GEND 102 - The Creative Mind I
- GEND 103 - The Creative Mind II
- GEND 112 - The Scientific Mind: Physical Sciences
- GEND 113 - The Scientific Mind: Life Sciences

Two additional Mind courses, 6 semester hours each (totaling 12 semester hours) and usually team-taught.

- GEND 201 - The Civic Mind
- GEND 351 - Organizational Mind

The remaining 6 semester hours can be additional Mind courses or General Education (GEND) electives.

## Experiential Learning



The student will complete 13 semester hours of experiential learning. The University is committed to preparing students for careers in science and technology fields. Part of what makes the degree program unique is an emphasis on experiential learning, which includes an internship, two projects, and seminar courses. By connecting the classroom, workplace, and research experiences within the program, the student can gain a range of marketable skills.

These skills are linked to the eight competencies at the heart of the University's curriculum in addition to the learning goals within the student's program of study. The experiential courses are expected to provide the student with an enhanced resume prior to graduation from the University.

## Guidelines for Experiential Learning - Multiple Components in One Semester

In order for a student to be able to complete two experiential learning components in one semester, the student must comply with the following:

1. Student must have a GPA of 3.0 or above.
2. Student must not have an "I" or incomplete in any previous Experiential Learning component (Project or Internship).
3. Student must not have previously failed any Experiential Learning component (Project or Internship).

**Seminar Courses** - The seminar courses integrate the student's academic, personal, and professional development success. These courses provide the student with the support and skill development needed to complete experiential learning courses and achieve the university core competencies. Additionally, seminars facilitate the completion of a reflective ePortfolio that includes evidence of experiential and competency-based learning.

**Projects** - Each project challenges the student to identify, investigate and analyze a particular topic or problem in the program of study and concentration. A key objective is to apply skills, methods, and knowledge obtained in previously completed courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. Projects are undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analyses or development plans for external organizations, the development of software applications, or market studies and business proposals. The student develops a unique plan and contract and establishes individual learning goals in consultation with a member of the faculty.

**Internships** - An internship allows the student to apply classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. For one semester, the student interacts with professionals in an external organization to explore career options related to the student's program of study. Each student is responsible for finding and completing an internship. The Office of Experiential Learning and the student's Faculty Advisor provides guidance through the process of obtaining and completing the internship. A student is able to enhance post-graduation career prospects by integrating this external experience into the academic program.

## Electives

The elective component of the curriculum provides the student opportunities: 1) to explore disciplines not included in the foundation, general education, and program requirements; 2) for study beyond the minimum requirements in the program discipline; or 3) to independently pursue an area of interest under the supervision of a faculty member. The number of elective semester hours required for graduation is specified by each program.

## Outline of Baccalaureate Degree Program

The curriculum requires a minimum of 120 earned semester hours to fulfill the Bachelor of Science degree requirements. The courses are distributed in the following required areas: foundation, general education, experiential, program, and electives. Each requirement is detailed as follows:

## **Foundation Courses - 18 semester hours**

### **Mathematics (9 semester hours)**

(9 semester hours from the following courses depending on the program of study)

- MATH 120 - College Algebra (3 semester hours)
- MATH 140 - Precalculus (3 semester hours)
- MATH 150 - Applied Mathematical Reasoning (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

### **English and Communication (9 semester hours)**

- ENGL 105 - College Composition (3 semester hours)
- or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- 
- COMM 110 - Speech (3 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)

## **General Education Courses - 30 semester hours**

### **All of the following courses - 24 semester hours:**

- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

### **Six (6) semester hours of General Education Electives**

(6 semester hours of additional Mind courses or General Education (GEND) electives)

## **Experiential Courses - 13 semester hours**

- (according to program of study) 298 Project I (3 semester hours)
- (according to program of study) 365 Internship (3 semester hours)
- (according to program of study) 498 Project II (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)
- SEMR 200 - Steppingstone (1 semester hour)
- SEMR 300 - Keystone (1 semester hour)
- SEMR 400 - Capstone (1 semester hour)

## **Electives - 9 - 19 semester hours**

## **Program Requirements - 40 - 50 semester hours**

## **Bachelor of Science Degree - total of 120 semester hours**

# Academic Programs

## Faculty and Administration

Members of Administration, staff, and full time and part time faculty, their titles, and areas of instruction are available on the University's website at: <https://harrisburgu.edu/faculty-and-staff-listing/>.

## Advanced Manufacturing

Advanced manufacturing is the application of information, computation, automation, devices, software, sensing, and networking to the manufacturing process. Advanced manufacturing can include cutting edge materials and emerging technologies that are enabled by the physical and biological sciences. This involves both traditional and tailored solutions in order to enhance manufacturing for existing products and new products emerging from new advanced manufacturing technologies. Advanced manufacturing is not limited to emerging technologies; it is also comprised of efficient, productive, highly integrated and controlled processes across a spectrum of globally competitive manufacturers and suppliers. Advanced manufacturing results in new markets, new products, new technologies, and new ways to position manufacturing to support societies that are or will be connected globally in the future.

## Program Goals

Graduates of the Bachelor of Science in Advanced Manufacturing program are able to:

- Produce simple and complex solutions to issues in manufacturing;
- Communicate research-based information in oral and written formats to both advanced manufactures and non-manufactures;
- Collect and analyze data gathered from industry and industrial-related issues;
- Evaluate the ability to analyze metallic and nonmetallic materials needed to produce prototypes and advanced manufacturing solutions; and,
- Create solutions that support global awareness and ethical decision making when resolving issues.

As part of the Advanced Manufacturing Program, the student completes a professional portfolio as a means for assessing learning outcomes and enhancing personal and professional development.

## Advanced Manufacturing, B.S.

### Advanced Manufacturing Requirements

This program requires a total of 47 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete all of the following courses - 47 semester hours:

- ADMA 115 - Microcomputer Applications in Technology (3 semester hours)
- ADMA 135 - Manufacturing Technology and Society (2 semester hours)
- ADMA 160 - Metallic Materials and Manufacturing Processes (3 semester hours)
- ADMA 230 - Applied Analog and Digital Electronics (3 semester hours)

- ADMA 240 - Computer Assisted Drawing (3 semester hours)
- ADMA 310 - Basics of Manufacturing Simulation (3 semester hours)
- ADMA 323 - Computer Assisted Product Design and Rapid Prototyping (3 semester hours)
- ADMA 338 - Non-Metallic Materials and Processing (3 semester hours)
- ADMA 345 - Designing and Rapid Prototyping with Solid Modeling (3 semester hours)
- ADMA 370 - CAD/CAM and Industrial Robotics (3 semester hours)
- ADMA 410 - Application of CAD/CAM and Industrial Robotics (3 semester hours)
- ADMA 420 - Advanced Manufacturing (3 semester hours)
- ADMA 430 - Programmable Logic Controllers and Integrations (3 semester hours)
- ADMA 455 - Manufacturing Automation Systems (CIM/FMS) (3 semester hours)
- ADMA 465 - Simulation of Systems and Integrations (3 semester hours)
- ADMA 480 - Application of Advanced Manufacturing (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Advanced Manufacturing Program

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- ADMA 115 - Microcomputer Applications in Technology (3 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 15

#### Summer Semester

*Optional*

## Second Year

### Fall Semester

- ADMA 135 - Manufacturing Technology and Society (2 semester hours)
- ADMA 240 - Computer Assisted Drawing (3 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- Electives (3 semester hours)

Total semester hours: 14

### Spring Semester

- ADMA 230 - Applied Analog and Digital Electronics (3 semester hours)
- ADMA 310 - Basics of Manufacturing Simulation (3 semester hours)
- ADMA 323 - Computer Assisted Product Design and Rapid Prototyping (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- ADMA 345 - Designing and Rapid Prototyping with Solid Modeling (3 semester hours)
- ADMA 370 - CAD/CAM and Industrial Robotics (3 semester hours)
- ADMA 298 - Project I (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- ADMA 160 - Metallic Materials and Manufacturing Processes (3 semester hours)
- ADMA 338 - Non-Metallic Materials and Processing (3 semester hours)
- ADMA 365 - Internship (3 semester hours)
- ADMA 410 - Application of CAD/CAM and Industrial Robotics (3 semester hours)
- Elective (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- ADMA 465 - Simulation of Systems and Integrations (3 semester hours)
- ADMA 420 - Advanced Manufacturing (3 semester hours)
- ADMA 430 - Programmable Logic Controllers and Integrations (3 semester hours)
- ADMA 498 - Project II (3 semester hours)
- GEND Elective (3 semester hours)

Total semester hours: 15

### Spring Semester

- ADMA 455 - Manufacturing Automation Systems (CIM/FMS) (3 semester hours)
- ADMA 480 - Application of Advanced Manufacturing (3 semester hours)
- GEND Elective (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)
- Electives (6 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

# Applied Mathematics

The BS in Applied Mathematics Degree consists of a strong core of courses in applied advanced mathematics, statistics, and computational science. The structure of the program allows the student to choose between two broad areas of study that are, at their root, highly mathematical: (1) data analytics, and (2) natural sciences. The purpose of the program is to provide foundational and hands-on experience in applied problems associated with the two disciplines.

## Program Goals

A graduate of the Bachelor of Science in the Applied Mathematics is prepared to:

- Develop an expertise in problem-formation, problem solving, and modeling techniques and strategies central to a wide variety of applications;

- Establish the ability to communicate analytic arguments clearly and concisely, in oral and written forms;
- Exhibit expertise in numerical problem-solving techniques using high-level programming languages and commercial computational software packages; and,
- Demonstrate foundational knowledge and skills within an interdisciplinary-work environment.

## Applied Mathematics, Data Analytics Concentration, BS

### Applied Mathematics Requirements

This program requires a total of 46-50 semester hours: 1) 34 semester hours from core course listed below and 2) 12 semester hours completed in the Data Analytics Concentration or 16 semester hours in the Natural Sciences Concentration. The semester hour value of each course appears in parentheses().

#### Complete all of the following Core courses - 34 semester hours

- CISC 120 - Programming I (4 semester hours)
- CISC 140 - Programming II (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- MATH 261 - Calculus III (3 semester hours)
- MATH 300 - Experiment Design and Analysis (3 semester hours)
- MATH 320 - Ordinary Differential Equations (3 semester hours)
- MATH 370 - Numerical Methods (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)
- MATH 420 - Methods in Applied Mathematics (3 semester hours)

#### Data Analytics Concentration - 12 semester hours

##### Complete all of the following courses - 12 semester hours:

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- ANLY 405 - Predictive Modeling (3 semester hours)
- ANLY 415 - Advanced Analytics and Reporting (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)

### Recommended Sequence for the Full-time Student Completing the Applied Mathematics with the Data Analytics Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of prerequisites.

#### First Year



## Fall

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
  
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 140 - Precalculus (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

## Spring

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

## Summer

*Optional*

## Second Year

### Fall

- CISC 140 - Programming II (3 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring

- GEND 201 - The Civic Mind (6 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 261 - Calculus III (3 semester hours)
- MATH 320 - Ordinary Differential Equations (3 semester hours)

Total semester hours: 15

## Summer

*Optional*

## Third Year

### Fall

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- GEND Electives (3 semester hours)
- MATH 298 - Project I (3 semester hours)
- MATH 370 - Numerical Methods (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring

- GEND Electives (3 semester hours)
- Electives (6 semester hours)
- MATH 365 - Internship (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)

Total semester hours: 15

## Summer

*Optional*

## Fourth Year

### Fall

- ANLY 405 - Predictive Modeling (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- MATH 420 - Methods in Applied Mathematics (3 semester hours)
- MATH 498 - Project II (3 semester hours)

Total semester hours: 15

### Spring

- ANLY 415 - Advanced Analytics and Reporting (3 semester hours)
- Electives (7 semester hours)
- MATH 300 - Experiment Design and Analysis (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 14

Summer

*Optional*

## **Applied Mathematics, Natural Sciences Concentration, BS**

### **Applied Mathematics Requirements**

This program requires a total of 46-50 semester hours: 1) 34 semester hours from core course listed below and 2) 12 semester hours completed in the Data Analytics Concentration or 16 semester hours in the Natural Sciences Concentration. The semester hour value of each course appears in parentheses().

**Complete all of the following Core courses - 34 semester hours**

- CISC 120 - Programming I (4 semester hours)
- CISC 140 - Programming II (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- MATH 261 - Calculus III (3 semester hours)
- MATH 300 - Experiment Design and Analysis (3 semester hours)
- MATH 320 - Ordinary Differential Equations (3 semester hours)
- MATH 370 - Numerical Methods (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)
- MATH 420 - Methods in Applied Mathematics (3 semester hours)

**Natural Sciences Concentration - 16 semester hours**

**Complete all of the following courses - 16 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- PHYS 330 - University Physics I (4 semester hours)
- PHYS 350 - University Physics II (4 semester hours)

## Recommended Sequence for the Full-time Student Completing the Applied Mathematics with the Natural Sciences Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of prerequisites.

### First Year

#### Fall

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
  
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 140 - Precalculus (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

#### Summer

*Optional*

### Second Year

#### Fall

- CISC 140 - Programming II (3 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring

- GEND 201 - The Civic Mind (6 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 261 - Calculus III (3 semester hours)
- MATH 320 - Ordinary Differential Equations (3 semester hours)

Total semester hours: 15

### Summer

*Optional*

### Third Year

#### Fall

- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 298 - Project I (3 semester hours)
- MATH 370 - Numerical Methods (3 semester hours)
- PHYS 330 - University Physics I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

#### Spring

- GEND Electives (3 semester hours)
- Electives (3 semester hours)
- MATH 365 - Internship (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)
- PHYS 350 - University Physics II (4 semester hours)

Total semester hours: 16

### Summer

*Optional*

### Fourth Year

#### Fall

- Electives (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- MATH 420 - Methods in Applied Mathematics (3 semester hours)
- MATH 498 - Project II (3 semester hours)

Total semester hours: 15

## Spring

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- Electives (3 semester hours)
- GEND Electives (3 semester hours)
- MATH 300 - Experiment Design and Analysis (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 14

## Summer

*Optional*

# Biotechnology

Biotechnology is a multi-disciplinary program that incorporates the foundations of biology, microbiology, genetics, molecular biology, and chemistry. Biotechnology focuses on the manipulation of living organisms, their products, and their processes to further knowledge, improve quality of life and engineer new tools and applications. Biotechnology is applied to a broad range of industries including the pharmaceutical, chemical, agricultural, food development and manufacturing, to name but a few. Biotechnology has impacted significantly in the fields of medicine, health, environment and new technology and will continue to do so far into the future.

## Program Goals

Graduates of the Bachelor of Science in Biotechnology program are able to:

- Demonstrate a broad range of basic laboratory skills and technical competencies applicable to the field of biotechnology and to the workplace;
- Develop a broad understanding of foundational concepts, mechanisms and principles which can be applied across the fields of applied biotechnology, molecular and microbial biotechnology, food biotechnology, and nanotechnology;
- Demonstrate scientific reasoning and critical thinking skills including the ability to evaluate and integrate multiple sources of information, recognize problems, evaluate data, and draw conclusions;
- Model independent and collaborative work environments in the classroom, the laboratory, the field, and the workplace;
- Demonstrate the successful ability to communicate scientific information to a variety of audiences and incorporate multiple modes of technology to achieve that goal; and,
- Connect the classroom to the world of work through multi-modal and interdisciplinary learning experiences.

## **Biotechnology, Food Safety and Quality Assurance Concentration, B.S.**

### **Biotechnology Requirements**

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

### **Complete all of the following Biotechnology Core Courses - 23 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

### **Food Safety and Quality Assurance Concentration - 25 semester hours**

#### **Complete all of the following courses - 19 semester hours:**

- BIOL 330 - Microbiology (4 semester hours)
- BIOL 370 - Molecular Biology (4 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- BTEC 371 - Food Science and Technology (4 semester hours)

#### **Complete 6 semester hours from the following:**

- BTEC 200 - Introduction to Quality and Food Safety (3 semester hours)
- BTEC 210 - Food and Nutrition (3 semester hours)
- BTEC 235 - Applied Cell and Agro Culture (4 semester hours)
- BTEC 405 - Applied Food Microbiology (3 semester hours)
- BTEC 420 - Food Safety and Quality Assurance (3 semester hours)
- INSC 410 - Epidemiology (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Food Safety and Quality Assurance Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)



- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- Food Safety and Quality Assurance concentration electives (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Third Year

#### Fall Semester

- BIOL 370 - Molecular Biology (4 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 298 - Project I (3 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

#### Spring Semester

- BIOL 330 - Microbiology (4 semester hours)
- BTEC 365 - Internship (3 semester hours)
- BTEC 371 - Food Science and Technology (4 semester hours)
- Electives (4 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Fourth Year

## Fall Semester

- BTEC 498 - Project II (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- Electives (7 semester hours)

Total semester hours: 16

## Spring Semester

- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- GEND Elective (6 semester hours)
- SEMR 400 - Capstone (1 semester hour)
- Food Safety and Quality Assurance concentration electives (3 semester hours)

Total semester hours: 13

## Summer Semester

*Optional*

# Biotechnology, General Biotechnology Concentration, B.S.

## Biotechnology Requirements

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

**Complete all of the following Biotechnology Core Courses - 23 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

**General Biotechnology Concentration - 27 semester hours**

**Complete all of the following courses - 20 semester hours:**

- BIOL 330 - Microbiology (4 semester hours)
- BIOL 370 - Molecular Biology (4 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 351 - Biotechnology Applications (4 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)

**Complete 7 semester hours from the following:**

- BIOL 210 - Introduction to Bioinformatics (4 semester hours)
- BIOL 214 - Anatomy and Physiology I (4 semester hours)
- BIOL 215 - Anatomy and Physiology II (4 semester hours)
- BIOL 320 - Genetics (3 semester hours)
- BIOL 375 - Immunology (4 semester hours)
- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 110 - Medical Terminology (1 semester hour)
- BTEC 210 - Food and Nutrition (3 semester hours)
- BTEC 220 - Applied Nanobiotechnology (4 semester hours)
- BTEC 222 - Emerging Laboratory Techniques (4 semester hours)
- BTEC 235 - Applied Cell and Agro Culture (4 semester hours)
- BTEC 250 - Medical Biotechnologies of 2020 (3 semester hours)
- BTEC 311 - Pharmacology I (3 semester hours)
- BTEC 320 - Drug Design and Development (3 semester hours)
- BTEC 340 - Forensic Biotechnology (3 semester hours)
- BTEC 355 - Neurology and Biotechnology (3 semester hours)
- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- BTEC 370 - Genetically Modified Foods (3 semester hours)
- BTEC 371 - Food Science and Technology (4 semester hours)
- BTEC 401 - Biosensor Technology (4 semester hours)
- BTEC 420 - Food Safety and Quality Assurance (3 semester hours)
- BTEC 435 - Computer-Aided Drug Design (4 semester hours)
- PHYS 210 - General Physics I (4 semester hours)

**Recommended Sequence for the Full-time Student Completing the General Biotechnology Concentration**

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

**First Year****Fall Semester**

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

#### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- BTEC Concentration Electives (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- BIOL 370 - Molecular Biology (4 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 298 - Project I (3 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- BIOL 330 - Microbiology (4 semester hours)
- BTEC 365 - Internship (3 semester hours)
- BTEC 351 - Biotechnology Applications (4 semester hours)
- Electives (4 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- CHEM 330 - Biochemistry I (4 semester hours)
- BTEC 498 - Project II (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 13

### Spring Semester

- BTEC Concentration Electives (4 semester hours)
- GEND Electives (6 semester hours)

- Electives (5 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## General Biotechnology

The following sequence should be used by the student in this concentration who has an interest in a postbaccalaureate health-related degree (MD, DO, DDS, VMD). Other support for the student includes our Health Careers Society and faculty advisors.

- General Biotechnology Placing into Calculus

# Biotechnology, Medical Biotechnology Concentration, B.S.

## Biotechnology Requirements

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Biotechnology Core Courses - 23 semester hours:

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

## Medical Biotechnology Concentration - 27 semester hours

Complete all of the following courses - 14 semester hours:

- BTEC 250 - Medical Biotechnologies of 2020 (3 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 355 - Neurology and Biotechnology (3 semester hours)
- BTEC 401 - Biosensor Technology (4 semester hours)

## Complete 13 semester hours from the following:

- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 110 - Medical Terminology (1 semester hour)
- BTEC 235 - Applied Cell and Agro Culture (4 semester hours)
- BTEC 240 - Techniques for Biomolecular Research (3 semester hours)
- BTEC 311 - Pharmacology I (3 semester hours)
- BTEC 320 - Drug Design and Development (3 semester hours)
- BTEC 351 - Biotechnology Applications (4 semester hours)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- BTEC 380 - Special Topics in Biotechnology (1 to 4 semester hours)

## Recommended Sequence for the Full-time Student Completing the Medical Biotechnology Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

#### Summer Semester

*Optional*

## Second Year

### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- BTEC 250 - Medical Biotechnologies of 2020 (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- BTEC Concentration Electives (3 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 298 - Project I (3 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

### Spring Semester

- BTEC 355 - Neurology and Biotechnology (3 semester hours)
- BTEC 365 - Internship (3 semester hours)



- BTEC Concentration Electives (6 semester hours)
- Electives (4 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- BTEC 401 - Biosensor Technology (4 semester hours)
- BTEC 498 - Project II (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 13

### Spring Semester

- BTEC Concentration Electives (4 semester hours)
- GEND Electives (6 semester hours)
- Electives (5 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

# **Biotechnology, Nanobiotechnology and NanoFabrication Concentration, B.S.**

## Biotechnology Requirements

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Biotechnology Core Courses - 23 semester hours:

- BIOL 102 - General Biology (3 semester hours)

- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

## Nanobiotechnology and NanoFabrication Concentration - 32 semester hours

Complete all of the following courses - 14 semester hours:

- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- PHYS 215 - Principles of Physics for Nanobiotechnology (4 semester hours)

Complete all of the 18 semester hours at the University Park Campus of The Pennsylvania State University:

- NANO 211 - Materials, Safety and Equipment Overview for Nanotechnology (3 semester hours)
- NANO 212 - Basic Nanotechnology Processes (3 semester hours)
- NANO 213 - Materials in Nanotechnology (3 semester hours)
- NANO 214 - Patterning for Nanofabrication (3 semester hours)
- NANO 215 - Materials Modification in Nanotechnology Applications (3 semester hours)
- NANO 216 - Characterization, Testing of Nanofabricated Structures and Materials (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Nanobiotechnology and NanoFabrication Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)

- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

#### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND Electives (3 semester hours)
- PHYS 215 - Principles of Physics for Nanobiotechnology (4 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

### Summer Semester

*Optional*

## Third Year

### Fall Semester

- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 365 - Internship (3 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- Electives (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- NANO 211 - Materials, Safety and Equipment Overview for Nanotechnology (3 semester hours)
- NANO 212 - Basic Nanotechnology Processes (3 semester hours)
- NANO 213 - Materials in Nanotechnology (3 semester hours)
- NANO 214 - Patterning for Nanofabrication (3 semester hours)
- NANO 215 - Materials Modification in Nanotechnology Applications (3 semester hours)
- NANO 216 - Characterization, Testing of Nanofabricated Structures and Materials (3 semester hours)

Total semester hours: 18

### Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- BTEC 498 - Project II (3 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 13

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- GEND Electives (3 semester hours)
- Electives (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 13

## Summer Semester

*Optional*

### Note:

The student completing the BTEC - Nanobiotechnology and NanoFabrication concentration may substitute successful completion of NANO 216 for Project I.

## Biotechnology, Nanobiotechnology Concentration, B.S.

### Biotechnology Requirements

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Biotechnology Core Courses - 23 semester hours:

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

### Nanobiotechnology Concentration - 29 semester hours

Complete all of the following courses - 25 semester hours:

- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 220 - Applied Nanobiotechnology (4 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- BTEC 401 - Biosensor Technology (4 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- PHYS 215 - Principles of Physics for Nanobiotechnology (4 semester hours)

## Complete one of the following courses - 4 semester hours:

- BIOL 370 - Molecular Biology (4 semester hours)
- BTEC 250 - Medical Biotechnologies of 2020 (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Nanobiotechnology Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

#### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)

- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 17

### Spring Semester

- BTEC 298 - Project I (3 semester hours)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Third Year

#### Fall Semester

- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 365 - Internship (3 semester hours)
- BTEC 401 - Biosensor Technology (4 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)

Total semester hours: 15

#### Spring Semester

- BTEC 220 - Applied Nanobiotechnology (4 semester hours)
- PHYS 215 - Principles of Physics for Nanobiotechnology (4 semester hours)
- GEND Electives (6 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

### Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- BTEC 498 - Project II (3 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- Electives (3 semester hours)

Total semester hours: 16

### Spring Semester

- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)
- SEMR 400 - Capstone (1 semester hour)
- Nanobiotechnology Concentration electives (4 semester hours)
- Electives (4 semester hours)

Total semester hours: 12

### Summer Semester

*Optional*

## **Biotechnology, Pharmaceutical Design Concentration, B.S.**

### Biotechnology Requirements

This program requires a total of 48 to 55 semester hours: 1) 23 semester hours from Core courses and 2) 25-32 semester hours completed in one of the following concentrations: Food Safety and Quality Assurance, General Biotechnology, Medical Biotechnology, Nanobiotechnology, Nanobiotechnology and Nanofabrication, and Pharmaceutical Design. The semester hour value of each course appears in parentheses ( ).

**Complete all of the following Biotechnology Core Courses - 23 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)



- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

## Pharmaceutical Design Concentration - 27 semester hours

Complete all of the following courses - 22 semester hours:

- BIOL 210 - Introduction to Bioinformatics (4 semester hours)
- BTEC 351 - Biotechnology Applications (4 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- BTEC 311 - Pharmacology I (3 semester hours)
- BTEC 320 - Drug Design and Development (3 semester hours)
- BTEC 435 - Computer-Aided Drug Design (4 semester hours)

Complete 5 semester hours from the following:

- BIOL 214 - Anatomy and Physiology I (4 semester hours)
- BIOL 215 - Anatomy and Physiology II (4 semester hours)
- BIOL 320 - Genetics (3 semester hours)
- BIOL 330 - Microbiology (4 semester hours)
- BIOL 370 - Molecular Biology (4 semester hours)
- BIOL 375 - Immunology (4 semester hours)
- BTEC 100 - Nanobiotechnology Explorations (2 semester hours)
- BTEC 220 - Applied Nanobiotechnology (4 semester hours)
- BTEC 222 - Emerging Laboratory Techniques (4 semester hours)
- BTEC 250 - Medical Biotechnologies of 2020 (3 semester hours)
- BTEC 350 - Biotechnology Techniques (4 semester hours)
- BTEC 355 - Neurology and Biotechnology (3 semester hours)
- BTEC 361 - Food Biotechnology Seminar (1 semester hour)
- BTEC 362 - General Biotechnology Seminar (1 semester hour)
- BTEC 363 - Nanobiotechnology Seminar (1 semester hour)

## Recommended Sequence for the Full-time Student Completing the Pharmaceutical Design Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)
- or

- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BTEC 170 - Introduction to Biotechnology (3 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

#### Spring Semester

- BIOL 210 - Introduction to Bioinformatics (4 semester hours)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (2-3 semester hours)

Total semester hours: 13-14

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- BTEC 298 - Project I (3 semester hours)
- BTEC 311 - Pharmacology I (3 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- Electives (3-4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 14-15

### Spring Semester

- BTEC 320 - Drug Design and Development (3 semester hours)
- BTEC 365 - Internship (3 semester hours)
- GEND Electives (6 semester hours)
- Pharmaceutical Design Concentration electives (3-4 semester hours)

Total semester hours: 15-16

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- BTEC 498 - Project II (3 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- Electives (3 semester hours)

Total semester hours: 16

### Spring Semester

- BTEC 351 - Biotechnology Applications (4 semester hours)
- BTEC 435 - Computer-Aided Drug Design (4 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)

- Pharmaceutical Design Concentration electives (1-2 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16-17

## Summer Semester

*Optional*

# Computer and Information Sciences

Choosing to major in computer and information sciences helps the student gain core knowledge of information sciences in order to integrate business and real-world perspectives, interpersonal and team skills, and the competencies that lead to a career in computer and information sciences. The ability to devise a solution and execute it is at the core of this program. The design of these solutions is what we call "creating a computation," which involves the integration of few key design notions of data representation, algorithms, programming, knowledge in systems, data security, and software engineering within one unified framework. The ultimate goal is to enable the student to understand a problem and build a general-purpose computer system from the ground up through a program of study that provides a sound computer information system engineering design experience.

## Program Goals

Graduates of the Bachelor of Science in Computer and Information Sciences program have to:

- Apply theoretical constructs of mathematical analysis, and sound reasoning to develop and deploy practical solutions for real world problems;
- Evaluate computing system requirements sufficient for developing efficient computational solutions for real world problems;
- Assimilate new methodologies and advances in computer technology in an ever-evolving discipline;
- Master the elements of effective written and oral communication of results to technical and non-technical audience;
- Work independently and in collaboration with colleagues;
- Live up to the ethical standards of the profession and professional knowledge and skills to contribute to society; and,
- Develop an understanding of the code of ethics of the software industry (social contract); and, therefore a sense of what it means to be a good citizen.

## Computer and Information Sciences, Individualized Concentration, B.S.

### Computer and Information Science Requirements - 50 semester hours

This program requires a total of 50 semester hours: 1) 35 semester hours from the core courses listed below and 2) 15 semester hours completed in the Individualized Concentration. The semester hour value of each course appears in parentheses( ).

Complete all of the following Core courses - 35 semester hours:

- CISC 120 - Programming I (4 semester hours)
- CISC 160 - Data Structures (3 semester hours)

- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)

The student must also complete the following concentration:

### Individualized Concentration - 15 semester hours

A CISC student must take 15 semester hours of CISC electives. The offerings of the CISC program provide the student with opportunities to deepen their skills and knowledge of cognate areas in Cyber Security, Artificial Intelligence, and Software Engineering. The student will work with their academic advisor(s) to craft an appropriate program of study. The intent is to provide the student with personally relevant training in subject and skill areas that align to the student's career goals, interests, and personal strengths.

### Complete all of the following - 15 semester hours:

- 300-400 level CISC courses (*not required in Core*) (9 semester hours)
- 400 level CISC courses (*not required in Core*) (6 semester hours)

### Recommended Sequence for the Full-time Student Completing the Individualized Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

#### First Year

##### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

##### Spring Semester

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Spring Semester

- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 13

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- CISC 298 - Project I (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- Electives (6 semester hours)

Total semester hours: 15

### Spring Semester

- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 365 - Internship (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- CISC 300-400 Level Elective ( 3 semester hours)
- CISC 400 - Computer Graphics (3 semester hours)
- CISC 498 - Project II (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 15

#### Spring Semester

- CISC 300-400 Level Elective (3 semester hours)
- CISC 400 - Computer Graphics (3 semester hours)
- Electives (3 semester hours)
- GEND electives (6 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*

## Environmental Science and Sustainability

This Bachelor of Science program produces a well-prepared student to deliver novel and sustainable solutions to the increasingly challenging environmental and natural resource problems of the future. The program has an interdisciplinary set of courses that

will give the student career-ready experience in field work, analysis, communication, and management. The student in the Environmental Science and Sustainability program is exposed to and utilizes such tools as field methods (mapping, sampling, logging), analysis (biological, chemical, lab methods, and more), service-based learning techniques (through collaborative class projects and cooperation with local businesses/institutions), and professional communication approaches (via presentations, professional meetings, grant writing, and publication).

## Program Goals

Graduates of the Bachelor of Science in Environmental Science and Sustainability program are able to:

- Create solutions that support global awareness and ethical policy decision;
- Communicate research-based information to both non-scientists and professional audiences;
- Manage data from different sources;
- Engage students in community-based learning; and,
- Evaluate scientific literature in terms of methods, data analysis, and conclusions.

## Environmental Science and Sustainability, B.S.

### Environmental Science and Sustainability Requirements - 50 semester hours

This program requires a total of 50 semester hours: 1) 39 semester hours from the core courses listed below and 2) 11 semester hours of elective courses. The semester hour value of each course appears in parentheses ( ).

#### Complete all of the following Core courses - 39 semester hours

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- BIOL 302 - Principles of Ecology (4 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- ENVS 100 - Environmental Studies Seminar (1 semester hour)
- ENVS 101 - Introduction to Environmental Science (4 semester hours)
- ENVS 201 - Introduction to Geology (3 semester hours)
- ENVS 220 - Principles of Hydrology (4 semester hours)
- ENVS 230 - Soils in the Critical Zone (4 semester hours)
- ENVS 302 - Environmental Regulation and Management (3 semester hours)
- GSTC 140 - Introduction to GIS (4 semester hours)
- PHYS 210 - General Physics I (4 semester hours)

The student must also complete 11 semester hours from the following elective courses:

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- ANLY 405 - Predictive Modeling (3 semester hours)
- BIOL 281 - Cell Biology Lecture (3 semester hours)



- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BIOL 305 - Evolution (3 semester hours)
- BIOL 330 - Microbiology (4 semester hours)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 200 - Environmental Chemistry I (3 semester hours)
- CHEM 310 - Environmental Chemistry II (4 semester hours)
- CISC 120 - Programming I (4 semester hours)
- ENVS 104 - Our Ocean World (3 semester hours)
- ENVS 211 - Introduction to Renewable Energy Systems (3 semester hours)
- ENVS 380 - Special Topics in Environmental Science (3 semester hours)
- ENVS 301 - Global Change: Physical Processes and Human Impact (3 semester hours)
- ENVS 350 - Ecosystem Management and Restoration (4 semester hours)
- ENVS 401 - Environmental Modeling (3 semester hours)
- GEND 251 - The Political Mind (6 semester hours)
- GSTC 210 - Cartography (3 semester hours)
- GSTC 220 - Applied Geospatial Technology (4 semester hours)
- GSTC 240 - GIS Policy (4 semester hours)
- GSTC 340 - Advanced Spatial Analysis (4 semester hours)
- GSTC 460 - Satellite Remote Sensing (4 semester hours)
- INSC 310 - Conservation Biology (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 220 - Principles of Business Management (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Environmental Science and Sustainability Program

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- ENVS 100 - Environmental Studies Seminar (1 semester hour)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 14

## Spring Semester

- COMM 110 - Speech (3 semester hours)
- ENVS 101 - Introduction to Environmental Science (4 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)

Total semester hours: 13

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- ENVS 201 - Introduction to Geology (3 semester hours)
- ENVS 302 - Environmental Regulation and Management (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- ENVS 220 - Principles of Hydrology (4 semester hours)
- GSTC 140 - Introduction to GIS (4 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- BIOL 302 - Principles of Ecology (4 semester hours)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)

- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- ENVS 230 - Soils in the Critical Zone (4 semester hours)
- ENVS 298 - Project I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- ENVS 498 - Project II (3 semester hours)
- ENVS Electives (4 semester hours)
- GEND Electives (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- ENVS 365 - Internship (3 semester hours)
- ENVS Electives (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- PHYS 210 - General Physics I (4 semester hours)

Total semester hours: 17

#### Spring Semester

- ENVS Electives (3 semester hours)
- Electives (9 semester hours)
- GEND Electives (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*

## **Esports Management, Production and Performance**

The eSports industry has quickly grown into a \$150 billion market, and this 49-credit core program prepares the students for a successful career in this evolving industry. Students will learn how to manage, produce and contribute to the eSports market by building unique skills and insights applicable to new and established organizations. This program is not a training ground for players, instead it combines three of Harrisburg University's strengths, business administration, interactive media and technology integration to build an industry pipeline for the next generation of esports decision-makers in management, production entrepreneurship and innovation.

## Program Goals

A graduate of the Bachelor of Science in the Esports Management, Production and Performance program is prepared to:

- Evaluate the esports ecosystem and its operation as a performance and commercial entertainment activity;
- Design real world and theoretical methods to address current issues facing the esports industry;
- Analyze how esports organizations are managed and governed across the esports ecosystem;
- Research, plan, organize, and produce various types of esports events, activities and services; and,
- Select appropriate business principles to enhance esports production, performance and engagement.

## Esports Management, Production and Performance, BS

### Esports Management, Production and Performance Requirements - 49 semester hours

This program requires a total of 49 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Core courses - 40 semester hours:

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- ESPT 110 - Competitive Gaming Seminar (1 semester hour)
- ESPT 120 - Introduction to Esports (4 semester hours)
- ESPT 210 - Contemporary Issues in Esports (4 semester hours)
- ESPT 220 - Social Media Management (4 semester hours)
- ESPT 310 - Live Event Management (4 semester hours)
- ESPT 320 - Esports Field Studies (3 semester hours)
- ESPT 410 - Fan Engagement Strategies (4 semester hours)
- ESPT 420 - Leadership (4 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 220 - Principles of Business Management (3 semester hours)

Complete 9 semester hours from the following courses:

- ESPT 230 - Esports Broadcasting (3 semester hours)
- ESPT 330 - Live Event Production (3 semester hours)

- ESPT 340 - Business Models and Trends in Esports (3 semester hours)
- IMED 250 - Video Production I (2 semester hours)
- IMED 251 - Video Production II (2 semester hours)
- IMED 255 - Audio Production (3 semester hours)
- IMED 320 - Creative Writing (3 semester hours)
- IMED 350 - Digital Photography (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 354 - Integrated Marketing Communications (3 semester hours)
- MEBA 352 - Consumer Behavior (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Esports Management, Production and Performance Program

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
  
- ESPT 110 - Competitive Gaming Seminar (1 semester hour)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 14

#### Spring

- COMM 110 - Speech (3 semester hours)
- ESPT 120 - Introduction to Esports (4 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 16

#### Summer

*Optional*

## Second Year

### Fall

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- ESPT 210 - Contemporary Issues in Esports (4 semester hours)
- MATH 150 - Applied Mathematical Reasoning (3 semester hours)
- MEBA 220 - Principles of Business Management (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 14

### Spring

- ESPT 220 - Social Media Management (4 semester hours)
- Esports Program Elective (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer

*Optional*

## Third Year

### Fall

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- ESPT 298 - Project I (3 semester hours)
- ESPT 310 - Live Event Management (4 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 14

### Spring

- ESPT 320 - Esports Field Studies (3 semester hours)
- ESPT 365 - Internship (3 semester hours)
- Esports Program Elective (3 semester hours)
- Electives (4 semester hours)
- GEND Electives (3 semester hours)

Total semester hours: 16

Summer

*Optional*

Fourth Year

Fall

- ESPT 410 - Fan Engagement Strategies (4 semester hours)
- ESPT 498 - Project II (3 semester hours)
- Esports Program Elective (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 16

Spring

- ESPT 420 - Leadership (4 semester hours)
- Electives (6 semester hours)
- GEND Electives (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 14

Summer

*Optional*

## Geospatial Technology

The Geospatial Technology program prepares the student with a cross-disciplinary education that promotes the development of computer science and geospatial technology competencies through conceptual, experiential and technology-based learning. The student utilizes leading-edge software and hardware tools to address current and industry-driven geospatial needs. The program addresses not only the hardware and software tools, but also application development and database skills. The student develops the blended set of geospatial technology, application development and spatial database capabilities that are in highest demand. Industry partnerships for corporate faculty, substantive internships, and project-based use of resources are a core component of this program and a leading factor in preparing graduates for seamless integration into the workforce.

## Program Goals

Graduates of the Bachelor of Science in Geospatial Technology program are able to:

- Determine and apply appropriate geographic positioning and data development technologies to college and accurately aggregate georeferenced observations, events and features;

- Select and apply the analytical functions of geospatial software tools to support the geographic inquiry process and improve decision support;
- Design and develop geospatial software applications and databases for processing, analyzing automating tasks or adding value to geospatial data; and,
- Demonstrate professionalism within the geospatial technology industry through application of legal and ethical decision making, proactive engagement within the professional community and appropriate professional conduct.

## Geospatial Technology, B.S.

### Geospatial Technology Requirements - 47 semester hours

Complete all of the following courses - 47 semester hours:

- GSTC 130 - Applied Geography (3 semester hours)
- GSTC 140 - Introduction to GIS (4 semester hours)
- GSTC 210 - Cartography (3 semester hours)
- GSTC 220 - Applied Geospatial Technology (4 semester hours)
- GSTC 240 - GIS Policy (4 semester hours)
- GSTC 330 - Spatial Database Management (4 semester hours)
- GSTC 340 - Advanced Spatial Analysis (4 semester hours)
- GSTC 450 - Desktop GIS Development (4 semester hours)
- GSTC 460 - Satellite Remote Sensing (4 semester hours)
- CISC 120 - Programming I (4 semester hours)
- CISC 140 - Programming II (3 semester hours)
- IMED 265 - Front-End Web Development (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)

### Recommended Sequence for the Full-time Student Completing the Geospatial Technology Program

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

#### First Year

##### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13



## Spring Semester

- CISC 120 - Programming I (4 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- GSTC 140 - Introduction to GIS (4 semester hours)

Total semester hours: 14

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- CISC 140 - Programming II (3 semester hours)
- COMM 110 - Speech (3 semester hours)
- GSTC 130 - Applied Geography (3 semester hours)
- GSTC 210 - Cartography (3 semester hours)
- MATH 150 - Applied Mathematical Reasoning (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND Electives (3 semester hours)
- GSTC 220 - Applied Geospatial Technology (4 semester hours)
- GSTC 240 - GIS Policy (4 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 17

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- GSTC 298 - Project I (3 semester hours)

- GSTC 330 - Spatial Database Management (4 semester hours)
- GSTC 340 - Advanced Spatial Analysis (4 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- GEND Electives (3 semester hours)
- GSTC 365 - Internship (3 semester hours)
- GSTC 450 - Desktop GIS Development (4 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- Electives (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- GSTC 460 - Satellite Remote Sensing (4 semester hours)
- GSTC 498 - Project II (3 semester hours)

Total semester hours: 16

#### Spring Semester

- Electives (9 semester hours)
- IMED 265 - Front-End Web Development (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 13

### Summer Semester

*Optional*

## **Interactive Media**

Interactive media includes the disciplines of new media, interactivity, human computer interaction, and digital cultures. The student's learning also focuses on interactive narrative, social media, virtual reality, digital and analog games, and augmented reality.

## Program Goals

A graduate of the Bachelor of Science in Interactive Media program is prepared to:

- Research situations, compile data, and deploy evidence to support design processes;
- Integrate into varied teams in a professional capacity to produce high quality results;
- Use information to accomplish a purpose and communicate effectively and professionally to peers, clients and audiences;
- Evaluate needs, practice innovative thinking and create solutions that address explicit concerns towards specific opportunities; and,
- Ideate, design and produce engaging products, services and experiences in a professional manner.

## Interactive Media, Advanced Media Production Concentration, B.S.

### Interactive Media Requirements

This program requires a total of 50 semester hours: 1) 26 semester hours from the core courses listed below and 2) 24 semester hours completed in one of the following concentrations: Advanced Media Production, User Experience Design, and Purposeful Game Design. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Core courses - 26 semester hours:

- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- IMED 240 - Interactive Media I (4 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)

### Advanced Media Production Concentration - 24 semester hours

Complete all of the following courses - 22 semester hours

- COMM 225 - Cinema Studies (2 semester hours)
- IMED 250 - Video Production I (2 semester hours)
- IMED 255 - Audio Production (3 semester hours)

- IMED 265 - Front-End Web Development (3 semester hours)
- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 350 - Digital Photography (3 semester hours)
- IMED 460 - Mixed Reality Development (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)

Complete one of the following courses - 2 semester hours:

- CISC 300 - Web Technologies (3 semester hours)
- IMED 251 - Video Production II (2 semester hours)
- IMED 310 - 3D Modeling II (3 semester hours)
- IMED 320 - Creative Writing (3 semester hours)
- IMED 330 - Interactive Information Design (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Advanced Media Production Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 15

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- COMM 225 - Cinema Studies (2 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)

Total semester hours: 14

### Spring Semester

- GEND Electives (3 semester hours)
- IMED 240 - Interactive Media I (4 semester hours)
- IMED 250 - Video Production I (2 semester hours)
- IMED 255 - Audio Production (3 semester hours)
- IMED 265 - Front-End Web Development (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- IMED 298 - Project I (3 semester hours)
- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 350 - Digital Photography (3 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND Electives (3 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 365 - Internship (3 semester hours)
- Electives (6 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- IMED 460 - Mixed Reality Development (3 semester hours)
- IMED 498 - Project II (3 semester hours)
- Electives (3 semester hours)

Total semester hours: 15

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)
- IMED Electives (2 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 13

## Summer Semester

*Optional*

# **Interactive Media, Purposeful Game Design Concentration, B.S.**

## Interactive Media Requirements

This program requires a total of 50 semester hours: 1) 26 semester hours from the core courses listed below and 2) 24 semester hours completed in one of the following concentrations: Advanced Media Production, User Experience Design, and Purposeful Game Design. The semester hour value of each course appears in parentheses( ).

Complete all of the following Core courses - 26 semester hours:

- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- IMED 240 - Interactive Media I (4 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)

## Purposeful Game Design Concentration - 24 semester hours

### Complete all of the following courses - 24 semester hours

- IMED 215 - Introduction to Game Studies and Design (3 semester hours)
- IMED 245 - Game Design: Analogue to Digital (3 semester hours)
- IMED 260 - Purposeful Games: Contexts and Concepts (3 semester hours)
- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 385 - Game Design (3 semester hours)
- IMED 388 - Games User Interface and Level Design (3 semester hours)
- IMED 420 - Games User Research (3 semester hours)
- IMED 485 - Game Development (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Purposeful Game Design Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 15

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- GEND Electives (3 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- IMED 215 - Introduction to Game Studies and Design (3 semester hours)

Total semester hours: 15

### Spring Semester

- IMED 240 - Interactive Media I (4 semester hours)
- IMED 245 - Game Design: Analogue to Digital (3 semester hours)
- IMED 260 - Purposeful Games: Contexts and Concepts (3 semester hours)
- Electives (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 14

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- IMED 298 - Project I (3 semester hours)
- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- IMED 385 - Game Design (3 semester hours)



- MATH 210 - Discrete Mathematics I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND Electives (3 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 365 - Internship (3 semester hours)
- IMED 388 - Games User Interface and Level Design (3 semester hours)
- Electives (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- IMED 420 - Games User Research (3 semester hours)
- IMED 485 - Game Development (3 semester hours)
- IMED 498 - Project II (3 semester hours)

Total semester hours: 15

#### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)
- SEMR 400 - Capstone (1 semester hour)
- Free Electives (3 semester hours)

Total semester hours: 14

### Summer Semester

*Optional*

## **Interactive Media, User Experience Design Concentration, B.S.**

## Interactive Media Requirements

This program requires a total of 50 semester hours: 1) 26 semester hours from the core courses listed below and 2) 24 semester hours completed in one of the following concentrations: Advanced Media Production, User Experience Design, and Purposeful Game Design. The semester hour value of each course appears in parentheses( ).

### Complete all of the following Core courses - 26 semester hours:

- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- IMED 240 - Interactive Media I (4 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)

### User Experience Design Concentration - 24 semester hours

#### Complete all of the following courses - 24 semester hours

- IMED 220 - Sociotechnical Theories (3 semester hours)
- IMED 225 - Design Tools and Processes (3 semester hours)
- IMED 270 - Research Methods for Interactive Design (3 semester hours)
- IMED 280 - Usability and Interface Design (3 semester hours)
- IMED 325 - Interactive Design Perspectives (3 semester hours)
- IMED 355 - Users and Populations (3 semester hours)
- IMED 358 - Patterns and Contexts (3 semester hours)
- IMED 450 - Design Studio (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the User Experience Design Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)

- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 15

### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- IMED 270 - Research Methods for Interactive Design (3 semester hours)
- IMED 280 - Usability and Interface Design (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 15

#### Spring Semester

- IMED 220 - Sociotechnical Theories (3 semester hours)
- IMED 240 - Interactive Media I (4 semester hours)
- IMED 225 - Design Tools and Processes (3 semester hours)
- GEND Electives (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 14

### Summer Semester

*Optional*

## Third Year

### Fall Semester

- IMED 298 - Project I (3 semester hours)
- IMED 325 - Interactive Design Perspectives (3 semester hours)
- IMED 355 - Users and Populations (3 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- MATH 150 - Applied Mathematical Reasoning (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- IMED 340 - Interactive Media II (4 semester hours)
- IMED 365 - Internship (3 semester hours)
- IMED 358 - Patterns and Contexts (3 semester hours)
- Electives (6 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- GEND Electives (3 semester hours)
- IMED 450 - Design Studio (3 semester hours)
- IMED 498 - Project II (3 semester hours)

Total semester hours: 15

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)
- SEMR 400 - Capstone (1 semester hour)
- Electives (3 semester hours)

Total semester hours: 14

## Summer Semester

*Optional*

# Integrative Sciences

This program produces a well-prepared student who is able to contribute to the local, regional, and global community on current scientific topics. An environment favorable to interdisciplinary learning in science is provided, and through classroom and experiential learning opportunities, the student is allowed to develop his or her own interests in the areas where the different disciplines overlap. In conjunction with the general education coursework, the student develops the skills to competently communicate with scientists and non-scientists, the motivation to be engaged citizens, the capacity to be sensitive to the needs of local and global communities, and the knowledge in the physical sciences to enter the workforce or graduate school.

## Program Goals

Graduates of the Bachelor of Science in Integrative Sciences program are able to:

- Demonstrate the basic knowledge and technical skills to work effectively in a cross-disciplinary scientific field by demonstrating the knowledge and skills from more than one of the scientific disciplines;
- Demonstrate the ability to communicate scientific information, including information that results from laboratory experimentation or field work, in oral and written formats to both scientists and nonscientists;
- Demonstrate the ability to make effective use of the library and other information resources in an academic area, including finding, conveying and critically evaluating scientific information obtained in scholarly journal articles, as well as sources obtained through an internet search;
- Demonstrate the ability to make effective use of computers in addition to using technology as a tool in writing, collaborating with a team, illustrating, and data analysis to communicate scientific information; and,
- Demonstrate sufficient mathematical and quantitative reasoning skills to perform competently in a professional position in the chosen field or in continuing professional training.

## Integrative Sciences, Biological Chemistry Concentration, B.S.

### Integrative Sciences Requirements

This program requires a total of 43-50 semester hours: 1) 15 semester hours from the core courses listed below and 2) 28-35 semester hours completed in one of the following concentrations: Biology, Biological Chemistry, Chemistry, and Forensics. The semester hour value of each course appears in parentheses( ).

Complete all of the following Integrative Sciences Core Courses - 15 semester hours:

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)

- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- PHYS 210 - General Physics I (4 semester hours)

Complete one of the following courses - 3 semester hours:

- BIOL 370 - Molecular Biology (4 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours)
- FORS 367 - Evidence (3 semester hours)

## Biological Chemistry Concentration - 34 semester hours

The following courses comprise the biological chemistry concentration of the Integrative Sciences program. The semester hour value of each course appears in parentheses ( ).

Complete all of the following courses - 28 semester hours:

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- CHEM 220 - Organic Chemistry II (4 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- CHEM 350 - Biochemistry II (4 semester hours)
- PHYS 260 - General Physics II (4 semester hours)

Complete 6 semester hours from the following courses:

- BIOL 320 - Genetics (3 semester hours)
- BIOL 330 - Microbiology (4 semester hours)
- BIOL 375 - Immunology (4 semester hours)
- CHEM 320 - Bio-Organic Chemistry (3 semester hours)
- CHEM 380 - Special Topics in Chemistry (3 semester hours)
- CHEM 420 - Bioinorganic Chemistry (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- PHYS 301 - Physical Thermodynamics (3 semester hours)
- PHYS 315 - Quantum Mechanics and Spectroscopy (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Biological Chemistry Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

## Fall Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
  
- GEND 102 - The Creative Mind I (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 14

## Spring Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 14

### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)

- Electives (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- GEND Electives (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- CHEM 210 - Organic Chemistry I (4 semester hours)
- GEND Electives (3 semester hours)
- INSC 298 - Project I (3 semester hours)
- PHYS 210 - General Physics I (4 semester hours)

Total semester hours: 14

### Spring Semester

- CHEM 220 - Organic Chemistry II (4 semester hours)
- INSC 365 - Internship (3 semester hours)
- INSC Core Course (3 semester hours)
- PHYS 260 - General Physics II (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- Biological Chemistry Concentration electives (3 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- INSC 498 - Project II (3 semester hours)

Total semester hours: 16



## Spring Semester

- Biological Chemistry Concentration electives (3 semester hours)
- CHEM 350 - Biochemistry II (4 semester hours)
- Electives (7 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 15

## Summer Semester

*Optional*

## Biochemistry

The following sequences should be used by the student in this concentration who has an interest in a postbaccalaureate health-related degree (MD, DO, DDS, VMD). Other support for the student includes our Health Careers Society and faculty advisors.

- Biological Chemistry Placing into Calculus
- Biological Chemistry Placing into Algebra

# Integrative Sciences, Biology Concentration, B.S.

## Integrative Sciences Requirements

This program requires a total of 43-50 semester hours: 1) 15 semester hours from the core courses listed below and 2) 28-35 semester hours completed in one of the following concentrations: Biology, Biological Chemistry, Chemistry, and Forensics. The semester hour value of each course appears in parentheses( ).

**Complete all of the following Integrative Sciences Core Courses - 15 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- PHYS 210 - General Physics I (4 semester hours)

**Complete one of the following courses - 3 semester hours:**

- BIOL 370 - Molecular Biology (4 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours)
- FORS 367 - Evidence (3 semester hours)

**Biology Concentration - 35 semester hours**

The following courses comprise the biology concentration of the Integrative Sciences program. The semester hour value of each course appears in parentheses ( ).

### Complete all of the following courses - 23 semester hours:

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BIOL 302 - Principles of Ecology (4 semester hours)
- BIOL 320 - Genetics (3 semester hours)
- BIOL 330 - Microbiology (4 semester hours)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)

### Complete 12 semester hours from the following courses:

- BIOL 214 - Anatomy and Physiology I (4 semester hours)
- BIOL 215 - Anatomy and Physiology II (4 semester hours)
- BIOL 225 - Entomology (4 semester hours)
- BIOL 305 - Evolution (3 semester hours)
- BIOL 370 - Molecular Biology (4 semester hours) (*if not taken in core*)
- BIOL 375 - Immunology (4 semester hours)
- BIOL 380 - Special Topics in Biology (3 semester hours)
- BTEC 240 - Techniques for Biomolecular Research (3 semester hours)
- CHEM 330 - Biochemistry I (4 semester hours)
- INSC 310 - Conservation Biology (3 semester hours)
- INSC 320 - The Study of Disease (3 semester hours)
- INSC 335 - Field Studies: Estuarial Ecosystems - Chesapeake Bay (3 semester hours)
- INSC 350 - Animal Behavior (4 semester hours)

## Recommended Sequence for the Full-time Student Completing the Biology Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)

- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- MATH 220 - Calculus I (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)
- Electives (3 semester hours)

Total semester hours: 15

#### Spring Semester

- BIOL 320 - Genetics (3 semester hours)
- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (3 semester hours)

Total semester hours: 13

### Summer Semester

*Optional*

## Third Year

### Fall Semester

- BIOL 302 - Principles of Ecology (4 semester hours)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- INSC 298 - Project I (3 semester hours)
- PHYS 210 - General Physics I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- BIOL 330 - Microbiology (4 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- INSC 365 - Internship (3 semester hours)
- Electives (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- INSC 498 - Project II (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- BIOL Concentration electives (4 semester hours)
- INSC Core Course (3 semester hours)

Total semester hours: 16

### Spring Semester

- SEMR 400 - Capstone (1 semester hour)
- BIOL electives (8 semester hours)
- GEND Electives (6 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

## Biology

The following sequences should be used by the student in this concentration who has an interest in a postbaccalaureate health-related degree (MD, DO, DDS, VMD). Other support for the student includes our Health Careers Society and faculty advisors.

- Biology Placing into Calculus
- Biology Placing into Algebra

## Integrative Sciences, Chemistry Concentration, B.S.

### Integrative Sciences Requirements

This program requires a total of 43-50 semester hours: 1) 15 semester hours from the core courses listed below and 2) 28-35 semester hours completed in one of the following concentrations: Biology, Biological Chemistry, Chemistry, and Forensics. The semester hour value of each course appears in parentheses( ).

**Complete all of the following Integrative Sciences Core Courses - 15 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- PHYS 210 - General Physics I (4 semester hours)

**Complete one of the following courses - 3 semester hours:**

- BIOL 370 - Molecular Biology (4 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours)
- FORS 367 - Evidence (3 semester hours)

### Chemistry Concentration - 34 semester hours

The following courses comprise the chemistry concentration of the Integrative Sciences program. The semester hour value of each course appears in parentheses ( ).

**Complete all of the following courses - 19 semester hours:**

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- CHEM 210 - Organic Chemistry I (4 semester hours)
- CHEM 220 - Organic Chemistry II (4 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- PHYS 260 - General Physics II (4 semester hours)

## Complete 15 semester hours from the following courses:

- CHEM 200 - Environmental Chemistry I (3 semester hours)
- CHEM 315 - Analytical Chemistry (4 semester hours)
- CHEM 320 - Bio-Organic Chemistry (3 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours) (*if not taken in core*)
- CHEM 330 - Biochemistry I (4 semester hours)
- CHEM 340 - Forensic Chemistry (4 semester hours)
- CHEM 380 - Special Topics in Chemistry (3 semester hours)
- CHEM 420 - Bioinorganic Chemistry (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- MATH 261 - Calculus III (3 semester hours)
- MATH 380 - Mathematical Modeling (3 semester hours)
- PHYS 301 - Physical Thermodynamics (3 semester hours)
- PHYS 315 - Quantum Mechanics and Spectroscopy (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Chemistry Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- PHYS 210 - General Physics I (4 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

### Spring Semester

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- GEND Electives (6 semester hours)
- MATH 260 - Calculus II (3 semester hours)
- PHYS 260 - General Physics II (4 semester hours)

Total semester hours: 17

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- CHEM 210 - Organic Chemistry I (4 semester hours)
- CHEM Concentration Electives (4 semester hours)
- Electives (3 semester hours)
- INSC 298 - Project I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 15

### Spring Semester

- CHEM 220 - Organic Chemistry II (4 semester hours)
- INSC Core Course (3 semester hours)
- INSC 365 - Internship (3 semester hours)
- Electives (7 semester hours)

Total semester hours: 17

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- Chemistry Concentration electives (4 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- INSC 498 - Project II (3 semester hours)

Total semester hours: 13

### Spring Semester

- Chemistry Concentration electives (7 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 14

## Summer Semester

*Optional*

## Chemistry

The following sequences should be used by the student in this concentration who has an interest in a postbaccalaureate health-related degree (MD, DO, DDS, VMD). Other support for the student includes our Health Careers Society and faculty advisors.

- Chemistry Placing into Calculus
- Chemistry Placing into Algebra

## **Integrative Sciences, Forensics Concentration, B.S.**

### Integrative Sciences Requirements



This program requires a total of 43-50 semester hours: 1) 15 semester hours from the core courses listed below and 2) 28-35 semester hours completed in one of the following concentrations: Biology, Biological Chemistry, Chemistry, and Forensics. The semester hour value of each course appears in parentheses( ).

**Complete all of the following Integrative Sciences Core Courses - 15 semester hours:**

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- PHYS 210 - General Physics I (4 semester hours)

**Complete one of the following courses - 3 semester hours:**

- BIOL 370 - Molecular Biology (4 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours)
- FORS 367 - Evidence (3 semester hours)

**Forensics Concentration - 32 semester hours**

The following courses comprise the Forensics concentration of the Integrative Sciences program. The semester hour value of each course appears in parentheses ( ).

**Complete all of the following courses - 9 semester hours:**

- FORS 125 - Forensic Science (3 semester hours)
- FORS 270 - Crime Scene Investigation (3 semester hours)
- FORS 360 - Forensic Case Study (3 semester hours)

**Complete one of the following courses - 3 semester hours:**

- CHEM 161 - General Chemistry II (3 semester hours)
- CHEM 162 - General Chemistry II Laboratory (1 semester hour)
- GEND 120 - Self & Society: Introduction to Sociology (3 semester hours)
- GEND 130 - General Psychology (3 semester hours)

**Complete 20 semester hours from the following courses:**

- BIOL 214 - Anatomy and Physiology I (4 semester hours)
- BIOL 215 - Anatomy and Physiology II (4 semester hours)
- BIOL 225 - Entomology (4 semester hours)
- BIOL 281 - Cell Biology Lecture (3 semester hours)
- BIOL 282 - Cell Biology Laboratory (1 semester hour)
- BIOL 370 - Molecular Biology (4 semester hours) (*if not taken in core*)
- BTEC 340 - Forensic Biotechnology (3 semester hours)

- CHEM 161 - General Chemistry II (3 semester hours) *(if not taken in concentration core)*
- CHEM 162 - General Chemistry II Laboratory (1 semester hour) *(if not taken in concentration core)*
- CHEM 210 - Organic Chemistry I (4 semester hours)
- CHEM 220 - Organic Chemistry II (4 semester hours)
- CHEM 325 - Instrumental Chemical Analysis (4 semester hours) *(if not taken in core)*
- CHEM 340 - Forensic Chemistry (4 semester hours)
- CISC 120 - Programming I (4 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 320 - Computer Forensics (3 semester hours)
- FORS 160 - Introduction to Forensic Computing (3 semester hours)
- FORS 315 - Forensic Entomology (4 semester hours)
- FORS 361 - Criminal Profiling (3 semester hours)
- FORS 362 - Medico-Legal Death Investigation (3 semester hours)
- FORS 363 - Forensic Population Studies (3 semester hours)
- FORS 364 - Fraud (3 semester hours)
- FORS 365 - Crime Scene Management (3 semester hours)
- FORS 366 - Interrogation Techniques (3 semester hours)
- FORS 367 - Evidence (3 semester hours) *(if not taken in core)*
- FORS 368 - Forensic Anthropology (3 semester hours)
- FORS 380 - Special Topics in Forensic Science (3 semester hours)
- GEND 120 - Self & Society: Introduction to Sociology (3 semester hours) *(if not taken in concentration core)*
- GEND 130 - General Psychology (3 semester hours) *(if not taken in concentration core)*
- MATH 210 - Discrete Mathematics I (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Forensics Concentration

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

## Spring Semester

- BIOL 102 - General Biology (3 semester hours)
- BIOL 103 - General Biology Laboratory (1 semester hour)
- FORS 125 - Forensic Science (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- CHEM 151 - General Chemistry I Lecture (3 semester hours)
- CHEM 152 - General Chemistry I Laboratory (1 semester hour)
- COMM 110 - Speech (3 semester hours)
- Forensics Concentration electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

### Spring Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- FORS 270 - Crime Scene Investigation (3 semester hours)
- GEND Electives (6 semester hours)
- INSC Core Course (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- Forensics Concentration electives (3 semester hours)
- Electives (3 semester hours)
- INSC 298 - Project I (3 semester hours)
- PHYS 210 - General Physics I (4 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 14

### Spring Semester

- Forensics Concentration electives (4 semester hours)
- Forensic Concentration Core Course (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- INSC 365 - Internship (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- Forensics Concentration electives (3 semester hours)
- Electives (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)
- INSC 498 - Project II (3 semester hours)

Total semester hours: 15

#### Spring Semester

- Electives (6 semester hours)
- FORS 360 - Forensic Case Study (3 semester hours)
- Forensics Concentration electives (4 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 14

### Summer Semester

*Optional*

# Information Systems and Information Technology

The Bachelor of Science program in Information Systems and Information Technologies offers an interdisciplinary curriculum focusing on Information Systems, Information Technology, and Computer Sciences. This program merges traditional academic topics with cutting edge ISIT practices and applications. The program prepares the student with hands-on practical knowledge of the most important building blocks of today's information systems and the underlying technologies. In addition to the theoretical understanding, practical knowledge of the technologies and their fundamentals including computer hardware, networking components, mobile devices, and cloud/virtual environments are discussed and delivered in this program. With the current trends of big data, mobile computing, virtualization, and cloud services, this program covers the most up-to-date practices in ISIT and prepares the graduates to tackle real-world challenges of the industry.

## Program Goals

Graduates of the Bachelor of Science in ISIT program are able to:

- Demonstrate general, theoretical, and practical knowledge of information systems and the supporting technologies;
- Identify, understand, and apply current IS processes/concepts and appropriate IT infrastructure/components;
- Setup and configure information systems and the supporting technologies;
- Troubleshoot and manage information systems and the supporting technologies; and,
- Analyze, evaluate, and design modern information systems to solve specific business problems based on user needs, business parameters, and IT infrastructure.

## Information Systems and Information Technology, B.S.

### Information Systems and Information Technology Requirements

This program requires a total of 49 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete all of the following Core courses - 42 semester hours:

- CISC 103 - Introduction to Computers & Information Sciences (4 semester hours)
- CISC 120 - Programming I (4 semester hours)
- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 300 - Web Technologies (3 semester hours)
- ISIT 140 - Introduction to Information Systems (3 semester hours)
- ISIT 220 - Capturing, Organizing, and Presenting Data (4 semester hours)
- ISIT 240 - Networking & Security Essentials (3 semester hours)
- ISIT 335 - Applied Operating Systems (3 semester hours)
- ISIT 430 - Cloud Services (3 semester hours)
- ISIT 470 - Emerging Technologies in ISIT (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)
- MEBA 375 - Statistics for Managers (3 semester hours)
- MEBA 470 - Business Systems Analysis, Modeling and Design (3 semester hours)

Complete 7 semester hours from the following courses:

- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 330 - Computer Networks (4 semester hours)
- CISC 333 - Defensive Programming (3 semester hours)
- CISC 349 - Smartphone Programming (3 semester hours)
- CISC 370 - Ethical Hacking (3 semester hours)
- CISC 440 - Wireless Security Management (3 semester hours)
- ISIT 360 - Network Installation and Maintenance (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 310 - eCommerce and mCommerce (3 semester hours)
- MEBA 472 - Business Intelligence and Decision Support Systems (3 semester hours)
- MEBA 480 - Enterprise Architectures and Integration for a Global Economy (3 semester hours)

## Recommended Sequence for the Full-time Student completing the Information Systems and Information Technology Program

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- CISC 103 - Introduction to Computers & Information Sciences (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- ISIT 140 - Introduction to Information Systems (3 semester hours)

Total semester hours: 16

#### Summer Semester

*Optional*

## Second Year

### Fall Semester

- CISC 120 - Programming I (4 semester hours)
- ISIT 220 - Capturing, Organizing, and Presenting Data (4 semester hours)
- ISIT 240 - Networking & Security Essentials (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)

Total semester hours: 17

### Spring Semester

- CISC 225 - Information System Design and Analysis (3 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- GEND Electives (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- ISIT 298 - Project I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)
- CISC 300 - Web Technologies (3 semester hours)

Total semester hours: 13

### Spring Semester

- MEBA 375 - Statistics for Managers (3 semester hours)
- ISIT 335 - Applied Operating Systems (3 semester hours)
- ISIT Electives (4 semester hours)
- ISIT 365 - Internship (3 semester hours)
- MEBA 470 - Business Systems Analysis, Modeling and Design (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- ISIT 430 - Cloud Services (3 semester hours)
- ISIT 498 - Project II (3 semester hours)
- ISIT Electives (3 semester hours)
- GEND Electives (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)

Total semester hours: 15

### Spring Semester

- ISIT 470 - Emerging Technologies in ISIT (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)
- Electives (10 semester hours)

Total semester hours: 14

## Summer Semester

*Optional*

# Management, Entrepreneurship, and Business Administration

This Bachelor of Science program prepares the student for a successful career in the modern job market by teaching them how to recognize opportunities and create value in both new and existing organizations. This program draws on three disciplines providing skills in Entrepreneurship, Managerial Decision Making, and Business Administration, and prepares the student to take leadership, management, and entrepreneurial roles in the public and private sectors. The student is taught skills such as strategic thinking, motivating and managing nationally and internationally diverse workforces, building and leading team efforts, negotiating successfully, and instituting planned change in organizations. MEBA is a high-quality business program advancing research at the intersection of innovation, leadership and entrepreneurship.

## Program Goals

Graduates of the Bachelor of Science in Management, Entrepreneurship, and Business Administration program are able to:



- Recognize business opportunities and identify competitive advantages;
- Plan business operations, new organizational processes, and entrepreneurial ventures;
- Effectively lead and participate in teamwork to build exceptional organizations; and,
- Describe and resolve ethical, legal, and social factors when solving modern business problems.

## **Management, Entrepreneurship, and Business Administration, Business Analytics Concentration, B.S.**

### **Management, Entrepreneurship, and Business Administration Requirements**

The program requires a total of 48-49 semester hours: a) 30 semester hours from the required Core courses; and b) 18-19 semester hours completed in one of the following concentrations: Individualized, Digital Health, Digital Marketing, Business Analytics, and Entrepreneurship. The semester hour value of each course appears in parenthesis ( ).

#### **Complete all of the following Core courses - 30 semester hours:**

- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)

#### **Business Analytics Concentration - 18 semester hours**

##### **Complete the following courses -18 semester hours:**

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- MEBA 375 - Statistics for Managers (3 semester hours)
- MEBA 382 - Research Design and Methodology (3 semester hours)
- MEBA 472 - Business Intelligence and Decision Support Systems (3 semester hours)
- MEBA 482 - Quantitative Methods in Managerial Decision-Making (3 semester hours)
- 300-400 Level MEBA Elective (not already in Core requirements) (3 semester hours)

### **Recommended Sequence for the Full-time Student Completing the Business Analytics Concentration**

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Semester hours are shown in parentheses ( ).

## First Year

### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 298 - Project I (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 375 - Statistics for Managers (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND Electives (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 365 - Internship (3 semester hours)
- MEBA 382 - Research Design and Methodology (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- ANLY 400 - Analytics Tools and Techniques (3 semester hours)
- GEND Electives (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 472 - Business Intelligence and Decision Support Systems (3 semester hours)
- MEBA 498 - Project II (3 semester hours)

Total semester hours: 15

### Spring Semester

- MEBA 432 - Management and Innovation Strategies (3 semester hours)
- MEBA 482 - Quantitative Methods in Managerial Decision-Making (3 semester hours)
- MEBA 300-400 Level Elective (3 semester hours)
- Electives (5 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 15

## Summer Semester

*Optional*

# Management, Entrepreneurship, and Business Administration, Digital Health Concentration, B.S.

## Management, Entrepreneurship, and Business Administration Requirements

The program requires a total of 48-49 semester hours: a) 30 semester hours from the required Core courses; and b) 18-19 semester hours completed in one of the following concentrations: Individualized, Digital Health, Digital Marketing, Business Analytics, and Entrepreneurship. The semester hour value of each course appears in parenthesis ( ).

### Complete all of the following Core courses - 30 semester hours:

- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)

### Digital Health Concentration - 19 semester hours

#### Complete the following courses - 19 semester hours:

- CISC 410 - Information Technology Project Management (4 semester hours)
- MEBA 360 - Healthcare Systems (3 semester hours)
- MEBA 381 - Special Topics in Digital Health (3 semester hours) (*Complete 6 semester hours of this course*)
- ISEM 542 - Health Informatics and Information Systems (3 semester hours)
- ISEM 543 - Digital Health (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Digital Health Concentration

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Semester hours are shown in parentheses ( ).

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 15

#### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 298 - Project I (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 360 - Healthcare Systems (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND Electives (6 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 365 - Internship (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- MEBA 425 - Product Management (3 semester hours)
- MEBA 381 - Special Topics in Digital Health (3 semester hours) (*Complete 6 semester hours of this course*)
- MEBA 498 - Project II (3 semester hours)

- ISEM 542 - Health Informatics and Information Systems (3 semester hours)

Total semester hours: 15

### Spring Semester

- CISC - 410 Information Technology Project Management (4 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)
- ISEM 543 - Digital Health (3 semester hours)
- Electives (4 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 15

### Summer Semester

*Optional*

## **Management, Entrepreneurship, and Business Administration, Digital Marketing Concentration, B.S.**

### Management, Entrepreneurship, and Business Administration Requirements

The program requires a total of 48-49 semester hours: a) 30 semester hours from the required Core courses; and b) 18-19 semester hours completed in one of the following concentrations: Individualized, Digital Health, Digital Marketing, Business Analytics, and Entrepreneurship. The semester hour value of each course appears in parenthesis ( ).

Complete all of the following Core courses - 30 semester hours:

- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)

### Digital Marketing Concentration - 18 semester hours

Complete the following courses - 18 semester hours:

- IMED 170 - Visual Design Fundamentals (3 semester hours)
- MEBA 352 - Consumer Behavior (3 semester hours)
- MEBA 354 - Integrated Marketing Communications (3 semester hours)
- MEBA 375 - Statistics for Managers (3 semester hours)
- MEBA 488 - Marketing Research (3 semester hours)
- 300-400 Level MEBA Elective (not Core requirements) (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Digital Marketing Concentration

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Semester hours are shown in parentheses ( ).

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 15

#### Summer Semester

*Optional*

### Second Year

#### Fall Semester



- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 298 - Project I (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Third Year

#### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 375 - Statistics for Managers (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

#### Spring Semester

- GEND Electives (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 352 - Consumer Behavior (3 semester hours)
- MEBA 365 - Internship (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- GEND Electives (3 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)
- MEBA 354 - Integrated Marketing Communications (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 498 - Project II (3 semester hours)

Total semester hours: 15

### Spring Semester

- MEBA 432 - Management and Innovation Strategies (3 semester hours)
- MEBA 488 - Marketing Research (3 semester hours)
- MEBA 300-400 Level Elective (3 semester hours)
- Electives (5 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 15

### Summer Semester

*Optional*

## **Management, Entrepreneurship, and Business Administration, Entrepreneurship Concentration, B.S.**

### Management, Entrepreneurship, and Business Administration Requirements

The program requires a total of 48-49 semester hours: a) 30 semester hours from the required Core courses; and b) 18-19 semester hours completed in one of the following concentrations: Individualized, Digital Health, Digital Marketing, Business Analytics, and Entrepreneurship. The semester hour value of each course appears in parenthesis ( ).

#### Complete all of the following Core courses - 30 semester hours:

- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)

- MEBA 350 - Finance (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)

## Entrepreneurship Concentration - 18 semester hours

Complete the following courses - 18 semester hours:

- MEBA 382 - Research Design and Methodology (3 semester hours)
- MEBA 410 - Business Entrepreneurship in Practice (3 semester hours)
- MEBA 411 - Entrepreneurial Investment (3 semester hours)
- MEBA 472 - Business Intelligence and Decision Support Systems (3 semester hours)
- MEBA 482 - Quantitative Methods in Managerial Decision-Making (3 semester hours)
- MEBA 488 - Marketing Research (3 semester hours)

## Recommended Sequence for the Full-time Student Completing the Entrepreneurship Concentration

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Semester hours are shown in parentheses ( ).

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- Electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 298 - Project I (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 410 - Business Entrepreneurship in Practice (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- GEND Electives (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)

- MEBA 350 - Finance (3 semester hours)
- MEBA 365 - Internship (3 semester hours)
- MEBA 382 - Research Design and Methodology (3 semester hours)

Total semester hours: 15

## Summer Semester

*Optional*

## Fourth Year

### Fall Semester

- GEND Electives (3 semester hours)
- MEBA 411 - Entrepreneurial Investment (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 472 - Business Intelligence and Decision Support Systems (3 semester hours)
- MEBA 498 - Project II (3 semester hours)

Total semester hours: 15

### Spring Semester

- MEBA 432 - Management and Innovation Strategies (3 semester hours)
- MEBA 482 - Quantitative Methods in Managerial Decision-Making (3 semester hours)
- MEBA 488 - Marketing Research (3 semester hours)
- Electives (5 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 15

## Summer Semester

*Optional*

# **Management, Entrepreneurship, and Business Administration, Individualized Concentration, B.S.**

## **Management, Entrepreneurship, and Business Administration Requirements**

The program requires a total of 48-49 semester hours: a) 30 semester hours from the required Core courses; and b) 18-19 semester hours completed in one of the following concentrations: Individualized, Digital Health, Digital Marketing, Business Analytics, and Entrepreneurship. The semester hour value of each course appears in parenthesis ( ).

### Complete all of the following Core courses - 30 semester hours:

- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)

### Individualized Concentration - 19 semester hours

#### Complete the following courses - 19 semester hours:

- MEBA Electives (not already in Core requirements) (12 semester hours)

AND

#### 7 semester hours of electives from the following list:

- GEND 400 - The Entrepreneurial Mind (3 semester hours)
- GEND 425 - Globalization (3 semester hours)
- Any CISC, IMED, or ISIT course (1-7 semester hours)

### Recommended Sequence for the Full-time Student Completing the Individualized Concentration

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Semester hours are shown in parentheses ( ).

#### First Year

##### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 110 - Introduction to Business and Entrepreneurship (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- MEBA Electives (6 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MEBA 225 - Accounting (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

#### Spring Semester

- GEND 201 - The Civic Mind (6 semester hours)
- MEBA 230 - Marketing (3 semester hours)
- MEBA 250 - Corporate Innovation and Entrepreneurship (3 semester hours)
- MEBA 298 - Project I (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Third Year

#### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- MEBA 322 - Decision Theory (3 semester hours)
- MEBA 335 - Business Law and Ethics (3 semester hours)
- MEBA Electives (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Spring Semester

- Electives (4 semester hours)
- MEBA 340 - Introduction to Innovation and Design Thinking (3 semester hours)
- MEBA 350 - Finance (3 semester hours)
- MEBA 365 - Internship (3 semester hours)
- MEBA Electives (4 semester hours)

Total semester hours: 17

### Summer Semester

*Optional*

### Fourth Year

#### Fall Semester

- GEND Electives (3 semester hours)
- MEBA 425 - Product Management (3 semester hours)
- MEBA 498 - Project II (3 semester hours)
- MEBA Electives (6 semester hours)

Total semester hours: 15

#### Spring Semester

- GEND Electives (3 semester hours)
- MEBA 432 - Management and Innovation Strategies (3 semester hours)
- Electives (6 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 13

### Summer Semester

*Optional*



## Five-Year Bachelor of Science/Master of Science Programs

The five-year Bachelor of Science/Master of Science programs are designed to result in a baccalaureate degree in Computer and Information Sciences or Interactive Media and a master's degree in Computer Information Sciences, Information Systems Engineering and Management, or Learning Technologies and Media Systems, respectively.

The student who demonstrates exceptional academic performance in the undergraduate Bachelor of Science program in Computer and Information Sciences or Interactive Media may be eligible to participate in one of the following accelerated dual-degree programs. These programs facilitate the student completing both degree programs in five years rather than the usual six.

| Bachelor of Science Program  | Master of Science Program   |
|--|---|
| Computer and Information Sciences with an Individualized Concentration | Computer Information Sciences with a concentration in Scientific Computing          |
| Computer and Information Sciences with an Individualized Concentration | Computer Information Sciences with a concentration in Cyber Security                |
| Computer and Information Sciences with an Individualized Concentration | Information Systems Engineering and Management with an Individualized Concentration |
| Interactive Media with a Concentration in Advanced Media Production    | Learning Technologies and Media Systems with an Individualized Concentration        |

The following standards for admission to the program must be met by the end of the first semester of the third year of study:

- completion of at least 75 semester hours toward the Bachelor of Science degree with a minimum cumulative grade point average of 3.25;
- a minimum grade point average of 3.50 in all computer and information sciences and mathematics courses attempted; and
- completion of all computer and information sciences Core requirements for the bachelor of science degree.

The student should complete and submit the Graduate Education Application for Admission when 75 semester hours have been earned. Required supporting documents include: current academic transcript and a recommendation from the student's academic advisor.

In order to remain in the program, the student must maintain: 1) a minimum 3.25 cumulative grade point average and 2) a minimum 3.50 computer and information science and mathematics grade point average.

The Bachelor of Science degree in Computer and Information Sciences or Interactive Media is conferred when the student has completed the undergraduate requirements (expected to be the end of the fourth year). During this four-year period, the student is subject to the undergraduate policies, tuition rates, financial aid regulations, academic policies and eligible for the student services described within the undergraduate education pages of this Catalog.

The Master of Science degree in Computer Information Sciences, Information Systems Engineering and Management, or Learning Technologies and Media Systems is conferred when the student has completed the graduate requirements (expected to be the end of the fifth year). During this period, the student is subject to the graduate policies, tuition rates, financial aid regulations, academic policies, and eligible for the student services described within the graduate education pages of this Catalog.

## **Computer and Information Science, Individualized Concentration/Computer Information Science, Cyber Security Concentration, B.S./M.S.**

The undergraduate hours consist of: 1) 18 semester hours of Foundations courses, 2) 30 semester hours of General Education, 3) 13 semester hours of Experiential Learning, and 4) 35 semester hours of Computer & Information Science program courses, and 5) 15 semester hours of Computer Science concentration courses. The graduate hours consists of: 1) 15 semester hours of Computer Information Science core courses, 2) 6 semester hours of Computer Information Science Experiential Learning, and 3) 15 semester hours of Cyber Security courses.

### **BS Computer and Information Science Requirements (35 semester hours):**

- CISC 120 - Programming I (4 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)

### **BS Individualized Concentration Requirements (15 semester hours):**

- 300-400 level CISC courses (not required in Core) (9 semester hours)
- 400 level CISC courses (not required in Core) (6 semester hours)

### **MS Computer Information Science Requirements (15 semester hours):**

- CISC 520 - Data Engineering & Mining (3 semester hours)
- CISC 525 - Big Data Architecture (3 semester hours)
- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours)
- CISC 610 - Data Structures & Algorithms (3 semester hours)

### **MS Scientific Computing Concentration Requirements (15 semester hours):**

- CISC 661 - Principles of Cybersecurity & Cyberwarfare (3 semester hours)
- CISC 662 - Ethical Hacking Development Lab (3 semester hours)
- CISC 663 - Cyber Risk Assessment & Management (3 semester hours)
  
- Elective (3 semester hours)  
or

- CISC 693 - Current Topics in Cyber Security (3 semester hours)
- Elective (3 semester hours)  
or
- CISC 683 - Special Topics in Cyber Security (3 semester hours)

### MS Experiential Learning Requirements (6 semester hours):

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- CISC 699 - Applied Project in CISC (3 semester hours)

### Recommended Sequence for the Full-time Student

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

#### First Year

##### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

##### Spring Semester

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

##### Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Spring Semester

- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- GEND Electives (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- CISC 298 - Project I (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 15

### Spring Semester

- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 365 - Internship (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Fourth Year

\*Graduate courses (see Graduate Catalog for course descriptions)

### Fall Semester

- CISC 300-400 Level Elective (3 semester hours)
- CISC 400 Level Elective (3 semester hours)
- CISC 498 - Project II (3 semester hours)
- CISC 530 - Computing Systems Architecture (3 semester hours) \*
- CISC 610 - Data Structures and Algorithms (3 semester hours) \*

Total semester hours: 15

### Spring Semester

- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- CISC 400 Level Elective (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours) \*
- CISC 661 - Principles of Cybersecurity & Cyberwarfare (3 semester hours) \*
- GEND Electives (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Fifth Year

### Fall Semester

- CISC 525 - Big Data Architecture (3 semester hours)
- CISC 662 - Ethical Hacking Development Lab (3 semester hours)
- GRAD 695 - Research Methodology & Writing Elective (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 693 - Current Topic in CYBSE (3 semester hours)

Total semester hours: 12

### Spring Semester

- CISC 520 - Data Engineering & Mining (3 semester hours)
- CISC 663 - Cyber Risk Assessment & Management (3 semester hours)
  
- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- CISC 699 - Applied Project in CISC (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 683 - Special Topic in CYBSE (3 semester hours)

Total semester hours: 12

### Summer Semester

*Optional*

## **Computer and Information Science, Individualized Concentration/Computer Information Science, Scientific Computing Concentration, B.S. /M.S.**

The undergraduate hours consist of: 1) 18 semester hours of Foundations courses, 2) 30 semester hours of General Education, 3) 13 semester hours of Experiential Learning, and 4) 35 semester hours of Computer & Information Science program courses, and 5) 15 semester hours of Computer Science concentration courses. The graduate hours consists of: 1) 15 semester hours of Computer Information Science core courses, 2) 6 semester hours of Computer Information Science Experiential Learning, and 3) 15 semester hours of Scientific Computing courses.

### **BS Computer and Information Science Requirements (35 semester hours):**

- CISC 120 - Programming I (4 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)

### **BS Individualized Concentration Requirements (15 semester hours):**

- 300-400 level CISC courses (not required in Core) (9 semester hours)
- 400 level CISC courses (not required in Core) (6 semester hours)

### MS Computer Information Science Requirements (15 semester hours):

- CISC 520 - Data Engineering & Mining (3 semester hours)
- CISC 525 - Big Data Architecture (3 semester hours)
- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours)
- CISC 610 - Data Structures & Algorithms (3 semester hours)

### MS Scientific Computing Concentration Requirements (15 semester hours):

- CISC 600 - Scientific Computing I (3 semester hours)
- CISC 601 - Scientific Computing II (3 semester hours)
- CISC 614 - Computer Simulation (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 691 - Current Topics in Scientific Computing (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 681 - Special Topics in Scientific Computing (3 semester hours)

### MS Experiential Learning Requirements (6 semester hours):

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  
- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- CISC 699 - Applied Project in CISC (3 semester hours)

### Recommended Sequence for the Full-time Student

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

#### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)

- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

### Spring Semester

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

#### Spring Semester

- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- GEND electives (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*



## Third Year

### Fall Semester

- CISC 298 - Project I (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 15

### Spring Semester

- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 365 - Internship (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*

## Fourth Year

\*Graduate courses (see Graduate Catalog for course descriptions)

### Fall Semester

- CISC 300-400 Level Elective (3 semester hours)
- CISC 400 Level Elective (3 semester hours)
- CISC 498 - Project II (3 semester hours)
- CISC 530 - Computing Systems Architecture (3 semester hours) \*
- CISC 610 - Data Structures and Algorithms (3 semester hours) \*

Total semester hours: 15

### Spring Semester

- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- CISC 400 Level Elective (3 semester hours)
- CISC 600 - Scientific Computing I (3 semester hours) \*
- CISC 603 - Theory of Computation (3 semester hours) \*
- GEND electives (3 semester hours)

- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Fifth Year

### Fall Semester

- CISC 525 - Big Data Architecture (3 semester hours)
- CISC 601 - Scientific Computing II (3 semester hours)
- GRAD 695 - Research Methodology & Writing (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 691 - Current Topic in SCMP (3 semester hours)

Total semester hours: 12

### Spring Semester

- CISC 520 - Data Engineering & Mining (3 semester hours)
- CISC 614 - Computer Simulation (3 semester hours)
  
- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- CISC 699 - Applied Project in CISC (3 semester hours)
  
- Elective (3 semester hours)  
or
- CISC 681 - Special Topic in SCMP (3 semester hours)

Total semester hours: 12

## Summer Semester

*Optional*

**Computer and Information Science, Individualized Concentration/Information Systems Engineering and Management, Individualized Concentration, B.S./M.S.**

The undergraduate hours consist of: 1) 18 semester hours of Foundations courses, 2) 30 semester hours of General Education, 3) 13 semester hours of Experiential Learning, and 4) 35 semester hours of Computer & Information Science program courses, and 5) 15 semester hours of Computer Science concentration courses. The graduate hours consist of: 1) 15 semester hours of ISEM core courses, 2) 6 semester hours of ISEM Experiential Learning, and 3) 15 semester hours of Graduate elective courses.

### **BS Computer and Information Science Requirements (35 semester hours):**

- CISC 120 - Programming I (4 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)
- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)

### **BS Individualized Concentration Requirements (15 semester hours):**

- 300-400 level CISC courses (not required in Core) (9 semester hours)
- 400 level CISC courses (not required in Core) (6 semester hours)

### **MS Information Systems Engineering and Management Requirements (15 semester hours):**

- ISEM 500 - Strategic Information Systems Planning, Engineering & Management (3 semester hours)
- ISEM 540 - Architectures and Integration of Modern Enterprises (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

### **Choose one of the following courses - 3 semester hours**

- CISC 510 - Object-Oriented Software (3 semester hours)
- ISEM 502 - User-Centered Design (3 semester hours)
- ISEM 530 - Analysis and Design of Modern Information Systems (3 semester hours)
- ISEM 565 - Business Intelligence and Decision Support Systems (3 semester hours)
- LTMS 531 - Designing Serious Games and Simulations (3 semester hours)

### **Choose one of the following courses - 3 semester hours**

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- MGMT 511 - Digital and Global Organizations (3 semester hours)
- PMGT 510 - Principle of Project Management (3 semester hours)

## MS Individualized Concentration Requirements (15 semester hours):

The Master of Science in Information Systems Engineering and Management student can choose courses totaling 15 semester hours of credit from any of the graduate programs at Harrisburg University. This option allows the ISEM student to build their own customized specializations and concentrations. Although the ISEM student can take any courses from any graduate program, they are encouraged to choose electives that focus on their professional area of interest. In addition, the ISEM student is expected to use the concepts learned in these electives to strengthen their capstone courses. Suggested elective courses that focus on areas such as Analytics, Business Intelligence, Digital Enterprises, Digital technologies, Information Security and many others are listed in the "ISEM Student Guide available at [www.ngecenter.org](http://www.ngecenter.org) (ISEM Corner) and or by contacting your ISEM advisor or the program lead.

## MS Experiential Learning Requirements (6 semester hours):

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- ISEM 699 - Applied Project in ISEM (3 semester hours)

## Recommended Sequence for the Full-time Student

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 13

#### Spring Semester

- CISC 120 - Programming I (4 semester hours)
- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- MATH 220 - Calculus I (3 semester hours)

Total semester hours: 16

## Summer Semester

*Optional*

## Second Year

### Fall Semester

- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)
- CISC 160 - Data Structures (3 semester hours)
- CISC 211 - Computer Organization and Architecture (4 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)

Total semester hours: 16

### Spring Semester

- CISC 225 - Information System Design and Analysis (3 semester hours)
- CISC 233 - Essential Algorithms (3 semester hours)
- GEND electives (3 semester hours)
- MATH 250 - Introduction to Linear Algebra (3 semester hours)
- MATH 310 - Discrete Mathematics II (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Third Year

### Fall Semester

- CISC 298 - Project I (3 semester hours)
- CISC 301 - Operating Systems (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 351 - Organizational Mind (6 semester hours)

Total semester hours: 15

### Spring Semester

- CISC 325 - Programming Languages Concepts and Paradigms (3 semester hours)

- CISC 365 - Internship (3 semester hours)
- CISC 300-400 Level Elective (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Fourth Year

\*Graduate courses (see Graduate Catalog for course descriptions)

## Fall Semester

- CISC 300-400 Level Elective (3 semester hours)
- CISC 400 Level Elective (3 semester hours)
- CISC 498 - Project II (3 semester hours)
- ISEM 500 - Strategic Information Systems Planning, Engineering & Management (3 semester hours) \*
- MGMT 510 - Business Strategy and Management Principles (3 semester hours) \*

Total semester hours: 15

## Spring Semester

- CISC 399 - Formal Languages and Automata Theory (3 semester hours)
  - CISC 400 Level Elective (3 semester hours)
  - GEND electives (3 semester hours)
  - ISEM 540 - Architectures and Integration of Modern Enterprises (3 semester hours) \*
  - ANLY 500 - Analytics I: Principles and Applications (3 semester hours) \*
  - or
  - MGMT 511 - Digital and Global Organizations (3 semester hours) \*
  - or
  - PMGT 510 - Principles of Project Management (3 semester hours) \*
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

## Summer Semester

*Optional*

## Fifth Year

## Fall Semester

- CISC 510 - Object-Oriented Software (3 semester hours)  
or
- ISEM 502 - User-Centered Design (3 semester hours)  
or
- ISEM 530 - Analysis and Design of Modern Information Systems (3 semester hours)  
or
- ISEM 565 - Business Intelligence and Decision Support Systems (3 semester hours)  
or
- LTMS 531 - Designing Serious Games and Simulations (3 semester hours)
  
- GRAD 695 - Research Methodology & Writing (3 semester hours)
- ISEM Individualized Concentration Electives (6 semester hours)

Total semester hours: 12

## Spring Semester

- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- ISEM 699 - Applied Project in ISEM (3 semester hours)
  
- ISEM Individualized Concentration Electives (9 semester hours)

Total semester hours: 12

## Summer Semester

*Optional*

# Interactive Media, Advanced Media Production/Learning Technologies and Media Systems, Individualized Concentration, B.S./M.S.

The undergraduate hours consist of: 1) 18 semester hours of Foundation courses, 2) 30 semester hours of General Education, 3) 13 semester hours of Experiential Learning, 4) 26 semester hours of Interactive Media Core courses, and 5) 24 semester hours of Advanced Media Production concentration courses.. The graduate hours consist of: 1) 15 semester hours of LTMS core courses, 2) 6 semester hours of LTMS Experiential Learning, and 3) 15 semester hours of Graduate elective courses.

## BS Interactive Media Requirements (26 semester hours):

- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- IMED 170 - Visual Design Fundamentals (3 semester hours)

- IMED 240 - Interactive Media I (4 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- IMED 440 - Interactive Studio (4 semester hours)

### BS Advanced Media Production Concentration Requirements (24 semester hours):

- COMM 225 - Cinema Studies (2 semester hours)
- IMED 250 - Video Production I (2 semester hours)
- IMED 255 - Audio Production (3 semester hours)
- IMED 265 - Front-End Web Development (3 semester hours)
- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 350 - Digital Photography (3 semester hours)
- IMED 460 - Mixed Reality Development (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)

### Complete one of the following courses - 2 semester hours:

- CISC 300 - Web Technologies (3 semester hours)
- IMED 251 - Video Production II (2 semester hours)
- IMED 310 - 3D Modeling II (3 semester hours)
- IMED 320 - Creative Writing (3 semester hours)
- IMED 330 - Interactive Information Design (3 semester hours)
- MEBA 230 - Marketing (3 semester hours)

### MS Learning Technologies and Media Systems Requirements (15 semester hours):

- LTMS 500 - Macro Instructional Design (3 semester hours)
- LTMS 510 - Learning Technologies and Solutions (3 semester hours)
- LTMS 514 - Media, Selection, Design and Production (3 semester hours)
- LTMS 518 - eLearning Development (3 semester hours)
- LTMS 525 - Learning Theories & Instructional Strategies (3 semester hours)

### MS Individualized Concentration Requirements (15 semester hours):

The Learning Technologies and Media Systems student can choose courses totaling 15 semester hours from any of the Master of Science programs.

### MS Experiential Learning Requirements (6 semester hours):

- GRAD 695 - Research Methodology and Writing (3 semester hours)



- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- LTMS 698 - Learning Technologies Internship (3 semester hours)  
or
- LTMS 699 - Applied Project in ISEM (3 semester hours)

## Recommended Sequence for the Full-time Student

The sequence that appears below was developed based upon the availability of specific courses each semester and the successful completion of course prerequisites.

### First Year

#### Fall Semester

- ENGL 105 - College Composition (3 semester hours)  
or
- ENGL 106 - Academic Writing and Critical Thinking (3 semester hours)
- MATH 120 - College Algebra (3 semester hours)
- GEND 102 - The Creative Mind I (3 semester hours)
- GEND 112 - The Scientific Mind: Physical Sciences (3 semester hours)
- IMED 140 - Introduction to Interactive Media (2 semester hours)
- SEMR 100 - Cornerstone (1 semester hour)

Total semester hours: 15

#### Spring Semester

- COMM 110 - Speech (3 semester hours)
- GEND 103 - The Creative Mind II (3 semester hours)
- GEND 113 - The Scientific Mind: Life Sciences (3 semester hours)
- CISC 120 - Programming I (4 semester hours)
- IMED 110 - Introduction to Digital Design (2 semester hours)

Total semester hours: 15

#### Summer Semester

*Optional*

### Second Year

#### Fall Semester

- COMM 225 - Cinema Studies (2 semester hours)
- ENGL 200 - Advanced Composition and Technical Writing (3 semester hours)

- IMED 170 - Visual Design Fundamentals (3 semester hours)
- MATH 280 - Introductory Statistics (3 semester hours)
- MEBA 210 - Introduction to Internet and Web Technologies (3 semester hours)
- SEMR 200 - Steppingstone (1 semester hour)

Total semester hours: 15

### Spring Semester

- IMED 240 - Interactive Media I (4 semester hours)
- IMED 250 - Video Production I (2 semester hours)
- IMED 255 - Audio Production (3 semester hours)
- IMED 265 - Front-End Web Development (3 semester hours)
- IMED 298 - Project I (3 semester hours)

Total semester hours: 15

### Summer Semester

*Optional*

### Third Year

#### Fall Semester

- IMED 300 - 3D Modeling I (3 semester hours)
- IMED 350 - Digital Photography (3 semester hours)
- IMED 365 - Internship (3 semester hours)
- IMED 370 - Producing Creative Projects (3 semester hours)
- MATH 210 - Discrete Mathematics I (3 semester hours)
- SEMR 300 - Keystone (1 semester hour)

Total semester hours: 16

#### Spring Semester

- GEND Electives (3 semester hours)
- GEND 201 - The Civic Mind (6 semester hours)
- IMED 340 - Interactive Media II (4 semester hours)
- IMED 498 - Project II (3 semester hours)

Total semester hours: 16

### Summer Semester

*Optional*

## Fourth Year

\* Graduate courses (see Graduate Catalog for course descriptions)

### Fall Semester

- GEND 351 - Organizational Mind (6 semester hours)
- IMED 460 - Mixed Reality Development (3 semester hours)
- LTMS 500 - Macro Instructional Design (3 semester hours) \*
- LTMS 510 - Learning Technologies and Solutions (3 semester hours) \*

Total semester hours: 15

### Spring Semester

- IMED 440 - Interactive Studio (4 semester hours)
- IMED Electives (2 semester hours)
- LTMS 514 - Media Selection, Design and Production (3 semester hours) \*
- LTMS 525 - Learning Theories and Instructional Strategies (3 semester hours) \*
- GEND Electives (3 semester hours)
- SEMR 400 - Capstone (1 semester hour)

Total semester hours: 16

### Summer Semester

*Optional*

## Fifth Year

### Fall Semester

- LTMS 518 - eLearning Development (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)
- LTMS Individualized Concentration Electives (6 semester hours)

Total semester hours: 12

### Spring Semester

- GRAD 699 - Graduate Thesis (3 semester hours)  
or
- LTMS 698 - Learning Technologies Internship (3 semester hours)  
or
- LTMS 699 - Applied Project in Learning Technologies (3 semester hours)

- LTMS Individualized Concentration Electives (9 semester hours)

Total semester hours: 12

Summer Semester

*Optional*

# Course Descriptions

## ADMA 115 - Microcomputer Applications in Technology

(3 semester hours)

**Prerequisites:** None

**Description:** Fundamental computer literacy skills for manufacturing in a Windows environment. Productivity software applications such as word processing, spreadsheets, OneNote, Microsoft Teams, Skype for Business, Access database and PowerPoint with an emphasis on organizing, accessing, managing and presenting data for personal and professional communication. Applications are applied to Gantt charts, return on investments calculations (ROI), critical path tasks, gated processing, lean manufacturing, quality control reports, inspection reports, and maintaining an engineering notebook. Offered Spring Semester, annually.

## ADMA 135 - Manufacturing Technology and Society

(2 semester hours)

**Prerequisites:** ADMA 115

**Description:** Manufacturing Technology and Society is an overview of the development and design of technical systems in society, their impact throughout history, and procedures for making choices of appropriate technology to apply currently and in the future, based on global awareness and strong moral and ethical standards. Topics of discussion include the agricultural revolution, industrial revolution, information revolution and the forces that brought them into existence and their downfalls. Lab activities and possibly visitations utilized to reinforce concepts. Offered Fall Semester, annually.

## ADMA 160 - Metallic Materials and Manufacturing Processes

(3 semester hours)

**Prerequisites:** ADMA 115

**Description:** This course is an overview of the selection, nondestructive testing, procedures, processing and application of metallic materials providing manufacturing-based solutions. Supporting topics to be covered in this course include the fundamentals of industrial safety, OSHA, lockout/tagout, finishing products and quality control. Lab activities, demonstrations and visitations may be utilized to reinforce concepts. Offered Spring Semester, annually.

## ADMA 230 - Applied Analog and Digital Electronics

(3 semester hours)

**Prerequisites:** ADMA 115

**Description:** This course is an introduction to analog and digital electronics as it relates to advanced manufacturing through hands-on activities centered around building and logically troubleshooting circuits and devices. The concepts and theories are covered in an industrial and/or an advanced manufacturing setting. Use of instrumentation is stressed with the application of problem-solving techniques. Offered Spring Semester, annually.

## ADMA 240 - Computer Assisted Drawing

(3 semester hours)

**Prerequisites:** None

**Description:** Computer Assisted Drawing is a basic course in computer-aided drawing, which integrates with manufacturing and automation. Content stresses learning major CAD commands and using the graphic user interface. Conceptual drawings, 2D drawings, 3D drawings, and spatial relationships are explored. Additional topics include file maintenance, printing formats, plotting and 3D printing are used to create two and three-dimensional design models. Offered Fall Semester, annually.

### **ADMA 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **ADMA 310 - Basics of Manufacturing Simulation**

(3 semester hours)

**Prerequisites:** None

**Description:** This course is the application of sophisticated computer simulation software for analysis of manufacturing operations, procedures and processes. The course includes an overview of server-based and cloud-computing applications to permit secure data sharing and collaborations in company partnerships. Team and individual projects with utilizing manufacturing simulation and data management applications will be applied and presented. Offered Spring Semester, annually.

### **ADMA 323 - Computer Assisted Product Design and Rapid Prototyping**

(3 semester hours)

**Prerequisites:** ADMA 240

**Description:** This course is based on, and not limited to, applied product design and rapid prototyping techniques. An introduction to the application of the cradle-to-grave engineering model will be used to design or redesign industrial solutions. The use of hand tools, 3D printers and equipment will be applied to quickly produce mockups of the developed solution and its presentation. Offered Spring Semester, annually.

### **ADMA 338 - Non-Metallic Materials and Processing**

(3 semester hours)

**Prerequisites:** None

**Description:** This course is an overview of the types of non-metallic materials, selection, destructive testing, processing and application of non-metallic materials including and not limited to natural, laminated, plastic, compounds and fluids provided through industrial based solutions. Lab activities, demonstrations and visitations may be utilized to reinforce concepts. Offered Spring Semester, annually.

### **ADMA 340 - Digitally Enhanced Manufacturing**

(3 semester hours)

**Prerequisites:** Permission of the Instructor

**Description:** The Digitally Enhanced Manufacturing course is an overview of the development design and application of the Internet of things (IoT) and Augmented Reality (AR) for manufacturing. IoT areas of study include data from products delivering data back to the manufacturer, their impact to date, and procedures for making choices of appropriate development and application of the technology as it applies currently and, in the future, based on global awareness and strong moral and ethical standards. AR for manufacturing will include the process needed to augment reality integrating hardware and software into a product that enhances industrial processes as explicit directions for executing a process and/or enhancing processes to provide a safer process execution. General topics of discussion for IoT and AR will include historical application of the technologies and

procedures, current applications and procedures, developing processes, techniques and analysis. Lab activities and possibly visitations will be utilized to reinforce concepts. Offered As needed.

### **ADMA 342 - Industrial Networking and Cybersecurity**

(3 semester hours)

**Prerequisites:** Permission of the Instructor

**Description:** The Industrial Networking and Cybersecurity course is an overview of the development of industrial networks and the methods available to secure the networks. The areas of study in industrial networking include an introduction to computer networks, physical layer cabling with twisted pair and fiber optics and wireless networking and their related hardware's. The areas of study in industrial cybersecurity include industrial control systems, insecure be inheritance, anatomy of ICS attacks, industrial control system risk assessments, the Purdue Model, the Defense-in-depth model, physical ICS security, ICS network security, ICS computer security, ICS application security, ICS device security and ICS cybersecurity program development. Offered As needed.

### **ADMA 345 - Designing and Rapid Prototyping with Solid Modeling**

(3 semester hours)

**Prerequisites:** ADMA 323

**Description:** Designing and Rapid Prototyping with Solid Modeling with parametric technology includes rapid prototyping, technical sketching, product design processes and the components/variables of good design are applied. Utilizing CAD solids modeling software to create part models and assemblies will be covered. Product designs are designed and analyzed for manufacturability, performance, and potential for profitability for a company. Oral presentations, patent searches and prototype development will be assigned and completed. Offered Fall Semester, annually.

### **ADMA 350 - Additive Manufacturing**

(3 semester hours)

**Prerequisites:** Permission of the instructor

**Description:** Additive manufacturing is the formalized term for what used to be called rapid prototyping and 3D Printing. This emerging technology is said to create a paradigm shift in methods and pace of production. In this course, basic principles and development of additive manufacturing, generalized process chain, photopolymerization, powder bed fusion, extrusion-based processes, material jetting, sheet lamination and directed energy deposition processes, direct write technologies, low cost systems, process selection guidelines, post processing and software issues, direct digital manufacturing, design for additive manufacturing, rapid tooling, applications, and future directions of the method will be covered. Offered as needed.

### **ADMA 360 - Subtractive Manufacturing**

(3 semester hours)

**Prerequisites:** Permission of the instructor

**Description:** The Subtractive Manufacturing course is a deep dive into the programming and use of the vertical milling machine and the lathe for preparation for certification on Mazak machines. The areas of study in subtractive manufacturing include Machine coordinate and programming coordinate systems, familiarization with Mazatrol functions and program creation, topics on turning, manual programming, topics on milling, multi-mode, line machining, tool data and tool file, virtual machining, machine simulation and arbitrary shapes. Offered as needed.

### **ADMA 362 - Nano Fabrication**

(3 semester hours)

**Prerequisites:** Permission of the instructor

**Description:** This course is an overview of the broad spectrum of processing approaches involved in "top down", "bottom up",

and hybrid nanofabrication. The majority of the course details a step by step description of the equipment, facilities processes and process flow used in today's device and structure fabrication. The student will be introduced to processing and manufacturing concerns such as safety, process control, contamination, yield, and processing interaction. The student will design process flows for micro- and nano-scale systems. The student will learn the similarities and differences in "top down" and "bottom up" equipment and process flows by undertaking hands-on processing. This hands-on overview exposure covers basic nanofabrication processes including deposition, etching, and pattern transfer. Offered as needed.

### **ADMA 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guides the learning process. The student integrates the collective observations, analyses, and reflections of the experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

### **ADMA 370 - CAD/CAM and Industrial Robotics**

(3 semester hours)

**Prerequisites:** None

**Corequisite:** ADMA 345

**Description:** This course is the conversion of CAD resources into NC machine code for the production of metallic and non-metallic products while integrated with industrial robots. Industrial robots will be introduced with hands-on programming of industrial robots and include tasks such as welding, palletizing, placement, finishing and robot integration into advanced manufacturing facilities. Offered Fall Semester, annually.

### **ADMA 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

### **ADMA 410 - Application of CAD/CAM and Industrial Robotics**

(3 semester hours)

**Prerequisites:** ADMA 370

**Description:** This course furthers the investigation into automation systems dealing with automated manufacturing practices in CNC machines, PLC's, vision systems, RFID and industrial robotics. Activities include automated handling and processing of materials using conveyors, positioners/work-holders and industrial robots. Computer Integrated Manufacturing techniques including technologies such as sensing, vision, automated product identification, storage and retrieval are covered. Offered Spring Semester, annually.

### **ADMA 420 - Advanced Manufacturing**



(3 semester hours)

**Prerequisites:** ADMA 410

**Description:** This course is an introduction to advanced manufacturing techniques including setup and use of current and advanced material processing machines and devices, includes 5 axis milling, laser cutting, water knife utilization, EDM processing, digitization and multiple 3D printing experiences. Offered Fall Semester, annually.

### **ADMA 430 - Programmable Logic Controllers and Integrations**

(3 semester hours)

**Prerequisites:** ADMA 230

**Description:** This course is the application of a combination of digital and analog logic technologies that will lay down a framework from which programmable logic controllers are programmed. The concepts of inputs, outputs, relay logic and ladder logic are addressed. Industrial robots and automated devices will be introduced, on-line as well as pendant programming, to include tasks such as pick and place, finish application and device integration. Offered Fall Semester, annually.

### **ADMA 455 - Manufacturing Automation Systems (CIM/FMS)**

(3 semester hours)

**Prerequisites:** ADMA 420

**Description:** This course is the approach of using computers to control the entire production process utilizing closed-loop control processes, based on real-time input from scenarios. The student will totally complete the digitization of manufacturing scenarios into advanced manufacturing scenarios in this course by including the application of CAD/CAM techniques. Offered Spring Semester, annually.

### **ADMA 465 - Simulation of Systems and Integrations**

(3 semester hours)

**Prerequisites:** ADMA 310

**Description:** This course is the application of sophisticated computer simulation software for a complete analysis of manufacturing operations and processes for a cradle to grave evaluation. Ground up individual and team projects utilizing simulation software, active data collection and storage to refine the manufacturing process that is controlled while providing and implementing efficiencies. Offered Spring Semester, annually.

### **ADMA 480 - Application of Advanced Manufacturing**

(3 semester hours)

**Prerequisites:** None

**Description:** This course is the application of the completed advanced manufacturing suite of resources, which will be applied to solve several different manufacturing issues/projects provided by manufacturing experts. The cradle to grave experience documents the project and then delivered in professional presentations and papers. Offered Spring Semester, annually.

### **ADMA 498 - Project II**

(3 semester hours)

**Prerequisites:** ADMA 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## **ANLY 400 - Analytics Tools and Techniques**

(3 semester hours)

**Prerequisites:** MATH 280

**Description:** The use of analytics is a common practice in modern business settings. This course introduces the basic concept and practice of analytics and its role in business. The emphasis is on the tools and techniques of analytics with case studies and examples. Topics include: data querying and reporting; data access and management; data cleansing; statistical programming; data mining introduction; relational databases; and, statistical analysis of databases. The student is also introduced to Business Intelligence (BI) and statistical methodology (i.e. clustering, decision tree, etc.) along with using popular analytics packages such as SAS, Google Analytics, Business Objects, Aginity, and others. Offered Fall Semester, annually.

## **ANLY 405 - Predictive Modeling**

(3 semester hours)

**Prerequisites:** ANLY 400 and MATH 380

**Description:** The development and implementation of models to predict outcomes based on input data is becoming an essential skill in modern enterprises. The objective of this course is to teach this skill. The course covers the principles of qualitative as well as quantitative models that can be used for predicting outcome based on input data. The predictions may be definitive, based on the assumptions or estimates based on probabilities. The student explores how to prepare input data, build predictive models, and assess the models by examining the output produced. Topics include: exploratory data analysis, linear regression, multiple linear regression, regression diagnostics, logistics regression, analysis of variance (ANOVA), time series and forecasting, statistical methods for process improvement, classifiers, and nonlinear models. General concepts behind how software packages roll up and how they screen data and produce risk scores on topics such as in-patient probability of readmissions. Offered Fall Semester, annually.

## **ANLY 415 - Advanced Analytics and Reporting**

(3 semester hours)

**Prerequisites:** ANLY 400 and ANLY 405

**Description:** The student is introduced to deterministic and stochastic decision tools used by leading corporations and applied researchers. The student utilizes these tools to solve complex, real-world problems, building on the basic theoretical understanding of optimization, simulation and predictive modeling obtained in prerequisite courses. The student works with commercial decision modeling programs such as Premium Solver professional (linear, integer and non-linear optimization), TreePlan (decision-trees), Crystal Ball (simulation), and OptQuest (optimization under uncertainty). Throughout the course, the importance of outside-the-model considerations, model limitations, and sources of modeling error are stressed while general frameworks for approaching particular problem types are developed. Offered Spring Semester, annually.

## **BIOL 102 - General Biology**

(3 semester hours)

**Prerequisites:** None

**Corequisite:** BIOL 103

**Description:** This course introduces the student to the major themes of biology, including properties of living organisms, comparison of eucaryotes vs. prokaryotes, patterns of inheritance, the central dogma, mitosis and meiosis, the diversity of life in both plants and animals, classification of organisms, evolution, metabolism, photosynthesis, cell structures, basic structure of the body, infectious disease, the Hardy-Weinberg principle, biodiversity, ecosystems, and the biosphere. A broad understanding of biology and living organisms in the biosphere is developed through hands-on, multimodal engaged learning opportunities in both the classroom and the companion laboratory component. Three hours of lecture, three hours of laboratory per week. Offered Fall and Spring Semester, annually.

## **BIOL 103 - General Biology Laboratory**

(1 semester hour)

**Prerequisites:** None

**Corequisite:** BIOL 102

**Description:** Companion laboratory component that demonstrates the major themes of biology presented in BIOL 102. Three hours of lecture, three hours of laboratory per week. Offered Fall and Spring Semester, annually.

## **BIOL 210 - Introduction to Bioinformatics**

(4 semester hours)

**Prerequisites:** MATH 120 and BIOL 102-BIOL 103 or BTEC 170

**Description:** Developing automated ways to deal with vast quantities of scientific information is an essential part of modern research. Bioinformatics aims to link scant pieces of seemingly unrelated information. This discipline seeds the very origins of new lines of scientific research investigations. Bioinformatics is shaping many research disciplines from genetics and molecular biology through to drug discovery, computer science, and even entomology. Offered Spring Semester, annually.

## **BIOL 214 - Anatomy and Physiology I**

(4 semester hours)

**Prerequisites:** BIOL 102-BIOL 103

**Description:** This course discusses the structural and functional makeup of the human body. Medical and anatomical terminology is mastered, and an emphasis is placed on covering the details of development, histology and functioning of the muscular, circulatory, cardiovascular and endocrine systems. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

## **BIOL 215 - Anatomy and Physiology II**

(4 semester hours)

**Prerequisites:** BIOL 214

**Description:** This course studies the immune system, lymphatic system, gastrointestinal tract and digestion, genitourinary system, and the nervous system. An in-depth examination of the five senses is also conducted. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

## **BIOL 225 - Entomology**

(4 semester hours)

**Prerequisites:** BIOL 102-BIOL 103

**Description:** This course introduces the biology, ecology and evolution of insects in both naturalistic and human contexts. Subject matter and course content includes field observation and collection techniques in addition to case studies of evolutionary, economical and historical importance. Three hours of lecture, three hours of laboratory per week. Offered Summer Semester, even-numbered years.

## **BIOL 281 - Cell Biology Lecture**

(3 semester hours)

**Prerequisites:** C or higher in BIOL 102-BIOL 103

**Corequisite:** BIOL 282

**Description:** This course examines the foundations of cell biology including the structure, function, differentiation, and growth of the eukaryotic cell. It is primarily concerned with eukaryotic cells from their evolution, organization, differentiation and biosynthesis. The simplicity and complexity of macromolecules in the cell are covered through multi-modal learning technologies on nutrition, energy production, and synthesis of cellular components. The student develops a thorough

understanding of the mechanisms underlying mitosis and meiosis, the cell cycle, and cancer. Three hours of lecture, three hours of laboratory per week. Offered Fall and Spring Semester, annually.

### **BIOL 282 - Cell Biology Laboratory**

(1 semester hour)

**Prerequisites:** C or higher in BIOL 102-BIOL 103

**Corequisite:** BIOL 281

**Description:** Companion laboratory component that examines the foundations of cell biology including the structure, function, differentiation, and growth of the eukaryotic cell. It is primarily concerned with eukaryotic cells from their evolution, organization, differentiation and biosynthesis. The simplicity and complexity of macromolecules in the cell are covered through multi-modal learning technologies on nutrition, energy production, and synthesis of cellular components. The student develops a thorough understanding of the mechanisms underlying mitosis and meiosis, the cell cycle, and cancer. Three hours of lecture, three hours of laboratory per week. Offered Fall and Spring Semester, annually.

### **BIOL 302 - Principles of Ecology**

(4 semester hours)

**Prerequisites:** BIOL 102-BIOL 103 or permission of instructor

**Description:** This course examines theories (including a variety of mathematical, verbal, and graphical models of important ecological processes), techniques of study (both laboratory and field-based), and natural history. The student explores: 1) various questions (in a broad sense) asked by ecologists; 2) ideas (theories, models) from which hypotheses are suggested to answer the questions; and 3) ways in which ecologists go about gathering data to refute or support the proposed hypotheses. Specific ecological studies are used to illustrate what has been learned about the natural world. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### **BIOL 305 - Evolution**

(3 semester hours)

**Prerequisites:** BIOL 102-BIOL 103

**Description:** This course reviews evidence for evolution prior to Darwin's seminal work and follows through to modern neo-Darwinist concepts. Natural selection, phenotypic and genotypic variation, population biology, extinction, and speciation are covered. The student examines mechanisms of evolutionary change. Material looks at different scales and perspectives from molecular to ecological, generational changes in populations, as well as observable patterns over millennia. Offered Spring Semester, odd-numbered years.

### **BIOL 320 - Genetics**

(3 semester hours)

**Prerequisites:** BIOL 281-BIOL 282 and CHEM 151-CHEM 152, or BS-Nursing Major, or permission of instructor

**Description:** This course is an introduction to human and population genetics including Mendelian and non-Mendelian genetics (DNA replication, transcription, and translation; genetic recombination and mutation), genetic basis of gender (sex-linked and non-sex linked genetic diseases), and emerging areas of genetics research. The student connects facts together to get a whole picture, to apply knowledge, then to solve a problem. Basic genetics introduces the student to the traditional elements of genetic biology and contemporary genetic topics. Offered Spring Semester, annually.

### **BIOL 330 - Microbiology**

(4 semester hours)

**Prerequisites:** BIOL 281-BIOL 282 and CHEM 151-CHEM 152

**Description:** This course is an introduction to microbial cell structure, growth and physiology combined with basic laboratory

techniques. The relationship between host and parasite is emphasized, especially as related to human disease, epidemiology and infection control. A broad range of infectious diseases are covered, including etiologic agent identification, modes of transmission and prevention. Three hours of lecture, three hours of laboratory per week. Offered Fall and Spring Semester, annually.

### **BIOL 370 - Molecular Biology**

(4 semester hours)

**Prerequisites:** BIOL 281-BIOL 282 and CHEM 151-CHEM 152

**Description:** The complicated process that goes on in living cells and organisms, in terms of the law of chemistry and physics, is described. The genetic message is examined, as it is carried in the form of DNA through transcription and translation as well as the biosynthesis of macromolecules. The course is designed to follow chemistry (general and organic) and biology coursework to complete an understanding of life chemistry. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### **BIOL 375 - Immunology**

(4 semester hours)

**Prerequisites:** BIOL 281-BIOL 282

**Corequisite:** BIOL 320 (Can be taken prior to or at the same time as BIOL 375.)

**Description:** This advanced course explores the specific innate and acquired aspects of the immune system. Innate host defenses, which protect humans against disease and foreign contaminants, are examined. Cellular immune response interaction with viral infections, foreign cells, or defective host cells are covered as to how the humoral immune response produces antibodies against foreign antigen and how these immune responses are controlled. Through an understanding of the nature of antibodies, lymphokines and specific cellular reaction, the student discovers the power and limitation of the immune system. This course also includes a significant laboratory component focusing on the analysis of blood cells, enzyme-linked immunosorbent assays (ELISAs), blood typing, and rapid commercial test technologies. Three hours of lecture, three hours of laboratory per week. Offered as needed.

### **BIOL 380 - Special Topics in Biology**

(3 semester hours)

**Prerequisites:** Consent of the instructor and academic advisor

**Description:** This course covers topics in biology. It is an in-depth study of a selected specialized area of biology and the content varies by semester. Offered As needed.

### **BTEC 100 - Nanobiotechnology Explorations**

(2 semester hours)

**Prerequisites:** None

**Description:** This is an introductory course to nanobiotechnology, which is the use of existing elements of natural systems to develop new technologies. The concepts of how nano-structures are characterized are defined and a review is conducted of the applications of this new technology. The course includes a laboratory component in addition to lecture component. Offered Fall Semester, annually.

### **BTEC 101 - Exploring Biotechnology Through Food, Science, and Cooking**

(2 semester hours)

**Prerequisites:** None

**Description:** This course provides an overview of basic science and technology through the lens of food and cooking. The student explores the importance of biology, physics, and chemistry in creating food flavor, texture, aroma, and consistency.

Visiting chefs explain techniques used to create food products in the kitchen while the student engages in interactive, experiential learning activities to understand the related scientific principles. The student is also being introduced to scientific methods used to evaluate food products. Offered Summer Semester, annually.

### **BTEC 102 - Exploring Nanobiotechnology**

(1 to 2 semester hours)

**Prerequisites:** None

**Description:** Nanobiotechnology is a STEM field gaining significance as the next industrial revolution due to its diversely applied nature with career opportunities for high-paying jobs. This course aims at introduction of Nanobiotechnology, which is the use of very small natural (DNA and protein-based) and man-made structures to develop new and innovative technologies. The course allows the student to learn the unique concepts and applications of nanostructures in various fields of life spanning medicine, pharma, food, environment, biomedical devices, and many more. The course includes several cool hands-on activities to reinforce the concepts. The student works on a small class project that involves a small paper and a presentation. Limited to the Dual Enrollment student. Offered Summer Semester, annually.

### **BTEC 103 - Food Biotechnology - Farm to Fork**

(1 semester hour)

**Prerequisites:** None

**Description:** This course focuses on the role of biotechnology in Food and Ag industry. Probiotic yogurts, nutritionally enriched crops, drought and pest resistant plants, intelligent packaging, and processed food - all involve biotechnology processes. The student will learn the structure and function of DNA and its applications. The class will cover the many methods DNA can be altered to create genetically modified organisms (GMOs)/products. The student will discuss the use of GMOs in today's society focusing on the pros and cons primarily in Ag-Food industry. This class also includes several labs for the student to review biotechnology applications as they create food products such as cheese and yogurt. The course also allows the student to explore various ways biotechnology creates efficient and advanced Ag/food products. Limited to the Dual Enrollment Student. Offered Summer Semester, annually.

### **BTEC 104 - Special Topics**

(1 to 2 semester hours)

**Prerequisites:** Based on topic(s) covered or permission of instructor

**Description:** This course covers topics in biotechnology. Limited to the Dual Enrollment student. Offered As needed.

### **BTEC 105 - The Art of Genes and Fusion**

(3 semester hours)

**Prerequisites:** None

**Description:** The student is introduced to molecular concepts regarding DNA, genes, proteins, and chromosome mapping to describe the importance of biotechnology to help combat human diseases and disorders. The student examines links between diseases and genes, such as leukemia and cancer. Lastly, the student will use case studies and contemporary topics in biotechnology and genetic engineering to understand the significance of gene manipulation in technology development. Offered As needed.

### **BTEC 106 - Emerging Medical Biotechnologies**

(1 semester hour)

**Prerequisites:** None

**Description:** Healthcare is getting revolutionized due to new medical biotechnologies. These are rapidly changing healthcare practices. Novel methods for Diagnostics and Medical Imaging now allow detection of Cancer in very early stages, even before

the symptoms appear. Biomedical devices such as Blood Glucose monitoring systems or insulin patches have helped millions. Prosthetics and other biomedical devices are being redefined with new looks and mind-boggling functionalities. Pharma companies are buzzing with development of new drugs, novel drug packaging, targeted drug delivery, and so on. Regenerative medicine and Tissue Engineering are making significant progress as well. This course introduces the student to cellular concepts, biotechnology basics, and their role in development of various medical biotechnologies. Limited to the Dual Enrollment Student. Offered Summer Semester, annually.

### **BTEC 107 - Special Topics in Biotechnology**

(1 to 3 semester hours)

**Prerequisites:** None

**Description:** This course covers emerging topics in biotechnology. It is an in-depth study of a selected specialized area of biotechnology and the content varies by semester. Offered As needed.

### **BTEC 110 - Medical Terminology**

(1 semester hour)

**Prerequisites:** BIOL 102/BIOL 103 or High School Biology or permission of instructor

**Description:** This course is designed as an introduction to the nomenclature used by various medical and dental professionals. The course focuses on learning techniques that will enable the student to easily understand medical terminology. Cross-listed with INSC 110. Offered As needed.

### **BTEC 170 - Introduction to Biotechnology**

(3 semester hours)

**Prerequisites:** BIOL 102-BIOL 103 or BTEC 105 or High School Biology or permission of instructor

**Description:** Biotechnology explores biological processes to produce raw materials, foodstuffs, and medical treatments for use by humans. The industry is key for generating income worldwide and feeds into the pharmaceutical, textile, food and agricultural industries. The course centers on three main goals: 1) to understand the biological processes involved in biotechnology methods; 2) to identify and criticize the benefits and drawbacks of current methods; and 3) to review new emerging technologies that focus on ecological solutions. Offered Fall Semester, annually.

### **BTEC 200 - Introduction to Quality and Food Safety**

(3 semester hours)

**Prerequisites:** None

**Description:** Overview of quality and food safety spanning all segments of the food industry. Topics include: meat, dairy, poultry, confectionary, and bakery segments including allied industry involvement. Offered As needed.

### **BTEC 210 - Food and Nutrition**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course provides an overview of the diet and nutritional requirements of protein, energy, whole grains, major vitamins and minerals and other food groups that are determinants of health and diseases in human populations. The sources, recommended intake, role of major nutrients, and metabolism are explored, in addition to case studies that address the impact of nutrition on human growth and development of chronic or acute diseases (i.e. cancer, diabetes, heart disease, etc.). Offered Spring Semester, annually.

### **BTEC 220 - Applied Nanobiotechnology**

(4 semester hours)

**Prerequisites:** BTEC 100 or permission of instructor

**Description:** This course addresses applications of nanobiotechnology for various fields such as medicine, drug-delivery, food and environment. The student explores how various nanostructures can be "functionalized" to perform targeted interactions. The need, application, limitations, and ethical positions for these topics are covered through a multimodal approach of lecture, lab, presentations, group discussions and interactive modules. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

## **BTEC 222 - Emerging Laboratory Techniques**

(4 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course covers the planning, execution and implementation of experimental design, the first step toward independent research. The problem areas covered center primarily on abstract principles that are difficult to convey in the standard lecture format. Accordingly, this course is laboratory intensive with visual and hands-on experiments used to reinforce concepts. Three hours of lecture, three hours of laboratory per week. Offered As needed.

## **BTEC 235 - Applied Cell and Agro Culture**

(4 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** The fields of biology, biochemistry, molecular biology and biotechnology are increasingly dependent on growing and experimenting with cells in culture. This course offers a concise, practical guide to the basic essentials of the techniques used in a modern cell culture laboratory. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, even-numbered years.

## **BTEC 240 - Techniques for Biomolecular Research**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course gives an in-depth, hands-on experience to fundamental laboratory techniques applied to bio-molecular research to the student in life sciences. The Biotech (life science in general) industry heavily depends on ability for use of these techniques for extraction, purification and characterization of biomolecules (proteins, a variety of types) using several bioanalytical techniques. This course allows the student to get a "life-at-the-bench" experience in application of these techniques. The course covers topics related to successful design of protocols for extraction, purification, characterization, and analysis of structure-function relationship of biomolecules for application in diagnostics, therapeutics, and several industrial applications. It also offers experience in using instrumentation generically used in medical, pharmaceutical, environmental, and other BTEC industries with an introduction to Good Laboratory Practices (GLP). Offered Spring Semester, annually.

## **BTEC 250 - Medical Biotechnologies of 2020**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** The field of biotechnology is evolving quickly with innovative technologies. The course covers the concept of biomarkers, its application in diagnostics and therapeutics. Topics such as pharmacogenomics, gene therapy, medical imaging, regenerative medicine, prosthetics, and point of care devices are at the interface of emerging medical technologies and applied biotechnology. This course serves to introduce the student to these emerging trends and technologies in the field of medical biotechnology. Offered Spring Semester, annually, or as needed.

## **BTEC 298 - Project I**



(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

## **BTEC 311 - Pharmacology I**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course studies how specific small molecules can impact and affect body behavior and responses. Small molecules or drugs made by man or from nature can modulate special gates and enzymes. These concepts are the first step into the world of pharmacology. The understanding of this course depends heavily on knowing what is considered normal for the body. Consequently, human physiological systems are featured as an integral part of this course. Offered Fall Semester, annually.

## **BTEC 320 - Drug Design and Development**

(3 semester hours)

**Prerequisites:** BTEC 311 or permission of instructor

**Description:** New drug discovery is a long process with soaring costs as the level of scientific complexity increases through research. This course is structured to follow the discovery process and is reliant on outside specialists and speakers. Offered Spring Semester, annually.

## **BTEC 340 - Forensic Biotechnology**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course is designed to introduce the student to the hands-on techniques and opportunities in the field of biotechnology for the forensic field. The course covers topics including introduction to biotechnology, DNA applications in forensic investigation, spectroscopic techniques, molecular biotechnology, and DNA fingerprinting, etc. The course will cover various techniques used in biotechnology (very significant for forensics) such as PCR, DNA immobilization, and DNA diagnostics. There will be field visits, case studies, and group discussions about the latest events in the field of forensic biotechnology. Offered as needed.

## **BTEC 350 - Biotechnology Techniques**

(4 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course develops the skills, competencies, and fundamentals of research procedures in biotechnology. The student is exposed to a variety of relevant biotechnology techniques in the laboratory at research or commercial centers. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

## **BTEC 351 - Biotechnology Applications**

(4 semester hours)

**Prerequisites:** BTEC 350 or permission of instructor

**Description:** This laboratory-intensive course examines the various applications in the field of biotechnology at a molecular

level, which aids the understanding of cellular mechanisms. The power, limitation, proper use and theoretical framework around biotechnology applications are explored. Biotechnology-related workforce growth, and the area corporations involved in this field, provide case study illustrations. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **BTEC 355 - Neurology and Biotechnology**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course will provide a comprehensive overview of the molecular biology and genetic basis of both age-related and injury-induced neurological diseases. Biotechnological research on the molecular mechanisms of neurological pathologies, focusing on unique as well as common mechanisms of age- and injury-related conditions, can lead to emerging diagnostic methods and result in more effective treatments, therapeutic assessments, and strategies for prevention. Offered Spring Semester, Annually.

### **BTEC 361 - Food Biotechnology Seminar**

(1 semester hour)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course reviews advances and applications in the field of food biotechnology. Class activities include primary article reviews, internet research, critiquing of research articles and presentations on topics from food biotechnology such as safety and quality issues with the food industry and applications of food technology in the food safety and quality protocols. Offered Spring Semester, annually.

### **BTEC 362 - General Biotechnology Seminar**

(1 semester hour)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course reviews newsworthy advances and application in the field of biotechnology. Class activities include primary article reviews, internet research, critiquing of research articles and presentations on topics from general biotechnology, such as the ethics of biotechnology. Offered Spring Semester, annually.

### **BTEC 363 - Nanobiotechnology Seminar**

(1 semester hour)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course reviews newsworthy advances and applications in the field of biotechnology. Class activities include primary article reviews, internet research, critiquing of research articles and presentations on topics from nanobiotechnology and its application. Offered Spring Semester, annually.

### **BTEC 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

**BTEC 370 - Genetically Modified Foods**

(3 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course explores the impact of plant and animal biotechnology on food nutrition and provides an understanding of the techniques and methods in genetically-modified food products. The advantages and disadvantages of genetically modified foods are explored, in addition to cultivation, production, processing, and manufacturing concerns that are related to genetically modified foods. A broad knowledge of the current laws governing use of genetically modified foods, ethical discussions surrounding production of these foods, and the global impact of those laws are studied. Offered Spring Semester, even-numbered years.

**BTEC 371 - Food Science and Technology**

(4 semester hours)

**Prerequisites:** BTEC 170 or permission of instructor

**Description:** This course explores the fundamental principles of food science including the nature of foods, causes of deterioration, and related advances in technology used in food processing, production, and preservation. The student becomes familiar with the types of micro-organisms that are utilized in the food industry, in addition to the control and prevention of food-borne illnesses through biotechnology and quality-control case studies. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, even-numbered years.

**BTEC 380 - Special Topics in Biotechnology**

(1 to 4 semester hours)

**Prerequisites:** None

**Description:** This course covers emerging topics in biotechnology. It is an in-depth study of a selected specialized area of biotechnology and the content varies by semester. Offered As needed.

**BTEC 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

**BTEC 401 - Biosensor Technology**

(4 semester hours)

**Prerequisites:** BTEC 100 or permission of instructor

**Description:** The course covers aspects such as: what is a biosensor, the types of biosensors, and how to develop a specific assay for a specific detection system. Also covered are the major techniques used in developing and functionalizing nanoparticles for specific biosensor assays. Applications of biosensor technology in medical diagnostics, environmental monitoring, bioremediation and quality control in the food industry are reviewed. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

**BTEC 405 - Applied Food Microbiology**

(3 semester hours)

**Prerequisites:** BTEC 200

**Description:** This course provides insight into the most recent developments of food-borne pathogens, toxins, and contaminants that may occur in a food production plant environment. The course is delivered in classroom and laboratory environments and includes a mixture of theory, demonstrations, and practical sessions on the fundamentals of food microbiology and food safety. Offered As needed.

## **BTEC 411 - Pharmacology II**

(3 semester hours)

**Prerequisites:** BTEC 311

**Description:** This course covers how specific small molecules affect body behavior and response. Various areas of pharmacology are explored, with a special focus on the central nervous system. The drugs covered modulate and alter signals that are in turn interpreted by special gates and enzymes, but pathways and control are typically more complex. These concepts mirror those of other disciplines, in particular biochemistry and molecular genetics, and require critical and procedural thought. A primary component of this course is an understanding of what is considered normal for the body. Accordingly, human physiological systems are studied as an integral part of this course. Offered As needed.

## **BTEC 420 - Food Safety and Quality Assurance**

(3 semester hours)

**Prerequisites:** BTEC 200 or permission of instructor

**Description:** This course explores the fundamental principles of food quality assurance and quality control based on the principles of Safe Quality Foods (SQF) and Hazard Critical Control Point (HACCP) planning. The student becomes familiar with the seven HACCP principles for controlling food safety within the food processing, production, and manufacturing environments. In addition, the student is shown basic and advanced principles for safely managing quality assurance and quality control (QA/QC) within the food industry. Offered Spring Semester, annually.

## **BTEC 435 - Computer-Aided Drug Design**

(4 semester hours)

**Prerequisites:** BIOL 210 or permission of instructor

**Description:** Conducting drug research in a directed and specific manner previously relied on how many small molecules could be tested per unit time. Over recent years, more and more drug design is coordinated with available literature and modern databases containing overwhelming amounts of information. To identify new potential drug molecules, automation has become essential to narrow the field before embarking on a biological screening process. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

## **BTEC 498 - Project II**

(3 semester hours)

**Prerequisites:** BTEC 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## **CHEM 151 - General Chemistry I Lecture**

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 220

**Corequisite:** CHEM 152

**Description:** This course provides a general introduction to atoms and molecules, stoichiometry, states of matter, solutions, reactions, kinetics and equilibrium which serve as a prerequisite for advanced courses. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### **CHEM 152 - General Chemistry I Laboratory**

(1 semester hour)

**Prerequisites:** MATH 120 or MATH 220

**Corequisite:** CHEM 151

**Description:** Companion laboratory component that illustrates the general introduction to atoms and molecules, stoichiometry, states of matter, solutions, reactions, kinetics and equilibrium which serve as a prerequisite for advanced courses. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### **CHEM 161 - General Chemistry II**

(3 semester hours)

**Prerequisites:** C or higher in CHEM 151-CHEM 152

**Corequisite:** CHEM 162

**Description:** A study of chemical principles including acid/base chemistry, bonding, thermodynamics and electrochemistry. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **CHEM 162 - General Chemistry II Laboratory**

(1 semester hour)

**Prerequisites:** C or higher in CHEM 151-CHEM 152

**Corequisite:** CHEM 161

**Description:** Companion laboratory component that illustrates the study of chemical principles including acid/base chemistry, bonding, thermodynamics and electrochemistry. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **CHEM 200 - Environmental Chemistry I**

(3 semester hours)

**Prerequisites:** C or higher in CHEM 151-CHEM 152

**Description:** An introductory investigation of current concerns and problems dealing with chemistry of the environment. Chemistry of the atmosphere, biosphere and hydrosphere are examined and discussed. Offered Fall Semester, even-numbered years.

### **CHEM 210 - Organic Chemistry I**

(4 semester hours)

**Prerequisites:** C or higher in CHEM 161-CHEM 162

**Description:** This course with laboratory is designed as a first-level introduction to the carbon-based reactions involved in life chemistry. The course focuses on the nomenclature, structure and fundamental basis for reactivity of organic compounds. It sets a background for advanced study in forensic or environmental chemistry and biochemistry. Three hours of lecture, three hours of laboratory per week. Offered Fall and Summer Semester, annually.

### **CHEM 220 - Organic Chemistry II**

(4 semester hours)

**Prerequisites:** C or higher in CHEM 210

**Description:** This course builds upon the principles learned in the first course and is designed to provide a foundation in the fundamentals of organic compounds, their structures, reactions, and underlying reaction mechanisms. Three hours of lecture, three hours of laboratory per week. Offered Spring and Summer Semester, annually.

### CHEM 310 - Environmental Chemistry II

(4 semester hours)

**Prerequisites:** CHEM 200

**Description:** This laboratory-intensive course addresses specific topics related to environmental chemistry; specifically, the transport of chemicals and energy amongst soil, air and water phases, rates of movement of solutes, and the chemical impact to biological systems. This is an advanced course specifically tailored for the student in the integrative sciences program of study or with specific interest in environmental chemistry. This course is required for the environmental chemistry concentration. Three hours of lecture, three hours of laboratory per week. Offered as needed.

### CHEM 315 - Analytical Chemistry

(4 semester hours)

**Prerequisites:** CHEM 161/CHEM 162 and MATH 280

**Description:** This course introduces theoretical and practical aspects of quantitative chemical analysis: primary analysis, error analysis, data handling; solution equilibria and acid-base titrations; spectrophotometry. The laboratory component emphasizes proper analytical techniques. Offered Fall Semester, annually.

### CHEM 320 - Bio-Organic Chemistry

(3 semester hours)

**Prerequisites:** CHEM 220

**Description:** This course is designed as an advanced undergraduate study of the structure and reactivity of carbon-based biomolecules. Approximately one-half of the course is devoted to a description of the structure and chemical properties of bio-organic compounds. The second half of the course draws upon the concepts from organic and inorganic chemistry in order to investigate enzymatic reactions and metabolism. Offered Fall Semester, odd-numbered years.

### CHEM 325 - Instrumental Chemical Analysis

(4 semester hours)

**Prerequisites:** CHEM 161-CHEM 162 and MATH 280

**Description:** This course introduces instrumental and method design, function, and operation applied to chemical analysis. The laboratory component emphasizes hands-on instrument use, data analysis, and unknown identification. Offered Spring Semester, annually.

### CHEM 330 - Biochemistry I

(4 semester hours)

**Prerequisites:** CHEM 210

**Description:** This course is an in-depth study of several classes of biomolecules: proteins, carbohydrates, and lipids. The course emphasizes the chemistry that dictates the structure and functions of biological molecules. Particular focus is given to: 1) amino acid and protein chemistry; 2) enzyme activity; and, 3) combination of the major classes of biological molecules to form biological membranes. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### CHEM 340 - Forensic Chemistry

(4 semester hours)

**Prerequisites:** CHEM 161-CHEM 162, MATH 280

**Description:** This course surveys the applications of science in a criminal investigation with a laboratory-based examination of the methods and analyses from a fundamental chemical perspective. Proper evidence sampling methods are introduced. This laboratory intensive course provides the student hands-on analytical experience with solution preparation, techniques for chemical separations of complex samples, preliminary, and/or confirmatory chemical tests for different types of evidence such as documents, fibers, body fluids, hair, and drugs. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, even-numbered years.

### **CHEM 350 - Biochemistry II**

(4 semester hours)

**Prerequisites:** CHEM 330

**Description:** This course is a detailed study of carbohydrate and fatty acid metabolism including biochemical thermodynamics. An in-depth study of nucleic acids and how their chemistry dictates their structure and biological function is also presented. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **CHEM 380 - Special Topics in Chemistry**

(3 semester hours)

**Prerequisites:** Consent of the instructor and academic advisor

**Description:** This course covers topics in chemistry. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

### **CHEM 420 - Bioinorganic Chemistry**

(3 semester hours)

**Prerequisites:** CHEM 210

**Description:** This course provides the student an advanced level of understanding of inorganic chemistry and its role in biological molecules. The relationship between structure, bonding, and reactivity of transition metals is discussed with a primary focus on coordination chemistry. Offered Fall Semester, odd-numbered years.

### **COMM 110 - Speech**

(3 semester hours)

**Prerequisites:** None

**Description:** This course builds on the skills acquired in ENGL 105 or ENGL 106. The student continues to study the process of effective communication, based on an understanding of purpose and audience using speaking techniques such as enunciation and modulation. The student builds an understanding of the basic skills needed to communicate across disciplines. Offered Each semester, annually.

### **COMM 225 - Cinema Studies**

(2 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106 and GEND 102

**Description:** This survey course investigates major movies, historical events, schools of thought, and developments in the history of film and mass communication. Through readings, lectures, and independent research, the student focuses on the relationships between history, technology, and media development and explores the impact motion media and mass communication have on society and the economy. Cross-listed with GEND 225. Offered Fall Semester, annually.

### **CISC 100 - Lego Robotics Programming**

(3 semester hours)

**Prerequisites:** Two years of high school algebra or equivalent

**Description:** This course provides an introduction to mobile robots and the fundamental concepts of programming by using Lego Mindstorms RCX robots. Lectures are followed by hands-on exercises performed in groups, where creativity is a key component. The primary goal is to obtain both visual and textual programming skills while promoting social aptitudes such as leadership and teamwork. Offered Summer Semester, annually.

### **CISC 101 - Exploring Lego Robotics**

(2 semester hours)

**Prerequisites:** None

**Description:** This course introduces mobile robots and the fundamental concepts of programming using Lego Mindstorms robots. Lectures are followed by hands-on labs where creativity and problem solving are key components. The primary goal is to obtain both visual and textual programming skills while promoting social aptitudes such as leadership and teamwork. Limited to the Dual Enrollment student. Offered Summer Semester, annually.

### **CISC 103 - Introduction to Computers & Information Sciences**

(4 semester hours)

**Prerequisites:** None

**Description:** This course serves as an introduction to computing and information systems. It uses both lecture and laboratory practice to introduce the student to the use of computers to solve problems. The student is presented the techniques, concepts, analysis, and reports on experiences and technologies and trends. This includes the concepts of hardware, software, networking, computer security, programming, database, e-commerce, decision support systems, and other emerging technologies. The student is introduced to techniques that search, evaluate, validate, and cite information found online. Widely-used applications including word processing, spreadsheets, databases, presentation, and web development software are also studied. Offered Spring Semester, annually.

### **CISC 104 - Special Topics**

(1 to 4 semester hours)

**Prerequisites:** Based on topic(s) covered or permission of instructor

**Description:** This course covers topics in Computer & Information Sciences. Offered Summer Semester, only.

### **CISC 106 - Special Topics**

(1 to 4 semester hours)

**Prerequisites:** Based on topic(s) covered or permission of instructor

**Description:** This course covers topics in Computer & Information Sciences. Offered As needed.

### **CISC 120 - Programming I**

(4 semester hours)

**Prerequisites:** MATH 120 or MATH 140

**Description:** This course introduces the concepts and techniques of computer programming. Emphasis is placed on developing the student's ability to apply problem-solving strategies to design algorithms and to implement these algorithms in a modern, structured programming language. Topics include fundamental programming constructs, problem solving techniques, simple data structures, Object- Oriented Programming (OOP), program structure, data types and declarations, control statements, algorithm strategies and algorithm development. Offered Fall and Spring Semester, annually.

### **CISC 140 - Programming II**



(3 semester hours)

**Prerequisites:** CISC 120

**Description:** This course builds upon fundamental concepts of programming and introduces several more advanced concepts. Emphasis is placed on the practical applications of the techniques and structures, as opposed to abstract theory, in the hopes of rendering the content accessible and useful in the context of using programming as a tool to solve problems. Topics covered include the basics of Object-Oriented Programming (OOP), sorting and searching algorithms, and basic data structures. Offered Fall and Spring Semester, annually.

### **CISC 160 - Data Structures**

(3 semester hours)

**Prerequisites:** MATH 210 (or taken concurrently) and CISC 120

**Description:** This lecture and laboratory course further develops the concepts and techniques of computer programming. Emphasis is placed on structured programming, top-down design, more advanced data structures, and the proper use of the programming language and development tools. Topics include abstract data types (ADTs), sets, records, recursion, problem solving and algorithms, fundamental computing algorithms, searching, introductory sorting, hash tables, basic algorithm analysis, Object-Oriented Programming (OOP), files, linked lists, queues, stacks, and binary trees. Offered Fall and Spring Semester, annually.

### **CISC 211 - Computer Organization and Architecture**

(4 semester hours)

**Prerequisites:** MATH 210 (or taken concurrently) and CISC 120

**Description:** The goal of the course is to teach the design and operation of a digital computer. It serves the student in two ways: First, for those who want to continue studying computer architecture, embedded systems, and other low-level aspects of computer systems, it lays the foundation of detailed implementation experience needed to make the quantitative tradeoffs in more advanced courses meaningful; and, second, for a student interested in other areas of computer science, it solidifies an intuition about why hardware is as it is and how software interacts with hardware. The subject matter covered in the course includes technology trends and their implications, performance measurement, instruction sets, computer arithmetic, design and control of a datapath, pipelining, memory hierarchies, input and output, and brief introduction to multiprocessors. Offered Fall and Spring Semester, annually.

### **CISC 225 - Information System Design and Analysis**

(3 semester hours)

**Prerequisites:** CISC 160 or permission of instructor

**Description:** This course is a foundation for database design and database security courses. Systems Analysis and Design is a fundamental, active field in which analysts continually learn new techniques and approaches to develop systems more effectively and efficiently. There is a core set of skills that all analysts need to know no matter what approach or methodology is used. All information systems projects move through the four phases of planning, analysis, design, and implementation; all projects require analysts to gather requirements, model the business needs, and create blueprints for how the systems should be built; and all projects require an understanding of organizational behavior concepts like change management and team building. This course captures the dynamic aspects of the field by keeping the student focused on doing Systems Analysis and Design while presenting the core set of skills that the analyst needs to know. Offered Fall and Spring Semester, annually.

### **CISC 233 - Essential Algorithms**

(3 semester hours)

**Prerequisites:** MATH 210 and one of the following, CISC 140 or CISC 160

**Description:** This course covers the basic techniques used to analyze problems and algorithms, including asymptotic, upper/lower bounds, and best/average/worst case analysis. Amortized analysis, complexity, and basic techniques are used to design algorithms (important classical algorithms including sorting, string, matrix, and graph algorithms). The goal for the

student is to be able to apply all the above to design solutions for real-world problems. Offered Fall and Spring Semester, annually.

### **CISC 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **CISC 300 - Web Technologies**

(3 semester hours)

**Prerequisites:** CISC 225 or MEBA 210

**Description:** The student studies, explores and examines tools and technologies used in web applications and web services. Coursework is accomplished both individually and in teams to build, launch, and market a website for a community member or as a university project. Topics include HTML, CSS, Java and Java scripting, database, and SQL. Offered Fall Semester, annually.

### **CISC 301 - Operating Systems**

(3 semester hours)

**Prerequisites:** CISC 211 and CISC 233

**Description:** This course provides an introduction to the design and implementation of operating systems. The student is exposed to different operating systems on various computer platforms and is expected to develop a significant operating system programming project in this area. Topics include operating systems principles, computer architecture, concurrency threads, CPU scheduling and dispatching, memory management techniques, computer security and system administration using Windows XP, Unix and Linux. Offered Fall and Spring Semester, annually.

### **CISC 320 - Computer Forensics**

(3 semester hours)

**Prerequisites:** CISC 211 and CISC 233

**Description:** This course provides the student with a unique hands-on experience in digital forensics using case studies. Emphasis is placed on computer incident responses and security risk assessments. Technical and legal issues regarding computer evidence are also covered, including the collection, analysis, and reporting of digital evidence to aid in the investigation. Computer evidence preservation is stressed using cross-validation of forensic tools and the documentation of computer evidence findings. Computer evidence processing methodologies and practices are also reviewed to combat legal challenges against the admissibility of computer-related evidence. Offered Fall Semester, annually.

### **CISC 325 - Programming Languages Concepts and Paradigms**

(3 semester hours)

**Prerequisites:** CISC 233 and MATH 310

**Description:** This course introduces the student to the fundamental concepts in design and implementation of programming languages. We examine the evolution and the theory of language design with respect to syntax and semantics of programming language. Different approaches to programming paradigms and feature inclusions are discussed both with respect to their utility

for developers as well as the underlying programming models which enable these features. This course examines the full range of programming models and language paradigms, starting from imperative, functional, logic programming to the latest object-oriented programming languages. Offered Fall and Spring Semester, annually.

### **CISC 330 - Computer Networks**

(4 semester hours)

**Prerequisites:** CISC 211

**Description:** The essential topics in computer (digital) and network security are covered. Areas covered include viruses, computer crime, web server security, denial of service attacks, authentication protocols, firewalls, Trojan horses, intrusion detection, data encryption methods, public key cryptography (RSA, DES), email viruses, attachments, spy ware, digital homeland security in wireless technologies and mobile computing. The student is expected to develop a significant programming project in this area. Offered Fall Semester, annually.

### **CISC 333 - Defensive Programming**

(3 semester hours)

**Prerequisites:** CISC 233

**Description:** This course provides the student with a hands-on experience in secure programming using encryption standards and case studies. Emphasis is placed on computer secure programming practices and programming security tools used for risk assessments. Technical and legal issues regarding unsecure or poorly designed software. Software tools as static code analyzer and fuzzers are used to detect flaws (bugs) in applications. Student conduct code reviews of their peers' class and lab programs. National Institute of Standards and Technology (NIST) encryption standards are studied and stressed as defensive programming requirements. Student use NIST encryption in their programs to protect and secure programs and data. Offered Spring Semester, annually.

### **CISC 340 - Introduction to Artificial Intelligence**

(4 semester hours)

**Prerequisites:** CISC 233 and MATH 310

**Description:** This course introduces intellectual issues and intelligent systems in the computer field. Topics include: Fundamentals of intelligent systems, artificial intelligence (AI), AI search strategies, knowledge representation, privacy rights and civil liberties, intellectual property, digital copyrights and patents, social and ethical issues, intelligent (Internet) agents, intelligent manufacturing systems, and robotics. Offered Spring Semester, annually.

### **CISC 349 - Smartphone Programming**

(3 semester hours)

**Prerequisites:** CISC 225 and CISC 233

**Description:** This course introduces the student to mobile computing and mobile application design process. This includes designing, implementing, testing, debugging, and publishing smartphone applications with an emphasis on Android mobile operating system. Mobile computing will be discussed from three perspectives: mobile technology, mobile networking, and mobile security. As a major deliverable of the course, the student will complete an application development project with the goal of releasing the application on Android market place. Offered Spring Semester, annually.

### **CISC 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the

workplace at an off-site placement, where ideas are tested, and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

### **CISC 370 - Ethical Hacking**

(3 semester hours)

**Prerequisites:** CISC 330 and CISC 333

**Description:** Teaching the student how to hack is a legitimate means of identifying a company's network weaknesses and can be an effective component of computer security. This course introduces the student to the role of an ethical hacker and the essential hacking technologies required. The different phases involved in hacking are exploited. The student is introduced to the techniques of penetration testing, intrusion testing, and "red-teaming." The student also reviews of the legal considerations for working as an ethical hacker. Offered Spring Semester, annually.

### **CISC 380 - Special Topics in Computer Science**

(3 semester hours)

**Prerequisites:** 60 credit hours completed and consent of the instructor and academic advisor

**Description:** This course covers emerging topics in Computer and Information Science. It is an in-depth study of a selected specialized area of Computer and Information Science and the content varies by semester. Offered Fall Semester, annually.

### **CISC 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** CISC 120 and a minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

### **CISC 397 - Principle of Software Engineering and System Analysis**

(3 semester hours)

**Prerequisites:** CISC 225 and CISC 301

**Description:** This course develops specific programming designs and specifications and the formal methods used. It is particularly important that the student place a great deal of emphasis in understanding the different design models and the sections covering requirements analysis and system specification. Developing a complete set of requirements and specifications is one of the more difficult and critical tasks in software engineering. During the course, the student is involved with a real problem solving/software development situation. The student is required to gather functional requirements, identify the problem, form a solution and present this solution to a prospective customer. Offered Fall Semester, annually.

### **CISC 399 - Formal Languages and Automata Theory**

(3 semester hours)

**Prerequisites:** CISC 233 and MATH 310

**Description:** This course presents a study of formal languages and the correspondence between language classes and the automata that recognize them. Formal definitions of grammars and acceptors, deterministic and non-deterministic systems,

grammar ambiguity, finite state and push-down automata, and normal forms will be discussed. Offered Fall and Spring Semester, annually.

### **CISC 400 - Computer Graphics**

(3 semester hours)

**Prerequisites:** CISC 301 and MATH 250

**Description:** This course covers the fundamental techniques behind applications such as PhotoShop, medical MRIs, video games, and movie special effects. It begins by building a mathematical model of the interaction of light with surfaces, lenses, and an imager. The student then studies the data structures and processor architectures that allow for efficiently evaluating that physical model. The student completes a series of programming assignments for both photorealistic image creation and real-time 3D rendering using C++, OpenGL, and GLSL. These assignments cumulate in a multi-week final project. Topics covered in the course include projective geometry, ray tracing, bidirectional surface scattering functions, binary space partition trees, matting and compositing, shadow maps, cache management, and parallel processing of GPUs. This is a core CS course. Offered Fall Semester, annually.

### **CISC 411 - Elements of Computing Systems**

(3 semester hours)

**Prerequisites:** CISC 301 and CISC 399

**Description:** This course covers the integration process of key notions from algorithms, computer architecture, operating systems, compilers, and software engineering in one unified framework. This is done constructively, by building a general-purpose computer system from the ground up. In that process, ideas and techniques used in the design of modern hardware and software systems are explored and discussed. This course provides in-depth overview of computer systems: sources of complexity and design principles, modularity, abstraction, layering, hierarchy, memory management, interpreters, and compilers along with operating systems design and management. Offered Fall Semester, annually.

### **CISC 431 - Natural Language Processing**

(3 semester hours)

**Prerequisites:** CISC 399

**Description:** This course introduces the fundamental concepts and ideas in natural language processing (NLP), otherwise known as computational linguistics. It develops an in-depth understanding of both algorithms for processing linguistic information and the underlying computational properties of natural languages. Word-level, syntactic, and semantic processing from both a linguistic and an algorithmic perspective are covered, aiming to get current with present research in the area. The course focuses on modern quantitative techniques in NLP using large corpora, statistical models for acquisition, disambiguation, and parsing and the construction of representative systems. Offered Spring Semester, annually.

### **CISC 432 - Statistical Pattern Recognition**

(3 semester hours)

**Prerequisites:** MATH 280 and 60 credit hours completed

**Description:** Many emerging applications, such as indexing, security, forensics, and information discovery, involve the use of novel ideas and effective techniques in teaching computers to recognize patterns in various signals and data, ranging from documents, images, audio, and other sensory signals. This course includes the introduction to basic theories, algorithms, and practical solutions of statistical pattern recognition. Topics covered include feature extraction, feature selection, Bayesian classifiers, neural networks, discriminative classifiers, clustering, performance evaluation, and fusion of models. The student gets some hands-on experience in the design, implementation and evaluation of pattern recognition algorithms by applying them to real-world problems. Offered Fall Semester, annually.

### **CISC 440 - Wireless Security Management**

(3 semester hours)

**Prerequisites:** CISC 370 and 60 credit hours completed

**Description:** This course exposes the student to authentication, access control, and auditing (the 3As), which are the fundamental mechanisms required in enterprise security management for countering the various types of threats on wireless based systems. The student is presented with an approach to managing enterprise security policies using wireless devices in order to effectively monitor and defend trusted domains. Specifically, the student will describe security architecture for designing and implementing a wireless-enabled solution for enterprise security management. Offered Spring Semester, annually.

## **CISC 460 - Database Management System**

(3 semester hours)

**Prerequisites:** CISC 225 and MATH 310

**Description:** This course introduces the management of database systems, with strong emphasis on understand the fundamentals of a Relational Database Management Systems (RDBMS). Central topics include data modeling and normalization, database architecting, and database creation using SQL as both the data definition and data manipulation language. Through these concepts, the student will design and implement a full database system, including all tables, views, triggers, functions, and procedures necessary for use at deployment. This course will also introduce the student to more advanced topics within field of database management such as physical database implementation, index creation, distributed databases, NoSQL systems, and big data. Offered Fall Semester, annually.

## **CISC 491 - Software Development Processes and Quality**

(3 semester hours)

**Prerequisites:** CISC 397

**Description:** This course provides the student with a project-oriented practice in software engineering by covering popular process models and the steps associated with these models. Topics covered in this course include software principles, software processes, software design, software project management, and software evolution knowledge units, etc. The student is expected to learn this course through practical programming exercises and software development in a "learning-by-doing" manner, i.e., the student works in teams to develop a significant medium-sized software system using practices covered and recommended in this course. After successful completion of this course, the student is expected to be well-prepared to develop software systems in a collaborative environment or to continue graduate study in related fields. Offered Spring Semester, annually.

## **CISC 498 - Project II**

(3 semester hours)

**Prerequisites:** CISC 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## **CISC 499 - Industry Software Ethics**

(3 semester hours)

**Prerequisites:** Senior Status

**Description:** Ethical obligations have both a professional and a personal dimension. Each are essential to consider; without a sense of personal ethics, one would be indifferent to their effect on the lives of others in circumstances where one's professional code is silent. So personal ethics helps us to be sure that we take full responsibility for our moral choices and their consequences. This course teaches the student how to gain knowledge and understanding of a number of aspects of this claim, including: the types of harms the public can suffer as result of this work; how software engineers contribute to the food life for others; who

exactly are the "public" to whom the engineer is obligated; why the software engineer is obligated to protect the public; what other ethical obligations software engineers are under; how software engineers can actually live up to ethical standards; what is the end goal of an ethical life in software engineering; what are the professional codes of software engineering ethics. Cross-listed with GEND 465. Offered Spring Semester, annually.

### **ENGL 005 - College Composition Recitation**

(0 semester hour)

**Prerequisites:** Placement by assessment

**Corequisite:** ENGL 105

**Description:** This course is offered as a companion to ENGL 105 for the student that requires improvement of college-level composition skills and serves as an opportunity to develop the foundations necessary to succeed in subsequent courses. Offered Each semester, annually.

### **ENGL 050 - Basic English**

(3 semester hours)

**Prerequisites:** None

**Description:** This course develops the foundation composition skills necessary to succeed in required composition courses. Credits do not count towards graduation requirements Offered As needed.

### **ENGL 105 - College Composition**

(3 semester hours)

**Prerequisites:** Placement by assessment

**Description:** This first-year composition course is an introduction to college-level writing strategies. By reading various writing styles and genres, the student will contemplate how purpose and audience guide the writing process. Writing assignments are to be completed according to a deadline with a goal of improving style, grammar, and diction. Offered Each semester, annually.

### **ENGL 106 - Academic Writing and Critical Thinking**

(3 semester hours)

**Prerequisites:** Placement by assessment

**Description:** This course introduces the student to academic writing expectations and techniques for reading critically, researching effectively, and writing persuasively. The student is shown how to use critical thinking as a tool for composition development. Writing assignments are to be completed according to a deadline with a goal of improving expanded thought and technical writing. Offered Fall Semester, annually.

### **ENGL 200 - Advanced Composition and Technical Writing**

(3 semester hours)

**Prerequisites:** Minimum of 30 earned semester hours including GEND 102, ENGL 105 or ENGL 106 and COMM 110

**Description:** This course introduces the student to technical communication and prepares the student for designing and producing technical documents. Practice strategies are used for effective professional and technical writing to produce documents in various formats with attention to clarity and design. Offered Each semester, annually.

### **ENGL 300 - English Language Literature**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106

**Description:** This course covers original literature written in the English language. The student studies the exemplary works of

literary genres, the author(s), elements of the genre, and the historical context within which the genres developed, in order to understand the connection between the works in a genre and that the history of people leads to such a body of work. Offered Spring and Summer Semester, annually.

### **ENGL 305 - The Art of the Narrative**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106 and GEND 102

**Description:** In this course the student will study the structure of narrative by exploring how stories take shape in the five art forms of poetry, fiction, non-fiction, drama, and film. The student examines the unique elements of each of these forms of art and also how the art forms borrow elements from each other. The course also explores how the structure of a narrative both creates and enhances the narrative's meaning. This exploration includes viewing narratives from five literary perspectives: formalist, historical, psychological, archetypal/mythological, and reader-response. Coursework will include creative as well as analytical writing. Offered As needed.

### **ENGL 310 - Creative Writing**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106

**Description:** The student is familiarized with professional fiction writing through the short story, with a focus on idea generation, scene setting, characterization and plot. Other forms of fiction writing, appropriate to student needs and interests, such as gaming, screenplays, or works of various lengths, are discussed. Cross-listed with GEND 310 and IMED 320 Offered Fall Semester, annually.

### **ENGL 380 - Special Topics**

(1 to 6 semester hours)

**Prerequisites:** Placement by assessment

**Description:** This course covers topics related to composition, literature or language arts. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

### **ENVS 100 - Environmental Studies Seminar**

(1 semester hour)

**Prerequisites:** None

**Description:** This introductory seminar class serves to orient the student with both the Environmental Science and Sustainability program offerings as well as possible career paths accessible to the student graduating with a degree in Environmental Science and Sustainability. Additionally, this course will highlight the importance of communication, teamwork, collaboration, and civic engagement in promoting environmental stewardship. Offered Fall Semester, annually.

### **ENVS 101 - Introduction to Environmental Science**

(4 semester hours)

**Prerequisites:** None

**Description:** Environmental science is the study of natural ecosystems, human impacts on the environment, and sustainable management of the Earth's resources. Processes of the physical and biological environment are used as a basis for consideration of current environmental topics. Other areas covered include: energy consumption and global warming, water and air pollution, waste management, impacts of deforestation on biodiversity, and other environmental changes occurring on a global scale. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **ENVS 104 - Our Ocean World**



(3 semester hours)

**Prerequisites:** None

**Description:** This course investigates the historical, geological, physical, chemical, and biological characteristics of the ocean environment. The basic language of marine science, and its underlying principles, are explored. The student pursues an understanding of the underwater history of the plant and the importance of the sciences, including the scientific method of research. Offered As needed.

## **ENVS 110 - Introduction to Controlled Environmental Agriculture**

(1 semester hour)

**Prerequisites:** None

**Description:** This course presents an introduction to the environmental and economic benefits of controlled environmental agriculture (CEA) as well as the relevant scientific principles as they apply to the CEA field, including the areas of aquaponics, hydroponics, vertical farming, etc. The business and management of running a CEA facility will also be introduced. Offered as needed.

## **ENVS 201 - Introduction to Geology**

(3 semester hours)

**Prerequisites:** ENVS 101

**Description:** This course is designed to give the student a tour through the planet Earth; from the inside to the outside and from the past to the present. The large-scale structure of the Earth, formation of mountains, explosive processes like volcanoes, earthquakes, and how water, glaciers, and other weather processes can shape the landscape are covered. Offered Fall Semester, annually.

## **ENVS 211 - Introduction to Renewable Energy Systems**

(3 semester hours)

**Prerequisites:** ENVS 101

**Description:** This course presents: photovoltaics, solar thermal systems, green building, fuel-cells, hydrogen, wind power, waste heat, biofuels, wave power, tidal power, and hydroelectric. Discussions of environment and social policy are integral components of the course. Offered Spring Semester, as needed.

## **ENVS 220 - Principles of Hydrology**

(4 semester hours)

**Prerequisites:** ENVS 201

**Description:** This course covers the hydrologic cycle in great depth and will also examine how humans utilize their water resources. It also delves into the properties of water, physical and chemical, and subsurface flow. Field methods, regional hydrogeology, and subsurface contamination investigations are all covered. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, as needed.

## **ENVS 230 - Soils in the Critical Zone**

(4 semester hours)

**Prerequisites:** ENVS 201

**Description:** This course centers on the overlap of soil science, environmental science, and geology. Our goal is to explain the fundamental principles in soil sciences and introduce the concept of the "Critical Zone," where water, rock, biology, and atmosphere interact as a system. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, as needed.

## **ENVS 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate, and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **ENVS 301 - Global Change: Physical Processes and Human Impact**

(3 semester hours)

**Prerequisites:** ENVS 201

**Description:** This course examines the physical processes and potential human impact of global climate change. The physical, chemical, and biological cycles contributing to the global environment are covered with the study of the recent explosive growth of the human population and the impacts on land, air, and water resources and on biological diversity produced by human advances in technology and society. Offered Fall Semester, even-numbered years.

### **ENVS 302 - Environmental Regulation and Management**

(3 semester hours)

**Prerequisites:** None

**Description:** This course covers the fundamental approaches of managing land, air, and water resources for environmental protection and pollution control. The course also covers compliance with environmental laws, regulations, and policies currently in effect. Offered Fall Semester, odd-numbered years.

### **ENVS 303 - Environmental Impact of Agriculture and Industrial Pollutants**

(3 semester hours)

**Prerequisites:** MATH 300 and BTEC 311

**Description:** The effects of human activities on the surrounding environment and water supplies are discussed from the perspective of pollutants entering water systems. A rational solution to the water supply problem may become an economic and environmental priority in the next 20 to 30 years. Offered Spring Semester, as needed.

### **ENVS 350 - Ecosystem Management and Restoration**

(4 semester hours)

**Prerequisites:** BIOL 302

**Description:** The student is introduced to ecosystem management through both lecture and field studies, with introductions to impacted, restored, and managed areas. This course investigates ideas and concerns of ecosystems through basic theories to discussions of case studies. Local areas of consideration and concern are visited and assessed using techniques introduced through course materials. The student is expected to be well-versed to argue for or against various corrective actions, depending on different views and interests. Several protection groups and their goals, both inside and outside of government, are discussed. Successful ecosystem restoration requires a balance between site conditions and needs, as well as human impact and use necessities. The course also includes the "human factors" of economics, politics, and tradition in finding working solutions for management. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, even-numbered years.

### **ENVS 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

## **ENVS 380 - Special Topics in Environmental Science**

(3 semester hours)

**Prerequisites:** Consent of the instructor and academic advisor

**Description:** This course covers topics in environmental science and renewable energy. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

## **ENVS 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

## **ENVS 401 - Environmental Modeling**

(3 semester hours)

**Prerequisites:** ENVS 201 and MATH 220

**Description:** This course uses environmental models to examine environmental policies. Topics presented are: basic modeling ideas, including the systems modeling approach, model formulation, prediction, and validation. Offered Spring Semester, even-numbered years.

## **ENVS 402 - Field Study of Environmental Pollutants**

(3 semester hours)

**Prerequisites:** ENVS 303, MATH 300 and BTEC 311

**Description:** The course presents cross-discipline exposure. Topical research, specialist knowledge, and sampling to identify the presence of pharmaceutical or agricultural agents from water locally are practiced. Cataloging, reporting, and presenting findings subject the student to meaningful and extensive exposure to scientific methods, troubleshooting, design, and execution of environmental science-based experiments. Offered Spring Semester, as needed.

## **ENVS 498 - Project II**

(3 semester hours)

**Prerequisites:** ENVS 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration. It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be

encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

### **ESPT 110 - Competitive Gaming Seminar**

(1 semester hour)

**Prerequisites:** None

**Description:** In this introductory course the student will explore the esports ecosystem; from its history to a review of current industry trends. The student will receive a broad understanding of various topics of esports through lectures, guest speakers and case studies. Offered Fall Semester, annually.

### **ESPT 120 - Introduction to Esports**

(4 semester hours)

**Prerequisites:** None

**Description:** This course is an overview of the esports industry. The student will explore financial, legal, ethical, marketing and operational issues surrounding esports. The goal is to gain insight and knowledge in esports as it relates to academic specializations and career opportunities. Offered Spring Semester, annually.

### **ESPT 210 - Contemporary Issues in Esports**

(4 semester hours)

**Prerequisites:** None

**Description:** The student will use inquiry skills to examine the issues that influence the esports industry. We will explore issues such as the history of esports, the political, social economics implications of a global industry. Further, we will explore the role that socio-cultural issues such as race, ethnicity, class, gender, sexuality, (dis)ability and age play in the understanding and practice of esports. The student will engage in research, discussion and problem solving in order to better understand and assess significant current issues. Offered Fall Semester, annually.

### **ESPT 220 - Social Media Management**

(4 semester hours)

**Prerequisites:** ENGL 200

**Description:** Social media is changing how business is done around the world in almost every industry. The business world is undergoing fundamental changes in how consumers identify, engage and support brands and connections. This course equips the student with the relevant knowledge, perspectives, and practical skills required for developing marketing strategies that leverage the opportunities inherent in social media and consumer-to-consumer social interactions for achieving business goals. Offered Spring Semester, annually.

### **ESPT 230 - Esports Broadcasting**

(3 semester hours)

**Prerequisites:** None

**Description:** In this course, the student will learn the fundamentals of various components of esports media such as writing strategies for broadcast, active voice, internet streaming, shooting on location, anchoring, play-by-play, and production of the various forms of esports media. Additionally, the student will examine economic, ethical, gender, and race issues in esports media. This experiential course offers the student an opportunity to apply knowledge and skills to esports production activities on campus. Offered Spring Semester, annually.

### **ESPT 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered as needed.

### **ESPT 310 - Live Event Management**

(4 semester hours)

**Prerequisites:** ESPT 210

**Description:** This course focuses on the essential components needed for planning, building, managing, and closing of live events and projects. The student will gain general knowledge of techniques and strategies used for successful planning, promotion, implementation and evaluation of live events such as concerts, esports competitions and conferences. Offered Fall Semester, annually.

### **ESPT 320 - Esports Field Studies**

(3 semester hours)

**Prerequisites:** ESPT 310 or permission of instructor

**Description:** This experiential learning course is designed to provide extensive exposure to the roles, responsibilities, and challenges of planning, managing, and producing live events. The student will gain practical experience by taking on production roles at one of several esports events. Course assessments will be based on individual pre-event planning assignments, field notes, and final experiential summary paper and presentation. Offered Spring Semester, annually.

### **ESPT 330 - Live Event Production**

(3 semester hours)

**Prerequisites:** ESPT 210 or IMED 250

**Description:** Streaming live events is more than pointing a webcam and turning on a laptop. Streaming has expanded the reach of traditional broadcast while also opening the industry to more roles and specialized skillsets. In this course students will plan, design, and produce several live stream events. The student will research current technologies, apply best practices, and reflect upon the process for esports and live event production. Offered Spring Semester, annually.

### **ESPT 340 - Business Models and Trends in Esports**

(3 semester hours)

**Prerequisites:** None

**Description:** This course provides the student with a deep understanding of the current marketplace for digital entertainment and electronic sports in preparation for successful careers in the esports and/or digital media industries. With a focus on entrepreneurialism, the student will cover a wide range of business, management and legal issues, including an overview of current business models in esports marketing and management. Topics will include pitching concepts, funding sources, copyright and intellectual property issues, production management techniques, revenue streams, and partnerships for aspiring entrepreneurs. Offered Spring Semester, annually.

### **ESPT 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guides the learning process. The student integrates the collective observations, analyses, and reflections of the experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship and represents the evolutionary and dynamic nature of the learning process. Offered as needed.

### **ESPT 380 - Special Topics in Esports Management, Production and Performance**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course covers emerging topics in Esports Management, Production and Performance. It is an in-depth study of a selected specialized area and the content varies by semester. Offered as needed.

### **ESPT 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered as needed.

### **ESPT 410 - Fan Engagement Strategies**

(4 semester hours)

**Prerequisites:** ESPT 220 or ESPT 310

**Description:** Events like the Super Bowl, Olympics and World Cup that rally the country around a national team generally drive heavy fan engagement. For regular season play, however, pro teams are increasingly challenged to find new ways to connect or retain fans in an era where in-arena attendance is down. Today, fans have countless ways to watch games, check scores and keep up with teams and players, be it via broadcast television, social media or streaming services. In this course, the student will use this digital shift to explore new opportunity for sports brands to leverage data to boost engagement and revenues. Offered Fall Semester, annually.

### **ESPT 420 - Leadership**

(4 semester hours)

**Prerequisites:** ESPT 320

**Description:** This course offers a comprehensive review of contemporary issues and perspectives on esports leadership, including current trends and classical leadership theories. The emphasis is on application of concepts in actual leadership settings and situations. Topics include development of leadership theories, personal assessment and development, values and ethics, motivation, power, followership, group dynamics, multiculturalism in leadership, conflict resolution, performance excellence, and the change process. Through a process of readings, self-discovery, group observations, and case studies, the student will identify, observe, analyze, and apply new leadership behaviors. Offered Spring Semester, annually.

### **ESPT 498 - Project II**

(3 semester hours)

**Prerequisites:** ESPT 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered as needed.

## **NPTH 110 - Foundations in Information Technology**

(2 semester hours)

**Prerequisites:** None

**Description:** The course focuses on the basic of computer hardware, software, mobile computing, networking, troubleshooting, and emerging technologies. The student learns about configuring operating systems, file and folder management, networks and network configuration, and the role of the OSI model in networking and troubleshooting. A fundamental understanding of computer hardware, operating systems, computer application software, networking technologies and protocols, web browsers, identifying security risks, troubleshooting errors, and system maintenance is gained. The course also included an exploration of cutting-edge technologies such as cloud computing and virtualization. Limited to the student enrolled in NuPaths. Offered as needed.

## **NPTH 120 - The Fundamentals of Productivity Software**

(3 semester hours)

**Prerequisites:** None

**Description:** The skills needed to increase productivity with data management, scheduling, and email management in Microsoft Excel and Outlook are developed in this course. Limited to the student enrolled in NuPaths. Offered as needed.

## **NPTH 130 - Technical Support for the Modern Enterprise**

(3 semester hours)

**Prerequisites:** None

**Description:** Confidently handle the most challenging technical support issues across a variety of computer hardware and operating systems. The course covers the essential principles of installing, building, upgrading, repairing, configuring, troubleshooting, optimizing, and preventative maintenance on desktop and laptop computers. Elements of the customer service and communication skills necessary to work with clients while providing technical support are also explored. Limited to the student enrolled in NuPaths. Offered as needed.

## **NPTH 150 - Windows Server Administration Fundamentals**

(3 semester hours)

**Prerequisites:** NPTH 110

**Description:** The course combines fundamental networking and server administration concepts for broad knowledge and skills in network and server installation, maintenance, and basic security. Limited to the student enrolled in NuPaths. Offered as needed.

## **NPTH 210 - The Fundamentals of Networks and Security**

(3 semester hours)

**Prerequisites:** NPTH 110

**Description:** The course combines fundamental networking and security concepts for broad knowledge and skills in network installation, maintenance, and security. Fundamental networking and security concepts are explored, and hands-on experience is

applied to Windows Server, Windows-based networking, anti-malware, and firewalls. Limited to the student enrolled in NuPaths. Offered as needed.

### **NPTH 220 - IT Security Operations**

(3 semester hours)

**Prerequisites:** None

**Description:** The course addresses the vital fundamentals of security to support the principles of confidentiality, integrity, and availability. Security layers, authentication, authorization, and accounting are explored, along with network security to protect the Server and Client. The student also learns to install and configure systems to secure applications, networks, and devices; perform threat analysis and respond with appropriate mitigation techniques; participate in risk mitigation activities; and operate with an awareness of applicable policies, laws, and regulations. The student prepares to take the Microsoft Technology Associate: Security Fundamentals and the CompTIA Security+ certification exams. Limited to the student enrolled in NuPaths. Offered as needed.

### **FORS 125 - Forensic Science**

(3 semester hours)

**Prerequisites:** None

**Description:** This course explores the science and art of forensic investigations and the identification, proper collection and recognition of evidence. The student looks at a variety of specialty areas such as firearms, tool marks, fiber tracing, hair paint, toxicology and photography. Crime scenes are explored using critical thinking skills to produce alternative strategies by thinking creatively. Experts in forensics are guest presenters. Fundamentals of the science behind the crime are explored. Case studies are presented as group projects and the student is expected to provide several scenarios and evidence for alternative conclusions. Offered Spring Semester, annually.

### **FORS 160 - Introduction to Forensic Computing**

(3 semester hours)

**Prerequisites:** None

**Description:** Computers are increasingly critical to forensic investigations. This course introduces the student to the basics of computer-stored data and methods of hiding, erasing and recovering data from storage media. It also explores the relationship between computer technology and crime scene investigation. Offered Spring Semester, odd-numbered years.

### **FORS 270 - Crime Scene Investigation**

(3 semester hours)

**Prerequisites:** None

**Description:** This is a fundamental course in forensic death investigations. The areas of specialized focus include the causes, manner, physical circumstances, and mechanisms of both natural and unnatural deaths. Death scenes are examined and investigations reviewed, with evidence pertaining to how people die. In addition, the course looks at the various legal considerations and methods germane to concluding equivocal death determinations. Offered Spring Semester, annually.

### **FORS 315 - Forensic Entomology**

(4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** The forensic entomologist can use a number of different techniques including insect species succession, larval weight, length, and technical methods such as the accumulated degree-hour technique. The student is introduced to standard forensic procedures and, when practical, will see and use those procedures. Three hours of lecture, three hours of laboratory per week. Offered Summer Semester, odd-numbered years.



### **FORS 360 - Forensic Case Study**

(3 semester hours)

**Prerequisites:** FORS 125 and FORS 270

**Description:** This course stresses field work and the application of collected evidence in the sometimes messy real world. The student analyzes several case studies, looking beyond the verdicts or newspaper reports to the actual workings of forensic science's involvement in the prosecution of criminal cases. Offered Spring Semester, annually.

### **FORS 361 - Criminal Profiling**

(3 semester hours)

**Prerequisites:** FORS 125 and FORS 270

**Description:** This course examines the process of profiling during the investigation of a crime. The process of psychological profiling was first institutionally used by the Federal Bureau of Investigation, but there are now multiple models for criminal profiling. The student studies the various models and how they relate both to expert witness standards and scientific methodologies. The course also examines the differences of these models and their application in case studies. Offered Fall Semester, annually.

### **FORS 362 - Medico-Legal Death Investigation**

(3 semester hours)

**Prerequisites:** FORS 125 and BIOL 215

**Description:** This course is a study of the process known as medico-legal death investigation. The course introduces the student to the legal systems surrounding the investigation of the cause and manner of death. The role of forensic pathology and the application of pathology to law are studied in relation to crime scene investigation. Natural, accidental, homicide and suicide deaths are explored in the perspective of the forensic pathologies. Offered Fall Semester, annually.

### **FORS 363 - Forensic Population Studies**

(3 semester hours)

**Prerequisites:** FORS 125, FORS 270 and MATH 280

**Description:** This course utilizes large data sets to discern large scale crime patterns. The student is introduced to crime databases and follows criminal activity patterns correlated to such variables as physical area, time or economics. This course involves research design and statistical analysis and is a group project-driven course. Offered Spring Semester, odd-numbered years.

### **FORS 364 - Fraud**

(3 semester hours)

**Prerequisites:** FORS 125 and FORS 270

**Description:** This course examines all aspects of fraud investigation, including medical and corporate fraud. Case studies are used and guest speakers employed in the field of fraud investigation are presenters. Practical knowledge of investigation techniques and knowledge of the common traits existing in fraud cases are examined. Offered As needed.

### **FORS 365 - Crime Scene Management**

(3 semester hours)

**Prerequisites:** FORS 125

**Description:** This course provides a practical introduction to criminal investigation and reflects the most recent investigative techniques and technology. The course outlines the fundamentals of inquiry and detail each element of an investigation. The course covers from the outset of an investigation, case preparation, and prosecution. Offered Fall Semester, annually.

### **FORS 366 - Interrogation Techniques**

(3 semester hours)

**Prerequisites:** FORS 125

**Description:** This course introduces the student to the principles of interview and interrogation by using innovative and effective techniques for obtaining information and detection of deception. The course also develops knowledge necessary to allow the student to understand laws used in dealing with interviews and interrogations. Offered As needed.

### **FORS 367 - Evidence**

(3 semester hours)

**Prerequisites:** FORS 125

**Description:** This course demonstrates how evidence is maintained for legal integrity and presentation in a court of law. The student studies and applies the Pennsylvania Rules of Evidence in areas such as physical evidence, testimonial evidence (including fact and expert testimony), the procedure to include the introduction of evidence in court, and the scientific standard. Offered Spring Semester, annually.

### **FORS 368 - Forensic Anthropology**

(3 semester hours)

**Prerequisites:** None

**Description:** Forensic anthropology is a science applied to law which focuses on the identification of remains, human or non-human, that are beyond recognition due to decompositional changes and are more or less skeletonized. Osteology is the study of bone. The student studies basic human skeletal anatomy involving the axial and appendicular skeleton. The student uses that knowledge in osteology to determine sex, age, stature, and ancestry of unknown individuals. The student is then able to apply knowledge to casework and have a general understanding of forensic anthropology laboratory practices. Offered as needed.

### **FORS 380 - Special Topics in Forensic Science**

(3 semester hours)

**Prerequisites:** Consent of the instructor and academic advisor

**Description:** This course covers topics in forensic science. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

### **FORS 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

### **GEND 102 - The Creative Mind I**

**Psychology, English Literature and Sociology**

(3 semester hours)

**Prerequisites:** None

**Description:** This course addresses learning and creativity by drawing from three fields of study: psychology, English literature and sociology. More specifically, learning and creativity are exposed by focusing on the theme of creating self-identity through

self-analysis and creating self-identity through interactions with other individuals or small groups. Offered Fall Semester, annually.

### **GEND 103 - The Creative Mind II**

#### **Psychology, English Literature and Sociology**

(3 semester hours)

**Prerequisites:** None

**Description:** This course addresses learning and creativity by drawing from the three fields of study: psychology, English literature and sociology. More specifically, learning and creativity are explored by focusing on the theme of serving a community through involvement with its social policies. Offered Spring Semester, annually.

### **GEND 104 - Our Ocean World**

(3 semester hours)

**Prerequisites:** None

**Description:** This course investigates the historical, geological, physical, chemical, and biological characteristics of the ocean environment. The basic language of marine science, and its underlying principles, are explored. The student pursues an understanding of the underwater history of the planet and the importance of the sciences, including the scientific method of research. Offered As needed.

### **GEND 112 - The Scientific Mind: Physical Sciences**

#### **Physical Science and Chemistry**

(3 semester hours)

**Prerequisites:** None

**Description:** This course presents a broad overview of modern science by integrating basic scientific principles and methodology to various disciplines of the natural and applied sciences. The overall emphasis of the scientific mind series is to begin the development of critical thinking, problem solving, experimental, mathematical, and information research skills that lie at the heart of scientific inquiry. The course emphasizes how the interplay between theory and experiment has led to our current understanding of physical science and chemistry and how this knowledge has found application towards the advancement of technology. Offered Fall Semester, annually.

### **GEND 113 - The Scientific Mind: Life Sciences**

#### **Earth, Space, and Life Sciences**

(3 semester hours)

**Prerequisites:** None

**Description:** This course presents topics from the natural sciences with the underlying framework of basic scientific principles and methodologies. This course stresses the interconnectedness of the natural world, demonstrably built on the foundations and building blocks of the basic physical sciences. Classwork includes technology applications for observing and understanding the natural world. The student explores the areas of cosmology and astronomy, earth sciences, and finally the biological sciences including genetics, ecology, and modern concepts of evolution. A student completing this sequence should have an understanding of scientific thought, advancement and philosophy that prepares them for higher- level courses. Offered Spring Semester, annually

### **GEND 120 - Self & Society: Introduction to Sociology**

(3 semester hours)

**Prerequisites:** None

**Description:** Sociology focuses on the systematic understanding of the way self-identity, social interaction, social organization,

social institutions, and social change occur in western societies like the United States. Major themes in sociological thinking include the interplay between the individual and society, how society is both stable and changing, the causes and consequences of social inequality, and the social construction of human life. Therefore, it can be said that sociology is the study of social actions, relations, and roles for both individuals and groups, researched through inductive analysis of case studies and generalizations. Understanding sociology helps us discover and explain social patterns and see how such patterns change over time and in different settings, in interaction with different people and groups. Through analyzing, discussing and writing about the social basis of everyday life, sociology also develops our ability for critical thinking, by revealing the social structure and processes that shape diverse forms of human life. Offered Summer and Spring Semester, annually.

### **GEND 130 - General Psychology**

(3 semester hours)

**Prerequisites:** None

**Description:** This course is a survey presentation of the fundamental theories, principles, and research methods of psychology. Emphasis is placed on psychology as the scientific study of behavior and cognitive processes. The student is expected to demonstrate critical evaluation and creative thinking skills, an understanding of the data-gathering methods of psychology, and an ability to utilize information technology. Offered Fall and Spring Semester, annually.

### **GEND 140 - Introduction to Astronomy**

(3 semester hours)

**Prerequisites:** MATH 081

**Corequisite:** MATH 120 or equivalent

**Description:** This course demonstrates how we learn about our universe; its past, present and future through application of the scientific method. The approach to this investigation focuses on developing a conceptual understanding of the fundamental scientific theories and measurement tools used by astronomers to deduce the properties of objects throughout the universe. The course covers the evolution of stars, galaxies, and the universe itself. Offered as needed.

### **GEND 150 - The Learned Mind**

#### **Introduction to Philosophy and English Literature**

(6 semester hours)

**Prerequisites:** COMM 110 and ENGL 105 or ENGL 106

**Description:** This course introduces the student to the readings and study of philosophy. This includes reading and reflecting on the great philosophies of modern history and, through a study of the people and their writings (literature), development of an appreciation of the power of the written word. The student is exposed to a large number of writings and learn to carefully critique both the approach and manner of writing. Offered Spring Semester, annually and Summer Semester, odd-numbered years.

### **GEND 201 - The Civic Mind**

#### **U.S. or World History, U.S. or World Politics, and Macroeconomics**

(6 semester hours)

**Prerequisites:** GEND 102

**Corequisite:** ENGL 200

**Description:** This course draws on topics related to American history and government, macroeconomics and ecology. The course demonstrates the interconnection between these fields of study by focusing on the civic responsibility involved with decisions regarding the distribution of the nation's resources. The course provides a historical look at the American democratic system, political institutions, fiscal policy, monetary institutions and the national economy and examines the influence of these structures on public and environmental health. Offered Spring Semester, annually and Summer Semester, even-numbered years.

### **GEND 225 - Cinema Studies**

(2 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106 and GEND 102

**Description:** This survey course investigates major movies, historical events, schools of thought, and developments in the history of film and mass communication. Through readings, lectures, and independent research, the student focuses on the relationships between history, technology, and media development and explore the impact motion media and mass communication have on society and the economy. Cross-listed with COMM 225. Offered Fall Semester, annually.

## **GEND 251 - The Political Mind**

### **International Governing Institutions and Global Health, Energy, Poverty, and Security**

(6 semester hours)

**Prerequisites:** GEND 102 and GEND 201

**Description:** This course introduces the student to a wide spectrum of critical global topics in governance, energy, health, poverty and security. The primary objective of the course is to encourage the student to understand international issues that affect global communities at different levels. The role of international institutions, intergovernmental and non-governmental organizations that promote globalization, environmental issues, trade, international finance, peace and human rights are covered. Offered Fall Semester, annually.

## **GEND 275 - Gender and Society**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106

**Description:** This course explains how gender affects people's lives in a variety of ways. Most people consider gender the learned or social differences between girls and boys, and women and men. Gender is a variable, and members of both sexes can vary in the extent to which they conform to gender roles and expectations. The course reviews the impact of gender on education, science, language, employment, history and politics. Offered As needed.

## **GEND 300 - The Cultured Mind**

### **World Cultures and Art**

(6 semester hours)

**Prerequisites:** GEND 102

**Description:** This course integrates the study of culture and art and introduces the student to a global and comparative study of culture as a key to understanding human behavior in different societies. The formation and application of art and culture is studied in relation to the impact of religious belief and tradition in different societies. The course explores similarities and differences in the world's major cultures and attempts to pinpoint the impacts on social institutions and human behavior. Offered Summer Semester, annually.

## **GEND 310 - Creative Writing**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106

**Description:** The student is familiarized with professional fiction writing through the short story, with a focus on idea generation, scene setting, characterization and plot. Other forms of fiction writing, appropriate to student needs and interests, such as gaming, screenplays, or works of various lengths, are discussed. Cross-listed with ENGL 310 and IMED 320. Offered Fall Semester, annually.

## **GEND 325 - Consulting**

(3 semester hours)

**Prerequisites:** None

**Description:** Consulting is the practice of assisting organizations or individuals through the analysis of existing situations and development of plans and solutions to address problems. The course introduces the principles and practice of consulting in modern settings through case studies, examples, and real-life projects. The course explains different types of consulting models (for internal as well as external users) and covers the consulting life cycle from engagement start to finish. Topics include: business requirements gathering and analysis; teamwork and conflict resolution; consulting skills; problem-solving; and communications skills. Emphasis is placed on producing deliverables in a timely and professional manner. Offered Spring Semester, annually.

## **GEND 351 - Organizational Mind**

### **Organizational Theory, Leadership and Microeconomics**

(6 semester hours)

**Prerequisites:** GEND 102, COMM 110 and ENGL 200

**Description:** This course introduces the student to organization, leadership, and decision-making in firms and businesses by drawing from the fields of organizational theory, leadership, and microeconomics. The objective is to encourage the student to understand the significance of organization and leadership in professional, economic and entrepreneurship activities. The role and impact of organizational theory and leadership is also explored in relation to a firm's microeconomic decisions, while attempting to be successful and productive in the marketplace. Offered Fall Semester, annually and Summer Semester, odd-numbered years.

## **GEND 380 - Special Topics in General Education**

(3 semester hours)

**Prerequisites:** None

**Description:** This course covers topics in general education. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

## **GEND 400 - The Entrepreneurial Mind**

### **Business and Social Entrepreneurship**

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** The student studies and compares key features of entrepreneurship from two important vantage points: business entrepreneurs and social entrepreneurship. The drive and creativity of individuals who question the status quo and explore new opportunities are examined. The student reads stories, completes case studies, and speaks with community entrepreneurs. Examples are taken from business and others from ordinary people who do remarkable work. The objective of this course is to help the student identify a specific entrepreneurial spirit, set goals, and develop skills in entrepreneurship. Offered Spring Semester, annually.

## **GEND 425 - Globalization**

### **Trade and Finance**

(3 semester hours)

**Prerequisites:** Minimum of 60 semester hours completed

**Description:** This course explores the significance of trade and finance by investigating the benefits and harms of globalization as it relates to world economic development. The course also probes the role of international organizations that promote well-being and security. Offered Fall Semester, even-numbered years.

## **GEND 450 - The Healthy Mind and Body**

### **Personal and Environmental Health**

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course provides the foundation for a study of various current health issues. The student investigates a topic related to personal, community or environmental health to conduct research, formulate an opinion of the topic, discuss relevant facts, and write about the topic. The projects in this class focus on the development of competence in both oral and written communication and information literacy. Offered Fall Semester, annually.

### **GEND 460 - The Ethical Mind: Research Ethics and Scientific Integrity**

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course addresses the important issues of professional ethics in sciences. These include normative standards of conduct and research integrity in diverse scientific disciplines. The course covers the core instructional areas identified by the U.S. Public Health Service's Office of Research Integrity. The student explores how to apply an ethics method to recognize and deal effectively with issues pertaining to human/animal experimentation, conflicts of interest, collaborative research, peer review, and other important issues that will benefit them now and in their future personal, academic, and professional endeavors. Offered Fall Semester, annually.

### **GEND 465 - The Ethical Mind: Ethics in a Digital Age**

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course examines current issues in digital technologies from a range of ethical frameworks. While professional codes of conduct and ethical workplace practices are addressed and examined, the course focuses on critical thinking about the role of the software designer in the workplace, community, and world. Cross-listed with CISC 499. Offered Spring Semester, annually.

### **GSTC 100 - Exploring Geographic Information Systems**

(2 semester hours)

**Prerequisites:** None

**Description:** This course focuses on the concepts of Geospatial Technology, including topology, projections, data modeling and spatial operations managed by Geographic Information Systems (GIS). The course includes lectures on GIS concepts and usage as well as GIS exercises include data capture, storage, query, analysis, display and output using ArcGIS software. The course also introduces the student to other Geospatial Technology like Global Positioning systems and Remote Sensing. Limited to the Dual Enrollment student. Offered Summer Semester, annually.

### **GSTC 130 - Applied Geography**

(3 semester hours)

**Prerequisites:** None

**Description:** This course has three specific ways of looking at the geography of the world: 1) World Geography - where regions of the world are examined based on human and physical features; 2) Applied Geography - which focuses on applying physical and human geography concepts to phenomenon such as environmental, political, and economic; and 3) how modern geospatial technology is changing the way geographic information is studied and used. Laboratory exercise include research and map exercises for world geography, worksheets and diagramming for physical geography exercises, and final project research into a selected applied geography topic of interest to the student. Offered Fall Semester, annually.

### **GSTC 140 - Introduction to GIS**

(4 semester hours)

**Prerequisites:** None

**Description:** This course focuses on the first of three primary Geospatial Technologies, Geographic Information Systems, but also introduces the student to Remote Sensing and Global Positioning Systems (GPS). The course includes both lecture on concepts and applications as well as laboratory exercises designed to develop the student's abilities in core GIS functionality. GIS exercises include spatial data capture, storage, query, analysis display and map output using the industry standard, ArcGIS software. Practical applications of GIS to areas such as environmental analysis, land use planning, emergency management and fundamental mapping techniques. The student finishes the course by completing a custom mapping project on a topic of interest to them. Offered Spring Semester, annually.

### **GSTC 210 - Cartography**

(3 semester hours)

**Prerequisites:** GSTC 140

**Description:** The presentation of data is both an art and a science. The student uses GIS to produce high-quality maps that expose complex spatial information and relationships in a clear and easy-to-understand display. Cartographic concepts and techniques, used to create not only hard copy printed maps but also prepare cartographic data for modern devices such as web pages and digital media, are explored. The class emphasizes laboratory work and a final project that uses GIS from an initial map concept, through data collection and analysis, to a final product. Offered Fall Semester, annually.

### **GSTC 220 - Applied Geospatial Technology**

(4 semester hours)

**Prerequisites:** GSTC 140

**Description:** This course bridges the gap between the concepts and tools introduced in GSTC 140 and the more advanced functions of ArcGIS, including spatial operations and data modeling. The student integrates diverse datasets, creates methodologies for data conversion/migration, and develops guidelines for spatial data quality control. The course continues to build competency in alternative GIS software solutions including Open Source GIS. Advanced modules of ArcGIS, including Spatial Analyst and 3D Analyst, are introduced. Offered Spring Semester, annually.

### **GSTC 240 - GIS Policy**

(4 semester hours)

**Prerequisites:** GSTC 140

**Description:** Through the use of geospatial technology examples, the current policy on managing data for public administration and public policy is explored. The student utilizes knowledge and skills in geospatial technology to understand the impact and constraints it places on both public and corporate policies. Knowledge of GIS is used to explore emerging public policy, professional standards, ethics, and future directions of geographic data. Offered Spring Semester, annually.

### **GSTC 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **GSTC 330 - Spatial Database Management**



(4 semester hours)

**Prerequisites:** CISC 140 and GSTC 220

**Description:** This course is intended for the student who is interested in designing and implementing a spatial database and also teaches them to write spatial queries that solve real-world problems through retrieving data from a spatially enabled database. The course is designed to cover the basics of the relational model for database management where data can be accessed and reassembled in different ways that are of relevance to both geographic and non-geographic context. The student will learn a domain-specific language such as Structured Query Language (SQL) to be able to manage data, and it also gives the student a solid background in vector, raster, and topology-based Geographic Information System (GIS) in order to analyze, view, and map data. Offered Fall Semester, annually.

### **GSTC 340 - Advanced Spatial Analysis**

(4 semester hours)

**Prerequisites:** GSTC 220

**Description:** This course focuses on critical evaluation of real-world case studies to determine the appropriate spatial data and advanced-level geospatial technology and tools to analyze, replicate and improve upon past solutions. The student works independently and in teams to develop and apply geospatial problem solving skills to a range of real-world scenarios. The growing requirement for the integration of GIS and 3-D building information modeling (BIM) for use in facilities management and emergency response is explored. Offered Fall Semester, odd-numbered years.

### **GSTC 350 - Web GIS Development**

(4 semester hours)

**Prerequisites:** CISC 140, CISC 300 and GSTC 220

**Description:** This course introduces the student to basic topics in spatial web-based software design and creation. Building on skills acquired in prerequisites in both GIS and Computer Science, the student uses industry standard tools and technologies to explore and develop foundational components of a functioning spatial web application and database. The bulk of the classroom time will be spent on a practical project in small groups with guidance from the instructor. The student must demonstrate a final project at the end of the semester. Offered as needed.

### **GSTC 360 - Sub-Artic Geospatial Field Studies**

(4 semester hours)

**Prerequisites:** GSTC 130 and GSTC 140

**Description:** This course exposes the student to the application of geographic and geospatial technology knowledge in a field studies environment. Learning activities focus on regional and cultural geography, geomorphology, climatology and GPS/GIS field data collection. Exposure to different cultures and environments is intended to provide practical experience with global awareness and a broader, more external, understanding of informational literacy. Offered As needed.

### **GSTC 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

## **GSTC 380 - Special Topics in Geospatial Technology**

(3 semester hours)

**Prerequisites:** None

**Description:** This course covers emerging topics in geospatial technology. It is an in-depth study of a selected specialized area and the content varies by semester. Offered Spring Semester, even-numbered years.

## **GSTC 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

## **GSTC 450 - Desktop GIS Development**

(4 semester hours)

**Prerequisites:** CISC 140 and GSTC 220

**Description:** This course immerses the student into desktop GIS software design and creation. Building on skills acquired in prerequisites in both GIS and Computer Science, the student uses industry standard tools and technologies to design and create a functioning spatial desktop scripts and applications. The bulk of the classroom time will be spent on practical project in small groups with guidance from the instructor. The student must demonstrate a final project at the end of the semester. Offered Spring Semester, annually.

## **GSTC 460 - Satellite Remote Sensing**

(4 semester hours)

**Prerequisites:** GSTC 220 and a minimum of 60 earned semester hours

**Description:** Remote sensing through the use of satellites and other aircraft is the science of acquiring and analyzing information about feature or phenomena from a distance. Satellite-borne sensors observe, measure and record the electromagnetic spectrum reflected or emitted by the earth and its environment for subsequent analysis and extraction of the information. Applications for satellite remote sensing include military surveillance, oil, insurance, real estate, transportation, city planning, environmental monitoring and other uses. The student works with raster-based satellite and aerial images to manipulate and analyze the electromagnetic signatures gathered from this technology. Offered Fall Semester, odd-numbered years.

## **GSTC 498 - Project II**

(3 semester hours)

**Prerequisites:** GSTC 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## **ISIT 106 - Special Topics**

(1 to 4 semester hours)

**Description:** This course covers topics in information systems and information technology. Offered As needed.

### **ISIT 140 - Introduction to Information Systems**

(3 semester hours)

**Prerequisites:** None

**Description:** Businesses rely on data-driven information to thrive and succeed. Information systems provide the means and the medium to collect, store, safeguard, retrieve, share, analyze, and present the data; therefore, information systems play an important role in our modern world. Almost all services ranging from banking to travelling to complex healthcare applications exploit information systems for data manipulations. In this course, the core concepts of any information system, namely people, processes, and technology, are discussed, and their social and organizational roles are explored. In this course, an overview of fundamental concepts of information systems, definition of key terms and current trends, the role and importance of information and information systems for businesses and management, social and organizational implications, along with some applications of information systems are explored and discussed through lectures and case studies. Offered Spring Semester, annually.

### **ISIT 220 - Capturing, Organizing, and Presenting Data**

(4 semester hours)

**Prerequisites:** ISIT 140 and CISC 103

**Description:** Data plays an essential role in an information system. In fact, an information system constructs the framework for data capturing, data safeguarding, data analysis, and data presentation in accordance with software, hardware, business processes, and people. Therefore, IS specialists should develop the knowledge and understanding of tools and applications along with best practices in capturing, organizing, and presenting data. This course explores the most popular software employed in information systems. Students explore the application of spreadsheets, databases, and other software for technical data management. Business intelligence tools and concepts are introduced. Other topics include the essentials of editing, formatting, and printing worksheets and workbooks and data visualization by exploring Microsoft Office® suite. In particular, students gain experience with Microsoft Excel®, Microsoft Access®, Microsoft SharePoint®, Microsoft Word®, Microsoft Excel®, and Microsoft PowerPoint® through assignments and projects. Other popular applications, text editors, and software will be examined and discussed. Offered Fall and Spring Semester, annually.

### **ISIT 240 - Networking & Security Essentials**

(3 semester hours)

**Prerequisites:** ISIT 140 and CISC 103

**Description:** This course covers basic networking concepts within the context of the networks we encounter every day. Students develop hands-on networking skills and understand the role networks play in our lives. In addition to networking concepts, students learn about data protection, cybersecurity, most common threats, vulnerabilities, cyber-attacks, and related discussions. Topics include introduction to networks, routing and switching essentials, protocols and services, network design and installation using real equipment and connecting the network to the Internet, practicing verification and troubleshooting the network and Internet connectivity, recognizing and mitigating network security threats, configuring common Internet applications, setting up sharing between computers, and configuring basic IP services. Other topics including WAN topologies, IP errors, security best practices, quality of service, cloud and virtualization, and network programming can be introduced and discussed. Offered Fall Semester, annually.

### **ISIT 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate, and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in

prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **ISIT 335 - Applied Operating Systems**

(3 semester hours)

**Prerequisites:** ISIT 240 and CISC 120

**Description:** This course provides practical knowledge of operating systems. Running at the core of all computers and networks, an OS manages resources and provides the environment for the execution of programs. Different operating systems have different features and capabilities, and it is important to select, properly install, and correctly configure the right OS so that it serves the needs of the business and ultimately runs the information system successfully. In this course, fundamental concepts of operating systems along with specific features of Microsoft's Windows®, Linux OS, and mobile operating systems will be discussed. Students learn the key concepts of process management, memory management, I/O operations, and security through hands-on practices and projects. Students learn to select, install, configure, maintain (i.e. update and upgrade), and troubleshoot operating systems. This course has both lecture and lab components. Offered Spring Semester, annually.

### **ISIT 360 - Network Installation and Maintenance**

(3 semester hours)

**Prerequisites:** ISIT 240

**Description:** In this course, students are taught how to install, operate, and troubleshoot a small enterprise branch network, including basic network security. Moreover, students learn to diagnose, restore, repair, and replace critical networking and system devices at customer sites. Working closely with professional teams to quickly and efficiently resolve support incidents is explored. Hands-on practices and real-world applications are examined and practiced by collaboration with Cisco Networking Academy in this course. In particular, students are introduced to Cisco network services and learn the application and configuration of Cisco router and switches. Even though the course exploits Cisco technology, fundamental concepts and universal principles are discussed and explored. Offered As needed.

### **ISIT 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200, SEMR 315, or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested, and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

### **ISIT 380 - Special Topics in Information Systems & Information Technology**

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours or consent of the instructor

**Description:** This course covers emerging topics in information systems and information technology. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

### **ISIT 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in the area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be part of that contract. Offered As needed.

### **ISIT 430 - Cloud Services**

(3 semester hours)

**Prerequisites:** ISIT 240 and CISC 120

**Description:** Cloud services have transformed traditional IT structure and business operations. Today, cloud technology dominates consumer and business applications, network services, and data center providers. Organizations are moving rapidly towards cloud services, and ISIT specialists should now have a good understanding of cloud and its services. This course provides a deep understanding of key cloud concepts, cloud services, and their applications to increase business productivity and effectiveness. Other topics include various cloud models, deployment models, different service platforms (IaaS, SaaS, PaaS, and other XaaS), comparison of cloud platforms, migration to cloud and its challenges, cloud security, cloud design, and industry best practices. Moreover, implementation, configuration, and management of cloud services will be practiced and examined through hands-on projects. Offered Fall Semester, annually.

### **ISIT 470 - Emerging Technologies in ISIT**

(3 semester hours)

**Prerequisites:** Senior Status in ISIT or consent of the instructor

**Description:** This course explores a topic or collection of topics of special interest that is timely and in response to critical or emerging topics in the broad field of information systems and information technologies. Topics may include hardware, software, organizational and social aspects of ISIT, ethical and legal considerations and frameworks, future trends and innovations, and ISIT implications on management, businesses, and marketing. Offered Fall and Spring Semester, annually.

### **ISIT 498 - Project II**

(3 semester hours)

**Prerequisites:** ISIT 298 or ISIT 398, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor.

**Description:** This project must be in the student's program of study or concentration. It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

### **IMED 105 - Introduction to Game Modding**

(2 semester hours)

**Prerequisites:** Two years of high school algebra or equivalent

**Description:** Many video game companies are actively promoting "modding" (the modification of) existing video games, a trend sweeping the industry. This course is a mix of game design and game play. Skills needed to create maps, import models, and mod nearly every aspect of the game experience are taught. Once completed, the student leaves with the latest tips and tricks to begin a career path in game design and development. Offered Fall Semester, even-numbered years.

### **IMED 110 - Introduction to Digital Design**

(2 semester hours)

**Prerequisites:** None

**Description:** Digital design introduces the essentials of visual computing, graphics, web technologies, and the design disciplines (graphic, information, game, social, and interactive) to the student interested in interactive media. Emphasis is placed on image manipulation, HTML/CSS design, crafting interactive experiences, and 3D modeling. By reviewing these fields of interest, the student is more prepared to choose a focus for continued study. Offered Spring Semester, annually.

### **IMED 140 - Introduction to Interactive Media**

(2 semester hours)

**Prerequisites:** None

**Description:** Interactive media encompasses a broad range of disciplines, technologies, processes and experiences. This course will introduce the student interested (and enrolled) in the primary areas offered in the Interactive Media program including interactive experience design, media production, and digital games design. This course will be co-taught by several IMED faculty members based on their areas of expertise. Offered Fall Semester, annually.

### **IMED 170 - Visual Design Fundamentals**

(3 semester hours)

**Prerequisites:** None

**Description:** This course introduces the basic concepts of design on print and time-based digital media. The principles of composition and color theory, and how these are affected by movement, duration and display, are covered. Vector and bitmap manipulation tools are explored in relation to graphic production across the design fields. Offered Fall Semester, annually.

### **IMED 200 - Cross-Media Communications**

(2 semester hours)

**Prerequisites:** None

**Description:** Cross-media communications are integrated, interactive experiences that occur across multiple media, with multiple authors and have multiple styles. This course presents how the audience becomes an active participant in the cross-media experience. Offered As needed.

### **IMED 215 - Introduction to Game Studies and Design**

(3 semester hours)

**Prerequisites:** IMED 110 or permission of instructor

**Description:** A key goal of this course is to understand the history, contexts, conceptual and technical foundations of digital games as an interactive media. To identify and understand the scope and complexities of digital games, this course draws on a range of disciplines and approaches including (but not limited to) communications and media studies, sociology, literature, film, semiotics, aesthetics, and games design. Through understanding the history, contexts, and theories of digital games as well as key concepts including engagement, identification, and immersion, the student will learn analytical skills which will enable them to develop and refine a critical vocabulary for articulating the range of elements that make up the overall gameplay experience. This includes both the distinctive features unique to games and those they share with other forms of media and culture. Offered Fall Semester, annually.

### **IMED 220 - Sociotechnical Theories**

(3 semester hours)

**Prerequisites:** GEND 103, IMED 110, and IMED 140

**Corequisite:** IMED 240

**Description:** This course will introduce the student to the theories and perspectives of human sociotechnical behavior. Drawing

on canonical and new social science literature, the course will present the student with overviews of theories of information, action, sociality, conflict and interaction within traditional and digital environments. The course includes attention to sociotechnical theories around communities of practice, online communities, social media, and enterprise knowledge management. This seminar-type survey course offers the student a better understanding of the contexts and perspectives within which people interact with others, around and through offline, online, and hybrid environments. Offered Spring Semester, annually.

### **IMED 225 - Design Tools and Processes**

(3 semester hours)

**Prerequisites:** IMED 110, IMED 140, and IMED Major or IMED 340

**Description:** This course is intended to offer the student the opportunity to work with a variety of tools and processes that support design practice. The course exposes the student to traditional and digital tools, templates, and techniques for design, grouped according to the five different stages in the Design Thinking practice. The course is run as a series of hands-on studio sessions. Offered Spring Semester, annually.

### **IMED 240 - Interactive Media I**

(4 semester hours)

**Prerequisites:** IMED 170

**Description:** The fundamental theory and practice of new media is explored in this course. It prepares the student for creative expression and technology application in all aspects of multimedia for effective message communication, whether it is for a specific product, a game or entertainment site, instruction, or eCommerce. New and emerging interactive digital media is used to create, store, transmit and sell products and services. The student may work on a project to enhance a local employer to recruit and expand business. Offered Spring Semester, annually.

### **IMED 245 - Game Design: Analogue to Digital**

(3 semester hours)

**Prerequisites:** IMED 110 or permission of instructor

**Corequisite:** IMED 215

**Description:** This course examines the various components of introductory game design. The student will examine archetypical games to study the fundamental structure, principles, and methodologies behind the design process. The student is expected to develop creative ideas implementing core game design elements, principles and practices throughout the course. Offered Spring Semester, annually.

### **IMED 250 - Video Production I**

(2 semester hours)

**Prerequisites:** COMM 225

**Description:** This course explores the fundamental theory and practice of creating digital media. The course also prepares the student for creative expression and technology application in all aspects of media for effective message communication, whether it is for a specific product, a game or entertainment site, instruction, or eCommerce. New and emerging digital media tools are used to create, store, transmit and sell products and services. The student employs these new skills to develop portfolio-ready pieces. Offered Spring Semester, annually.

### **IMED 251 - Video Production II**

(2 semester hours)

**Prerequisites:** IMED 250

**Description:** This course builds on digital video production skill development. The student uses visual design principles, motion

graphics, sound design, and creative camera techniques and editing to produce client-based projects. This course also includes considerable training on the use of studio equipment, including its care and maintenance. Offered Fall Semester, annually.

### **IMED 255 - Audio Production**

(3 semester hours)

**Prerequisites:** None

**Description:** Audio production can make or break media-based projects. Understanding how sound is created, recorded, processed and managed in digital formats is at the heart of crafting interactive experiences. This course is designed as an introduction to computer based recording, editing, mixing and production of sound. A software purchase is required. Offered Spring Semester, annually.

### **IMED 260 - Purposeful Games: Contexts and Concepts**

(3 semester hours)

**Prerequisites:** IMED 340 or all of the following, IMED 215 and Interactive Media Major

**Description:** From entertainment to education, digital and analogue games are created and consumed in a wide range of contexts and purposes. This course aims to map the field of 'purposeful' games; games that serve a specific purpose other than pure entertainment, to examine and recognize the scope of games that are created towards a specific purpose including serious games, games for change, and educational games. Designed as a survey course, the student will be introduced to different types of purposeful games, examine case studies, diverse audiences, and explore design principle that exemplify each category. The student will learn the basic principles of game design as they relate to the different purposes and be given the opportunity to explore their own game ideas as they relate to the course content. Offered Spring Semester, annually.

### **IMED 265 - Front-End Web Development**

(3 semester hours)

**Prerequisites:** IMED 240 or MEBA 210

**Description:** This course prepares the student for a career in web development. The student will expand their knowledge of the emerging web technologies while applying sound design methodologies to frontend web development. This multi-faceted course introduces the student to a variety of web development tools and the role of a web designer focused on user interface design. Student will also spend a large portion of the semester transforming interface designs and wire frames into functioning web sites using Adobe Brackets, HTML, CSS, JavaScript and other web technologies as necessary. Offered Spring Semester, annually.

### **IMED 270 - Research Methods for Interactive Design**

(3 semester hours)

**Prerequisites:** IMED 340 or all of the following, IMED 110, IMED 140 and Interactive Media Major

**Description:** This course introduces the student to the package of study design and research methods employed in design science. Lessons is structured around design research methodology, execution and reporting. The student engages in learning about and practicing research skills and methods, in order to develop the capacity needed to research the people, processes, contexts and temporalities of digital interaction opportunities. Through readings, discussions, and the exploration of examples, guidelines, and heuristics, the course engages the student in the methodological aspects of human-focused research within design practice. Offered Fall Semester, annually.

### **IMED 280 - Usability and Interface Design**

(3 semester hours)

**Prerequisites:** IMED 110 or permission of the instructor

**Description:** Usability is at the core of the interactive experience design. This course focuses on usability methods and processes to evaluate the design options and digital interfaces for interactive products, services and experiences. This course looks at



product usability assessment across the design lifecycle, using published case studies and real-life projects. Interface design activities include product usability study design, execution, evaluation, and reporting. Through reading, analysis and hands-on labs, the student will learn the cost of bad design, and gain a practical understanding of common interface assessment tools. Offered Fall Semester, annually.

### **IMED 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **IMED 300 - 3D Modeling I**

(3 semester hours)

**Prerequisites:** None

**Description:** Media arts and animation is used in various industries including architecture, television, advertising, education, and forensics. Skills needed in the media arts and animation industry include design, illustration, compositing, and three-dimensional computer modeling. Additionally, the student improves skills in story development, background and layout design, and special effects. This interactive course utilizes industry-related technology and software. Offered Fall Semester, annually.

### **IMED 310 - 3D Modeling II**

(3 semester hours)

**Prerequisites:** IMED 300

**Description:** The creation of rigs and the motion of characters and objects in games and animation are explored, including full character, muscle, facial, and dynamic rigs. Also reinforced are the principles of animation, such as movement and weight. Offered Spring Semester, annually.

### **IMED 315 - Tabletop Game Design Studio**

(3 semester hours)

**Prerequisites:** IMED 245 or permission of instructor

**Description:** This course is a studio course meant for the student who is interested in becoming game designers and/or developers within the tabletop game industry or are curious about how to design tabletop games instead of video games. The student will design, build, playtest, and self-publish a tabletop game (board game, card game, or dice game). Most classes involve minimal instruction and will instead focus on hands on research and development guided by project milestones, one on one guidance between teacher and student, and group critiques/discussions about each student's game. Activities will include guided and development sessions, internal and external playtest sessions, trips to local game conferences, and guest lectures. By the end of the course, each student will have their very own self-published tabletop game prototype. *There is a cost for the purchase of the published prototype.* Offered Fall, annually.

### **IMED 320 - Creative Writing**

(3 semester hours)

**Prerequisites:** ENGL 105 or ENGL 106

**Description:** The student is familiarized with professional fiction writing through the short story, with a focus on idea generation, scene setting, characterization and plot. Other forms of fiction writing, appropriate to student needs and interests, such as gaming, screenplays, or works of various lengths, are discussed. Cross-listed with ENGL 310 and GEND 310. Offered Fall Semester, annually.

### **IMED 325 - Interactive Design Perspectives**

(3 semester hours)

**Prerequisites:** IMED 220 and IMED 240

**Description:** This course will introduce the student to the design perspectives encountered most often in interaction design. Design perspectives are attitudes towards how to design which reflect their political, social, and technological beliefs about design practice. Through readings and case studies, the student explores a variety of perspectives in the domain of digital interactive design. The student also explores the foundations of design practice through different standpoints, histories, frames of reference and interpretations of different views of the 'best' way to design. Offered Fall Semester, annually.

### **IMED 330 - Interactive Information Design**

(3 semester hours)

**Prerequisites:** IMED 170 and MATH 280

**Description:** The increasing amount of data that an individual is exposed to is simultaneously creating an increase in cognitive load. Information Visualization (InfoVis) systems and techniques are intended to aid in dealing with this deluge. Information visualization is the use of interactive interfaces to visually represent abstract data. This course is intended for the student interested in understanding and utilizing information visualization in their own work. Offered Fall Semester, annually.

### **IMED 335 - Introduction to Game Engines**

(3 semester hours)

**Prerequisites:** CISC 120 or permission of the instructor

**Description:** Through creating games in two industry standard game engines, this course is intended to introduce the student to the essentials of game development, including Game Editor, Assets Store, Prototype, Game Physics, Character Animation, 2D Features, C#, and C++ Game Scripting. Upon successful completion of this course, the student will be able to use two industry standard game engines to develop both 2D and 3D games; evaluate different engines in game design & development process; and develop collaboration skills through working in game development studio format. Offered as needed.

### **IMED 340 - Interactive Media II**

(4 semester hours)

**Prerequisites:** IMED 240

**Description:** This course focuses on analyzing, managing, producing, and deploying interactive media projects. Topics include: initial planning, proposal writing, information architecture, interface design, project management, user testing, and installation. The student develops various project ideas and presents a final design concept to potential museum, hospitality, theme park or government agency client. Software, hardware, and resources vary based on technical aspects and unique aesthetics of an interactive encounter. Offered Spring Semester, annually.

### **IMED 345 - Mobile Experience Design and Development**

(3 semester hours)

**Prerequisites:** CISC 120 or permission of the instructor

**Description:** This course will introduce the student to mobile design and development using industry standard mobile app development system. The weekly topics cover mobile application lifecycle, mobile interface design, data and app distribution. Through weekly homework assignments, the student will design mobile experience for intended audience, and build mobile

applications/games. The student will also be introduced to current mobile design and development practices, such as project management, troubleshooting, and software testing. Offered as needed.

### **IMED 350 - Digital Photography**

(3 semester hours)

**Prerequisites:** None

**Description:** This course is designed to introduce three major components of digital photography; camera mechanics, image composition and digital photo editing. The student is expected to confidently control the photographic process and produce a portfolio of work that has been carefully imagined, executed, edited and presented. A digital SLR camera and Adobe Creative Cloud license are required for this course. Offered Fall Semester, annually.

### **IMED 355 - Users and Populations**

(3 semester hours)

**Prerequisites:** IMED 220 and IMED 270

**Description:** This course will introduce the student to the design-based theories and contexts of users and populations, as found in interaction design. This course is structured around three design contexts: cohorts; environments; and capabilities. The course takes place as a series of case-based seminars. Through readings, discussions, and the exploration of examples and heuristics, the course draws the student's attention to the need to develop their comprehension of used-based theories within design practice. Offered Fall, annually.

### **IMED 358 - Patterns and Contexts**

(3 semester hours)

**Prerequisites:** IMED 220 and IMED 325

**Description:** This course introduces the student to the contextual design of patterned interfaces in interaction design. This course is structured as a series of lectures and seminars around four design area: contexts; visuals; patterns; and actions. Taking the approach of goal-driven design, student engage in reading, discussing, experimenting, and presenting design rationales for design choices around traditional and new digital interfaces. The student will be challenged to consider areas of conflict and divergence within a design thinking framework. The student will analyze and reconcile conflicts between goal orientations, contextual needs, and environmental challenges within interactive design practice. Offered Spring Semester, annually.

### **IMED 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

### **IMED 370 - Producing Creative Projects**

(3 semester hours)

**Prerequisites:** IMED 340

**Description:** This course evaluates design and development procedures used across creative industries. The student is introduced to effective team and process management procedures utilized through the lens of interactive experiences and software

development. These topics are further developed through guest lectures, collaborative learning exercises and the development of individual project plans which primarily focus on the people, pixels and processes used in interactive media development. Offered Fall Semester, annually.

### **IMED 380 - Special Topics in Interactive Media**

(3 semester hours)

**Prerequisites:** Consent of the Instructor and Academic Advisor

**Corequisite:** 60 credit hours completed

**Description:** This course covers emerging topics in Interactive Media. It is an in-depth study of a selected specialized area of Interactive Media and the content varies by semester. Offered As needed.

### **IMED 385 - Game Design**

(3 semester hours)

**Prerequisites:** ENGL 200

**Description:** This is a studio course that explores and teaches the principles, mechanics and processes of game design. The student is shown the fundamental philosophies of game design and how to apply them to various entertainment and educational projects. The tips, tools, and techniques taught in this course exist to provide practical resources needed to develop skills and strategies for individuals interested in exploring careers in the game design industry. Offered Fall Semester, annually.

### **IMED 388 - Games User Interface and Level Design**

(3 semester hours)

**Prerequisites:** IMED 385

**Description:** User interfaces and video games are inextricably linked. Like many interactive experiences, for a player to play and engage with a game and its content, there needs to be a functioning user interface. But beyond function, a game user interface not only provides an interactive function, but should be related to the context, narrative and overall aesthetic experience of a game. In combining game user interface and level design in one course, this course aims to develop a deeper understanding of the relationship between the two. Through interactive lectures and applied design workshops, this course will provide the student with a theoretical, conceptual and applied understanding of game user interfaces and level design. Offered Spring Semester, annually.

### **IMED 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** IMED 240 and a minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

### **IMED 420 - Games User Research**

(3 semester hours)

**Prerequisites:** IMED 340

**Corequisite:** IMED 385

**Description:** This class aims to bridge concepts, principles, and methods of usability and playability assessment for digital games design. The class will cover a range of game related theories, focus on learning different methods of game-play data collection, evaluate what methods work best at different points of the development cycle, and teach the student how to effectively

communicate the collected data to the designers/development team. The overall goal of this class is to develop the student's knowledge of the theories, methods, application and communication of games user research and play-testing. Offered Fall Semester, annually.

### **IMED 440 - Interactive Studio**

(4 semester hours)

**Prerequisites:** IMED 340

**Description:** This course is an upper-level production course focusing on the creation of innovative, workable prototypes using a variety of interactive techniques and emerging technologies. New media (games, digital simulations, mobile applications, and social experience design) is the latest development genre and are analyzed as cultural artifacts. The aesthetics of user experience, personal interaction, and delivery systems are covered along with an analysis of leadership techniques used in independent and AAA production firms. Offered Spring Semester, annually.

### **IMED 450 - Design Studio**

(3 semester hours)

**Prerequisites:** All previous Interactive Media-User Experience Design Concentration Course Requirements

**Description:** This course is a hands-on practice-oriented studio course. This course requires the student to work with internal and external local clients to conduct and report original design space research within the domain of interaction and experience design. Using a Design Thinking approach, the student will ideate, produce, and test a conceptual prototype that addresses the design problem identified through the research and analysis done in this studio course. Offered Fall Semester, annually.

### **IMED 460 - Mixed Reality Development**

(3 semester hours)

**Prerequisites:** CISC 120 and IMED 340 or permission of instructor

**Description:** This course covers the design and development of augmented and virtual reality experiences. The student uses the studio model to learn and explore the unique affordances and design opportunities inherent in mixed reality platforms. An understanding of the concepts and techniques of computer programming is required. Offered Fall Semester, annually.

### **IMED 485 - Game Development**

(3 semester hours)

**Prerequisites:** IMED 385

**Description:** As the growth of digital simulations and entertainment continues, this course is an opportunity for the student to examine models and strategies for creating digital games. Through lectures, hands-on labs, and team projects, the student gains experience applying the fundamentals of game design into the development process. Projects are developed using standard game development environments and provide interactive media experiences for the student's e-portfolio. Offered Fall Semester, annually.

### **IMED 498 - Project II**

(3 semester hours)

**Prerequisites:** IMED 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration. It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## INSC 101 - Introduction to Laboratory Sciences I

(1 semester hour)

**Prerequisites:** None

**Description:** This course introduces the student to the laboratory environment where the safe handling of material, equipment, and waste is learned. The course includes an introduction to the sciences, specifically organic and inorganic chemistry, bio-molecules, and ecology. Experiments performed by the student using the periodic table to learn about chemical interactions, chemical synthesis and other principles supplement the course content. The biological content focuses on the links between the chemistry learned and how biology relies on controlled chemistry to function at the cellular level. The course culminates at the ecology level on how species are identified and interact with one another. *Limited to the Dual Enrollment student.* Offered As needed.

## INSC 102 - Introduction to Laboratory Sciences II

(1 semester hour)

**Prerequisites:** INSC 101

**Description:** This course is a continuation of the introduction to the sciences, specifically organic and inorganic chemistry, bio-molecules, and ecology. Experiments performed by the student using the periodic table to learn about chemical interactions, chemical synthesis and other principles supplement the course content. The student is shown how to separate, measure, account and record starting materials against what is attained and use equations to predict actual and theoretical yields. Weak acids and bases are also discussed as these principles are extremely relevant to the bio-molecules component. The course relies on mastery of techniques from INSC 101 and those within 102 for an extended ecology project that is planned, modified and executed in the field studying a local ecosystem. *Limited to the Dual Enrollment student.* Offered As needed.

## INSC 105 - Field Studies in Natural Science

(3 semester hours)

**Prerequisites:** None

**Description:** The student is introduced to the natural world in this course through discussion, multimedia and field experience. The exploration of the natural world takes the class from shores of the Susquehanna River to stellar nurseries where new stars and planets are born. The journey together builds the foundation for more intensive studies in science and personal ownership of our own discoveries. Offered Spring Semester, even-numbered years.

## INSC 110 - Medical Terminology

(1 semester hour)

**Prerequisites:** BIOL 102/BIOL 103 or High School Biology

**Description:** This course is designed as an introduction to the nomenclature used by various medical and dental professionals. The course focuses on learning techniques that will enable the student to easily understand medical terminology. Cross-listed with BTEC 110. Offered As needed.

## INSC 115 - The Chemistry of Life

(3 semester hours)

**Prerequisites:** None

**Description:** What's Organic about Organic Chemistry? This is one of the many discussions that occurs in the O.C. (Organic Connection). Why is organic chemistry important for a future nurse, lawyer, teacher, scientist or informed citizen? To answer this question, organic chemistry in the context of everyday life is presented. Teamwork and outdoor expeditions keeps the student moving and thinking while studying the chemistry of life. Offered As needed.

## INSC 120 - The Scientific Method and Public Opinion

(3 semester hours)

**Prerequisites:** None

**Description:** Public opinion is often dictated by preconceived notions, tradition and superstition. This class uses the power of the scientific method, experimental design and statistics to explore some of the things accepted by the public as givens: lunar cycle effects; life, death and holidays; and superstition and old wives' tales. Data-mining techniques are employed, followed by a discussion and application of the appropriate quantitative methods to explore the phenomena under scrutiny. This course has field trips, with one overnight stay. Relations with local hospitals and police officials are developed for access to data. Offered Summer Semester, annually.

### **INSC 140 - Introduction to Integrative Science**

(3 semester hours)

**Prerequisites:** None

**Description:** Many things live side-by-side with humans, often remaining hidden from day-to-day life yet thriving among homes and city streets. Humanity's reach has been extended through ceaseless questioning and technology to observe the very large and the very small. Telescopes, microscopes, and swarming satellites overhead all assist to understand both the world around us and our place within it. The student is introduced to the natural world through science and science's tools of observation, and will learn to ask the questions which expand the mind and ignite the innate sense of wonder and curiosity. Offered As needed.

### **INSC 180 - Integrative Science**

(3 semester hours)

**Prerequisites:** None

**Description:** The student continues the exploration of the natural world through the use of active, collaborative approaches to help connect mechanisms, ideas, patterns, and numeracy measures amongst fields which are often considered to be distinct and separate. The nature of such vital elements as molecules of life, the earth and cosmos, diversity and biodiversity, evolution, and strategies for successful ecosystems are explored. Offered as needed.

### **INSC 200 - Applications of Field Ecology**

(4 semester hours)

**Prerequisites:** CHEM 151-CHEM 152, INSC 180 and MATH 120

**Description:** Organism data is used to understand evolutionary relationships. Field ecologists collect ranges of species samples and specimens. This work is crucial for learning how and where new infections and invasive species evolve. Applied molecular biology is studied and practiced. One to three field trips are required. Offered Fall Semester, as needed.

### **INSC 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, ENGL 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

### **INSC 310 - Conservation Biology**

(3 semester hours)

**Prerequisites:** BIOL 302

**Description:** This course covers the importance of biodiversity, the existence of a wide variety of plant and animal species in their natural environment, and the causes and consequences of its reduction and the efforts at prevention of its loss. The student becomes familiar with the history of conservation efforts and identifies instances of success and failure. Material includes applications of conservation science to single species, communities or ecosystems. Offered Spring Semester, odd-numbered years.

### **INSC 320 - The Study of Disease**

(3 semester hours)

**Prerequisites:** BIOL 281-BIOL 282 and minimum of 45 earned semester hours, or BS Nursing Major, or permission of instructor

**Description:** The human body is studied in health and disease with a focus on the contemporary causes of human pathology. Information on metabolic and infectious disorders that effect major body systems is explained. The study surveys system organ structure and metabolic/genetic aspects of disease, from simple to complex. Offered As needed.

### **INSC 335 - Field Studies: Estuarial Ecosystems - Chesapeake Bay**

(3 semester hours)

**Prerequisites:** Minimum of 45 earned semester hours or permission of instructor

**Description:** This course introduces the student to a broad range of subject areas in matters associated with the Chesapeake Bay and its watershed. During the week-long field trip, the ecologically-rich area is visited and studied. Historic and economically important sites are also visited. Research methodologies are introduced to the student and participation leads to a better understanding of the environment. Offered Summer Semester, annually.

### **INSC 336 - Field Studies: Tropical Ecosystems**

(3 semester hours)

**Prerequisites:** Minimum of 45 earned semester hours or permission of instructor

**Description:** This course introduces the student to a broad range of subject areas in matters associated with tropical ecosystems. During the week-long field trip, the ecologically-rich area is visited and studied. Historic and economically important sites are also visited. Research methodologies are introduced to the student and participation leads to a better understanding of the environment. A non-refundable deposit of \$500 is required in order to preregister for this course. Offered Spring Semester, annually.

### **INSC 337 - Field Studies: Wetland Ecosystems**

(3 semester hours)

**Prerequisites:** Minimum of 45 earned semester hours or permission of instructor

**Description:** This course introduces the student to a broad range of subject areas in matters associated with wetland ecosystems. During the week-long field trip, the ecologically-rich area is visited and studied. Historic and economically important sites are also visited. Research methodologies are introduced to the student and participation leads to a better understanding of the environment. A non-refundable deposit of \$500 is required in order to preregister for this course. Offered Summer Semester, annually.

### **INSC 340 - Community Health and Research**

(3 semester hours)

**Prerequisites:** Minimum of 45 earned semester hours

**Description:** This course provides the foundation for a study into relevant community health topics facing area residents. The



course has three important and integrated components: reading and discussion in seminar fashion on a variety of subjects related to community health, environmental health and research practices; the development, investigation and conduct of a community-based research project mentored by the faculty or a business/agency partner; and, the synthesis of the results and implications of the research into a final public and poster presentation. This course stresses both oral and written communication in issues of science and public policy (content, process and competency). Offered as needed.

### **INSC 350 - Animal Behavior**

(4 semester hours)

**Prerequisites:** BIOL 102/BIOL 103 or permission of instructor

**Description:** This course exposes the student to a broad range of topics within the area of animal behavior, from evolutionary and ecological perspectives. Natural selection and adaptation as functions of behavioral ecological and socio-biological processes are the focus. Ethological questions are also addressed. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, odd-numbered years.

### **INSC 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

### **INSC 380 - Special Topics in Integrative Sciences**

(3 semester hours)

**Prerequisites:** None

**Description:** This course covers emerging topics in integrative sciences. It is an in-depth study of a selected specialized area and the content varies by semester. Offered As needed.

### **INSC 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

### **INSC 401 - Nanoscience**

(3 semester hours)

**Prerequisites:** CHEM 210 and PHYS 210

**Description:** This course is an inter-disciplinary course in nanoscience, from a first principles perspective. The course also covers societal and environmental impacts of nanotechnology. Offered as needed.

## INSC 410 - Epidemiology

(3 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course studies how diseases are detected, identified, and distributed within populations. Epidemiology is the study of the distribution and determination of health-related states or events in specific populations and the application of this study to the control of health problems. The student is shown the medical and scientific investigative skills needed to critically think, strategize, and predict new epidemics and control current ones. Mathematics is used to model disease progression. Offered as needed.

## INSC 498 - Project II

(3 semester hours)

**Prerequisites:** INSC 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

## MEBA 100 - Exploring Entrepreneurship

(2 semester hours)

**Prerequisites:** None

**Description:** This course focuses on entrepreneurship and innovation. The goal is to improve the participant's understanding, insight, and skill as a potential entrepreneur. The key skill areas addressed are creativity, critical thinking, collaboration and communication. The topic of ethical decision-making as a component of entrepreneurship is also addressed. This course is designed for the student who is interested in defining and transforming a creative, problem solving idea into a sustainable business or program. *Limited to the Dual Enrollment student.* Offered Summer Semester, annually.

## MEBA 104 - Special Topics in MEBA

(1 to 6 semester hours)

**Prerequisites:** None

**Description:** This course covers topics in Management, Entrepreneurship, and Business Administration. Offered As needed.

## MEBA 106 - Entrepreneurship Immersion Camp: The Shark Tank

(1 semester hour)

**Prerequisites:** None

**Description:** This course is an Entrepreneurship Immersion Summer Camp for High School students. The goal of this camp is to introduce students to the ideas of entrepreneurship, enhance their communication, planning and execution skills, that are needed for starting a new private business. Throughout this camp the student will learn firsthand how to generate and develop new business ideas, conduct product and market analysis, create marketing and communication plans, and how to pitch their ideas to potential investors. The ideas will be evaluated by a panel of judges, who will determine the winners of the competition. Coaching, computers, and other resources will be available to the attendees. *Limited to the Dual Enrollment student.* Offered Summer Semester, annually.

## MEBA 108 - Independent Study

(1 to 4 semester hours)

**Prerequisites:** None

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

## **MEBA 110 - Introduction to Business and Entrepreneurship**

(3 semester hours)

**Prerequisites:** None

**Description:** The goal of this course is to introduce entrepreneurship concepts by providing insight into entrepreneurial processes—from finding and evaluating good business opportunities to new venture start-up and growth issues—and entrepreneurial behavior, a critical success factor in new venture creation. The student is taught how businesses are structured and study data from business operations. The student will analyze and evaluate business data to make decisions. The student practices how to use spreadsheets for analysis to make informed decisions, use written communication to justify those decisions, and deliver oral presentations to communicate those decisions. Offered Spring Semester, annually.

## **MEBA 201 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** MEBA 110

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered As needed.

## **MEBA 210 - Introduction to Internet and Web Technologies**

(3 semester hours)

**Prerequisites:** None

**Description:** The main objective of this course is to introduce the current as well as emerging Internet and Web technologies that enable and drive the modern enterprises. The student is exposed to the key building blocks (enterprise applications, computing platforms, databases, and networks) of the modern Internet-Web infrastructure. Through experiments and examples, the main ideas of the Internet, the ISPs, wireless networks, Classical Web, Semantic Web, XML, Web 2.0, social networking, wireless web, and mobile apps are explained. The course exposes the student to the main aspects of web-based software development processes through simple hands-on projects. The student is introduced to the basic software concepts by developing simple web sites by using HTML5 and CSS3 and then using Javascript, Java applets, XML and XSL to introduce more sophisticated features. The student also has an opportunity to develop a simple web portal that involves simple database queries by using SQL. Offered Fall Semester, annually.

## **MEBA 220 - Principles of Business Management**

(3 semester hours)

**Prerequisites:** None

**Description:** The student is provided with analytical tools to understand and synthesize the most current applications of theories and concepts in business management and is exposed to the debate on the dynamic of business environment, evolving business models, economic systems, and scale of domestic and global competition in the market place. Offered Fall Semester, annually.

## MEBA 225 - Accounting

(3 semester hours)

**Prerequisites:** MEBA 110

**Description:** The student is introduced to the basic concepts and standards underlying managerial accounting systems. The student learns how to produce income statements, balance sheets, and cash flow statements. The student also learns how these documents describe the state of the firm in terms of revenue recognition, inventory, long-lived assets, present value, and long-term liabilities. The emphasis of this course is for the student to understand the internal operations of a firm and how those operations are reflected in documentation. Offered Fall Semester, annually.

## MEBA 230 - Marketing

(3 semester hours)

**Prerequisites:** MEBA 110

**Description:** Marketing is defined as the process of getting the right products to the right people, at the right place, time, and price by using the most effective promotional course of action. Marketing is also defined as providing goods and services that meet or exceed expectations of potential consumers' needs and wants. The student is shown what makes a company embrace ethics in professional decision-making; what encourages corporations to become socially responsible; what the processes are for product concepts, product development, and types of consumer products and services; how companies research the market, configure market segmentation, and target their market; and how companies develop online marketing strategies in order to target consumers and businesses. Offered Spring Semester, annually.

## MEBA 250 - Corporate Innovation and Entrepreneurship

(3 semester hours)

**Prerequisites:** None

**Corequisite:** MEBA 230

**Description:** This course covers the use of entrepreneurial capabilities to develop new ventures, products, and processes. These concepts can be used with start-ups or within an established organization. The student is introduced to some of the core concepts and analytical tools used in entrepreneurship as part of a strategy for growth, updating a company's offerings, or developing totally new products. In order to instantiate these changes, the student will integrate services, markets, internal processes, quality, community relationships, and customer experience. Offered Spring Semester, annually.

## MEBA 298 - Project I

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member, and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered As needed.

## MEBA 310 - eCommerce and mCommerce

(3 semester hours)

**Prerequisites:** MEBA 110 and MEBA 210 or CISC 120; MEBA 210 may be completed concurrently

**Description:** This course studies, analyzes and evaluates the business and technical aspects of eCommerce and mCommerce (mobile commerce). Business strategies to start a business, advertising a business, and selling the business product are covered.

Case studies are used to explain the business process that needs to be automated to support the eCommerce and mCommerce initiatives. Economic trends and emerging web and mobile computing technologies are explored to understand the technical, business, and social processes that are shaping the electronic marketplace. Offered Fall Semester, even-numbered years.

### **MEBA 312 - Leadership and Organizational Behavior**

(3 semester hours)

**Prerequisites:** MEBA 250 or a minimum of 60 earned semester hours and BS-Nursing Major

**Description:** Modern organizations are characterized by constant change, market fluctuations, increased automation, and globalization. This course explores and examines the basic framework for leadership styles focuses on ethical leadership in times of change and crisis through use of case studies and examples. The course examines the behavior of individuals and groups in the modern global settings and concentrates on improving productivity, job satisfaction, team development and continuous improvement practices experiences. Offered Fall and Spring Semester, annually.

### **MEBA 322 - Decision Theory**

(3 semester hours)

**Prerequisites:** MATH 280

**Description:** This course provides the student with general and applied decision theory. Decision making processes and biases are discussed within individual, group, and organizational levels. The student learns how decision biases can be leveraged to predict and "nudge" behavior and to improve impressions. Ethical considerations are also discussed. Offered Fall Semester, annually.

### **MEBA 330 - Sales and Sales Management**

(3 semester hours)

**Prerequisites:** MEBA 230

**Description:** This course examines sales management strategies, approaches and best practices in creating an adaptive sales force. Areas explored include the human dimension of hiring and firing employees, how to look proactively at how to market and sell in a global and technological environment and identify where people skills and competencies are vitally important. The productivity and assessment of the sales force, through motivation and training, are also explored. Methods to advertise and sell over the Internet are studied. Current events, market trends and areas, and regional associations for the various sales trades are covered. Offered As needed.

### **MEBA 335 - Business Law and Ethics**

(3 semester hours)

**Prerequisites:** MEBA 110

**Description:** The purpose of this course is to define fundamental legal terminology regarding contracts, torts, property, and wills, as well as differentiate between business ethics and legal issues. The course provides the student with foundational information about the U.S. legal system and dispute resolution and their impact on business. The major content areas include general principles of law, the U.S. Constitution, legal systems, the relationship between law and ethics, contracts, sales, torts, agency law, intellectual property, and business law in the global context. Offered Fall and Spring Semester, annually.

### **MEBA 340 - Introduction to Innovation and Design Thinking**

(3 semester hours)

**Prerequisites:** MEBA 110

**Description:** This course introduces the student to the tools and mindset required to be an innovator and an entrepreneur. Through innovation, design thinking, and entrepreneurship, this course leads the student through the processes used for finding problems worth solving and mobilizing the resources to solve them. Offered Spring Semester, annually.

### **MEBA 350 - Finance**

(3 semester hours)

**Prerequisites:** MEBA 225

**Description:** This course builds on MEBA 225 Accounting. The student will learn how to analyze firms' financial statements and disclosures and determine how to use financial statements in valuation of a firm's strategy and future. This course is very applied and uses data from a variety of sources, especially data generated from the student's experiential projects. The student will acquire an understanding of both the "how" of accounting procedures and the underlying reasons "why" these practices are adopted. These skills are essential for pursuing a broad range of professions in management, analysis, entrepreneurialism, law, and finance. Offered Spring Semester, annually.

### **MEBA 352 - Consumer Behavior**

(3 semester hours)

**Prerequisites:** MEBA 230

**Description:** This course includes an understanding of consumer behavior in the digital marketplace and the foundation for digital marketing strategy. The student is introduced to consumer segmentation, use of consumer research, and trends in adoption of digital media. Exploration for channels of digital communications including desktop, mobile, tablet, gaming and TV are discussed and analyzed. The student is shown how to plan and execute basic consumer research using digital tools and the use of CRM (customer relationship management) tools to track and market to different consumer types. Offered As needed.

### **MEBA 354 - Integrated Marketing Communications**

(3 semester hours)

**Prerequisites:** MEBA 230

**Description:** Agencies and individuals need to possess expertise in professional marketing practices and mediums. Integrated marketing merges all aspects of marketing communication such as advertising, sales promotion, public relations, direct marketing and social media, through a mix of tactics, methods, channels, media and activities into a unified user-centric strategy. Through critical evaluation and marketplace analysis, the student applies theories, utilizes frameworks, examines case studies, and integrates marketing practices in both team and individual projects. Offered As needed.

### **MEBA 360 - Healthcare Systems**

(3 semester hours)

**Prerequisites:** None

**Description:** This course introduces the business, operational, and management aspects of healthcare. Through case studies and examples, the student is introduced to a wide range of healthcare topics such as healthcare business processes, healthcare clinical systems and services (patient care, physician support systems, healthcare networks), hospital systems, healthcare management, and government regulations. Offered Fall Semester, even-numbered years.

### **MEBA 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200, SEMR 315, or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guide the learning process. The student integrates the collective observations, analyses, and reflections of this experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship, and represents the evolutionary and dynamic nature of the learning process. Offered As needed.

**MEBA 375 - Statistics for Managers**

(3 semester hours)

**Prerequisites:** MATH 280 or BS Nursing Major

**Description:** This course applies statistical knowledge to business. The student explores the ability to define problems, form questions, collect data, analyze the data using inferential tools, and how to formulate and test hypotheses. The student is expected to master probability concepts within the realm of decision making. Offered As needed.

**MEBA 380 - Special Topics in Management Entrepreneurship, and Business Administration**

(1 to 4 semester hours)

**Prerequisites:** MEBA 110 and permission of the instructor

**Description:** This course covers emerging topics in business, entrepreneurship, management, and technology. The topics change as the field evolves but will span strategy, business models, and societal trends. Offered As needed.

**MEBA 381 - Special Topics in Digital Health**

(3 semester hours)

**Prerequisites:** MEBA 360 and permission of instructor

**Description:** This course covers emerging topics in Digital Health. The topics will change as the field evolves but will span digital healthcare management, security and privacy issues, the role of public policies and regulations in healthcare IT, electronic health records (EHR), and the growing role of information and communication technologies in global health. Offered Spring Semester, even-numbered years.

**MEBA 382 - Research Design and Methodology**

(3 semester hours)

**Prerequisites:** MEBA 322

**Description:** This course provides the student with the skills and knowledge needed to employ research methodologies in a business setting. Traditional experimental and quasi-experimental approaches will be covered. The student is shown how to use the scientific method to develop assessment tools, for market testing and product development, and to engage in targeted marketing. Offered As needed.

**MEBA 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** MEBA 110 and permission of the instructor

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered as needed.

**MEBA 410 - Business Entrepreneurship in Practice**

(3 semester hours)

**Prerequisites:** MEBA 250

**Description:** The student will learn the process of how to create an innovation-based new venture. As a framework for this, we use the business planning process and the student develops the essential parts of a business plan and investor pitch as a useful vehicle to achieve this goal. The student works in teams to launch companies, working through issues of the market analysis,

technology viability assessment, competitive positioning, team-building, product life-cycle planning, marketing strategy, sales channel analysis, and a strong emphasis on the entrepreneur as a sales person. Offered Fall Semester, annually.

### **MEBA 411 - Entrepreneurial Investment**

(3 semester hours)

**Prerequisites:** MEBA 250

**Description:** This course examines the elements of entrepreneurial finance, focusing on technology-based start-up ventures and the early stages of company development. This course addresses key questions which challenge all entrepreneurs: how much money can and should be raised; when it should be raised and from whom; what is a reasonable valuation of a company; and how funding, employment contracts, and exit decisions should be structured. This course aims to prepare the student for these decisions, both as an entrepreneur and venture capitalist. Offered Fall Semester, annually.

### **MEBA 420 - International Business and Strategies**

(3 semester hours)

**Prerequisites:** MEBA 220 and MEBA 230

**Description:** This course discusses how global markets impact managerial processes. The questions under investigation are how managers adapt their organizational practices to accommodate global and local cultures and businesses practices in different parts of the world. The course explores the best practices in global strategic management, organizational design, human resource processes and organizational behavior. Also discussed are business strategy, Porter Models, and micro-macro economics in global and extended enterprises. Global supply chains and global operation management, with an emphasis on total quality management (TQM), are also examined. Offered Spring Semester, even-numbered years.

### **MEBA 425 - Product Management**

(3 semester hours)

**Prerequisites:** MEBA 230

**Description:** This course provides the student with the critical information needed to develop a product and brand strategy that generates both quick wins and long-term value. By completing this course, the student is in a position to create an activity plan to bring their brand strategy to life - both externally towards consumers and internally to employees. Offered Fall Semester, annually.

### **MEBA 432 - Management and Innovation Strategies**

(3 semester hours)

**Prerequisites:** MEBA 225 and MEBA 250

**Description:** To capture the high level of complexity under which strategic management takes place, this course predominantly uses the case method to examine how general managers create and maintain a competitive advantage for their organizations. The student examines critical strategic issues confronted by top executives of organizations, as well as take a general management and a multi-functional approach to these strategic issues by using all the core business functions. Offered Spring Semester, annually.

### **MEBA 470 - Business Systems Analysis, Modeling and Design**

(3 semester hours)

**Prerequisites:** MEBA 110 or CISC 300

**Description:** This course prepares the student to analyze business information systems and to build models and logical designs that can be implemented later. Emphasis is on understanding the business processes and business requirements and building conceptual models that help in the analysis of business requirements. Complex systems and to build designs and architectures that can satisfy the business requirements are discussed. The course emphasizes business process modeling, business patterns,



object orientation, design patterns and component-based design approaches. Topics include modern system life cycles, project management, BRODE (buy, rent, outsource, develop, extend) strategies in system building, business system modeling, requirements analysis, conceptual design, architectures, physical design, and design for the modern mobile systems with security and integration considerations. Offered Fall Semester, odd-numbered years.

### **MEBA 472 - Business Intelligence and Decision Support Systems**

(3 semester hours)

**Prerequisites:** MEBA 225 and MEBA 230

**Description:** Modern electronically-enabled enterprises rely increasingly on knowledge that needs to be managed and processed through a variety of intelligent tools. This course covers the vital issue of business intelligence and knowledge management in modern enterprises and discusses how decision support and expert systems tools can be used for effective decision making in organizations. Topics include artificial intelligence in a business context, business intelligence and business analytics, data mining, data warehousing, click stream mining, knowledge management, decision support and expert systems, artificial intelligence principles, neural networks, learning systems, and intelligent agents in a business context. Offered As needed.

### **MEBA 480 - Enterprise Architectures and Integration for a Global Economy**

(3 semester hours)

**Prerequisites:** MEBA 310

**Description:** Modern digital enterprises are characterized by increased automation, mobile services, extended B2B operations with global business partners, and on-demand business services. The main concern in such enterprises is to architect and integrate a very wide range of services quickly and effectively. This course highlights the role of information and communication technologies, enterprise models, and emerging service oriented architectures (SOA) standards in developing flexible and integrated business architectures. Offered Spring Semester, even-numbered years.

### **MEBA 482 - Quantitative Methods in Managerial Decision-Making**

(3 semester hours)

**Prerequisites:** MEBA 375 and MEBA 382

**Description:** This course provides the student with a solid foundation in the statistical methodologies required for quantitative decision-making. The student is shown how to identify the correct statistical analysis to perform given the research question and the format (type) of data. Correlation, t-tests, chi-square, regression, and analysis of variance (ANOVA) will be covered, and the student practices how to perform these analyses using both Excel and R. Focus is placed on the use of statistical results to make informed decisions in a business context (e.g., A|B testing, assessment, and systems optimization). Offered As needed.

### **MEBA 485 - Marketing Analytics**

(3 semester hours)

**Prerequisites:** MEBA 375

**Description:** This course introduces the student to researching the needs and wants of customers. The student performs statistical analysis on multiple factors involved in developing marketing campaigns, such as pricing, digital marketing, multiple marketing channels, segmentation, and others. Offered As needed.

### **MEBA 488 - Marketing Research**

(3 semester hours)

**Prerequisites:** MEBA 375 and MEBA 230

**Description:** This course uses marketing research to make business decisions. The student identifies a marketing problem, collects marketing data regarding the stated problem, analyzes the collected data, interprets findings, presents implications and findings; and applies findings as proposed business actions. The student's research includes quantitative, qualitative and mixed

method approaches; they collect data using questionnaires (close and open-ended), focus groups, panels, interviews (structured and unstructured) and to analyze and interpret the results. Offered As needed.

### **MEBA 498 - Project II**

(3 semester hours)

**Prerequisites:** MEBA 298 or MEBA 398, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member, and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered As needed.

### **MATH 081 - Prealgebra**

(3 semester hours)

**Prerequisites:** Placement by assessment

**Description:** This course is offered to the student who needs additional preparation in algebra or who has been away from mathematics for several years. Subject areas to be covered include: arithmetic of whole numbers, fraction and decimals, ratios and percent's, and basic algebraic concepts. Math study skills are an integral part of this course. Prepares the student for College Algebra. Credit does not count towards graduation requirements. Offered Each semester, annually.

### **MATH 082 - Prealgebra Recitation**

(0 semester hour)

**Prerequisites:** IP grade in MATH 081

**Description:** This course is required for the student who earned a grade of in progress (IP) in MATH 081 in a previous semester. The student has the opportunity to complete topics presented in MATH 081 under the supervision of an instructor on a scheduled basis. Offered As needed.

### **MATH 104 - Special Topics**

(1 to 3 semester hours)

**Prerequisites:** Based on topic(s) covered or permission of instructor

**Description:** This course covers topics in Mathematics. Offered As needed.

### **MATH 120 - College Algebra**

(3 semester hours)

**Prerequisites:** C or higher in MATH 081 or by assessment

**Description:** This course is designed for the student with an elementary knowledge of algebra. Topics include properties of real numbers, problem-solving using equations and inequalities, algebraic functions, graphing, systems of equations and inequalities, polynomial functions and graphs, exponents and radicals, the binomial theorem, zeros of polynomials, inverse functions, and applications and graphs. Free on-line graphing and calculating utilities are used in lieu of a graphing calculator. This course meets a total of 4 hours per week to permit active learning activities each week driven by student interests or needs. Offered Each semester, annually.

### **MATH 140 - Precalculus**

(3 semester hours)

**Prerequisites:** Placement by Assessment into College Algebra

**Description:** This course develops the properties, definitions and graphs of the algebraic, logarithmic and trigonometric functions and their inverses. The treatment emphasizes how to construct models of applications using the algebraic and transcendental functions. Offered Fall and Spring Semester, annually.

## MATH 150 - Applied Mathematical Reasoning

(3 semester hours)

**Prerequisites:** MATH 120

**Description:** The course introduces some of the major themes and ideas in mathematical reasoning and focuses on mathematical applications relevant to a non-physical science student. The content in the course will help the student to use mathematical concepts effectively in their respective disciplines. The course lays a lot of stress on geometry and trigonometry. Topics covered in the course includes plane geometry, transformational geometry, trigonometry, set theory, logic, and elementary graph theory. Offered Fall and Spring semester, annually.

## MATH 210 - Discrete Mathematics I

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 220

**Description:** This course provides the student with an understanding of multiple mathematical concepts and methods, which shape the foundation of modern information science in a form that is relevant and useful. Discrete mathematics plays a fundamental role for computer science, which is similar to that played by calculus for physics and engineering. Many concepts in computer science are best understood from a perspective that requires expertise with mathematical tools and certain reasoning skills associated with mathematical maturity. The topics covered draw on current material from several mathematical disciplines: graph theory, mathematical logic, and set theory. Offered Fall Semester, annually.

## MATH 220 - Calculus I

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 140 or MATH 280

**Description:** This course introduces techniques to evaluate limits and covers continuity, special trigonometric limits, absolute value limits and differentiation of algebraic, trigonometric, and logarithmic functions. The course explores intermediate value theorem, mean value theorem, and extreme value theorem. Other topics for exploration are application and formal definition of derivative average rate of change versus instantaneous rate of change, velocity, and the introduction of the definite integral and its applications. A graphing calculator is required for this course. Offered Fall and Spring Semester, annually.

## MATH 250 - Introduction to Linear Algebra

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 220

**Description:** As science and engineering disciplines grow so does the use of mathematics; new mathematical problems are encountered, and new mathematical skills are required. In this respect, linear algebra has an essential role in various engineering and scientific disciplines. This course develops the fundamental algebraic tools involving matrices and vectors to study linear systems of equations and Gaussian elimination, linear transformations, orthogonal projection, least squares, determinants, eigenvalues and eigenvectors and their applications. This course develops concrete computational skills along with theoretical considerations. Offered Spring Semester, annually.

## MATH 260 - Calculus II

(3 semester hours)

**Prerequisites:** MATH 220

**Description:** This course focuses on the exploration of differential calculus, the derivatives of all functions. An emphasis is placed on the rules of differentiation and their proofs. The course analyzes graphs of functions using the concept of derivative and its application and includes an introduction to integral calculus, integration properties, differential equations and notation. Problem solving is learned using elementary integration techniques, elementary trigonometric integration, and hyperbolic functions. A graphing calculator is required for this course. Offered Summer and Fall Semester, annually.

### **MATH 261 - Calculus III**

(3 semester hours)

**Prerequisites:** MATH 260

**Description:** This course develops vector algebra, the calculus of more than one variable; partial derivative; volume; surface and line integrals; the polar, cylindrical and spherical coordinate systems; and the theory of vector fields. It develops the theory of vector calculus and conservative vector fields which lead to the conservation laws of nature. In addition, the course fully treats the mathematical framework of defining geometry in three dimensions. Offered Spring Semester, annually.

### **MATH 280 - Introductory Statistics**

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 220

**Description:** This course covers elementary topics from the probability and statistics of both discrete and continuous random variables. Topics include independence and dependence, mean, variance and expectation, and distributions of random variables. Statistics is applied to hypothesis testing. This course provides the student with a broad, general knowledge and understanding of statistics. The emphasis of this course is on the utility and practical application of statistics rather than on the mathematical derivation of statistical principles. Offered Each semester, annually.

### **MATH 298 - Project I**

(3 semester hours)

**Prerequisites:** SEMR 200, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor, and a minimum of 40 earned semester hours

**Description:** This first project in the student's experiential program challenges the student to identify, investigate and analyze a particular topic in the program of study or a concentration. A key objective is to apply skills, methods, and knowledge obtained in prior courses with independent thinking and research; the final product represents the successful and purposeful application of knowledge. The project is undertaken with the close mentorship of a faculty member and may involve a community partner. Projects can involve scientific-based research or laboratory experiences, needs analysis or development plans for external organizations, or market studies and business plan proposals. Offered as needed.

### **MATH 300 - Experiment Design and Analysis**

(3 semester hours)

**Prerequisites:** MATH 120 or MATH 140

**Description:** This course is an introduction to applied design of experiments and the statistical analysis of scientific data. It provides a detailed development of specific parametric and non-parametric statistical procedures and their application to various experimental designs. This course is well-suited for a student to apply sound data analysis technique to experimental data. Key course objectives are: designing experimental procedures to obtain the desired information, application of the statistical procedures consistent with the design, and to draw meaningful inferences from the results. Offered Spring Semester, annually.

### **MATH 310 - Discrete Mathematics II**

(3 semester hours)

**Prerequisites:** MATH 210 or MATH 260

**Description:** This course ensures that the student reaches the level of mathematical maturity necessary for the study of Computer and Information Science. Topics covered draw on current material from the study of graphs, trees, relations, algorithms and models of computation. Offered Spring Semester, annually.

## **MATH 320 - Ordinary Differential Equations**

(3 semester hours)

**Prerequisites:** MATH 260

**Description:** This course serves as an introduction to Ordinary Differential Equations (ODEs) and their applications. Topics include: Existence, uniqueness and the stability of solutions; first and second order ODEs; applications; the Laplace transform; numerical methods; systems of ODEs and solutions of linear equations with constant coefficients. Developing applied models taken from a wide variety of fields and learning to communicate your understanding by writing effective arguments are key objectives of this course. Offered Spring Semester, annually.

## **MATH 365 - Internship**

(3 semester hours)

**Prerequisites:** SEMR 200 or permission, an approved learning contract, permission of Office of Experiential Programs, designation of an appropriate academic advisor, and a site supervisor

**Description:** An internship allows the student to put theory into practice. The student applies classroom experiences to the workplace at an off-site placement, where ideas are tested and competencies and skills are developed. Throughout the internship, the student works regularly with a faculty supervisor, the Office of Experiential Programs, and a site supervisor who guides the learning process. The student integrates the collective observations, analyses, and reflections of the experiential team into an internship portfolio that showcases the accomplishments of the experience. The unique portfolio is constructed throughout the internship and represents the evolutionary and dynamic nature of the learning process. Offered as needed.

## **MATH 370 - Numerical Methods**

(3 semester hours)

**Prerequisites:** MATH 210 or MATH 220

**Description:** This course covers the math methodologies that underlie the techniques of scientific computing and related numerical methods. Topics include: direct and iterative methods for linear systems, eigenvalue decompositions and factorizations, stability and accuracy of numerical algorithms, the IEEE floating-point standard, sparse and structured matrices, and linear algebra software. Other topics may include memory hierarchies and the impact of caches on algorithms, nonlinear optimization, numerical integration, FFTs, and sensitivity analysis. Problem sets will involve use of C++ programming language. The course is intensely practical with solved examples and graded exercises. Offered Fall Semester, annually.

## **MATH 380 - Mathematical Modeling**

(3 semester hours)

**Prerequisites:** MATH 220

**Description:** This course involves applications of mathematics to real-world problems drawn from industry, research, laboratories, the physical sciences, engineering and scientific literature. Techniques used include parameter estimation, curve fitting, calculus, elementary probability, optimization, computer programming, and ordinary and partial differential equations. People routinely solve problems using estimation, probability, optimization, and simulation or modeling techniques without considering themselves mathematicians. This course broadens and strengthens the exposure of the interested student to applications of mathematics frequently seen in industry, science, and government. Offered Spring Semester, annually.

### **MATH 381 - Special Topics**

(1 to 4 semester hours)

**Prerequisites:** Consent of the Instructor and Academic Advisor

**Description:** This course covers topics in Mathematics. Offered As needed.

### **MATH 390 - Independent Study**

(1 to 4 semester hours)

**Prerequisites:** Minimum of 60 earned semester hours

**Description:** This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract. Offered as needed.

### **MATH 420 - Methods in Applied Mathematics**

(3 semester hours)

**Prerequisites:** MATH 320

**Description:** Several topics in advanced calculus are developed in this course including functions of a complex variable, infinite series, Fourier series, Partial Differential Equations, Probability Theory and Mathematical Statistics. Applied problems arising from many fields of science and data analysis are treated using the mathematical topics covered. Computer Aided Software is used to supplement the material in each topic. Offered Fall Semester, annually.

### **MATH 498 - Project II**

(3 semester hours)

**Prerequisites:** MATH 298, an approved learning contract, permission of the Office of Experiential Programs, designation of an appropriate academic advisor

**Description:** This project must be in the student's program of study or concentration(s). It should demonstrate application of the skills, methods, and knowledge of the discipline to solve a problem or answer a question representative of the type to be encountered in the student's profession. As with Project I, this is undertaken with the close mentorship of a faculty member and may involve a community partner. The ideal project has a clear purpose that builds directly upon the learning that occurs within the student's first project and internship. Offered as needed.

### **NANO 211 - Materials, Safety and Equipment Overview for Nanotechnology**

(3 semester hours)

**Prerequisites:** CHEM 161/CHEM 162, MATH 120, and PHYS 210

**Description:** Nanofabrication processing equipment and materials handling procedures with a focus on safety, environment, and health issues. *Course available only at The Pennsylvania State University - University Park campus.* Offered Each semester, annually.

### **NANO 212 - Basic Nanotechnology Processes**

(3 semester hours)

**Corequisite:** NANO 211

**Description:** Step-by-step description of equipment and processes needed in top-down, bottom-up, and hybrid nanofabrication. *Course available only at The Pennsylvania State University - University Park campus.* Offered Each semester, annually.

**NANO 213 - Materials in Nanotechnology**

(3 semester hours)

**Corequisite:** NANO 212

**Description:** The use of materials for nanotechnology as well as the unique material properties available at the nano-scale. *Course available only at The Pennsylvania State University - University Park campus.* Offered Each semester, annually.

**NANO 214 - Patterning for Nanofabrication**

(3 semester hours)

**Corequisite:** NANO 212

**Description:** Lithographic process from substrate preparation to exposure; process from development through inspection; advanced optical lithographic techniques. *Course available only at The Pennsylvania State University - University Park campus.* Offered Each semester, annually.

**NANO 215 - Materials Modification in Nanotechnology Applications**

(3 semester hours)

**Corequisite:** NANO 212

**Description:** Processing steps used in modifying material properties in nanofabrication. *Course available only at The Pennsylvania State University - University Park campus.* Offered Each semester, annually.

**NANO 216 - Characterization, Testing of Nanofabricated Structures and Materials**

(3 semester hours)

**Corequisite:** NANO 212

**Description:** Measurements and techniques essential for controlling device fabrication. *Course available only at The Pennsylvania State University - University Park campus.* May substitute Project I. Offered Each semester, annually.

**PHYS 210 - General Physics I**

(4 semester hours)

**Prerequisites:** High School Physics and Algebra II

**Description:** This course provides an introductory treatment of classical Newtonian physics and covers kinematics in one and two dimensions, vector forces, Newton's laws of motion, uniform circular motion, work, conservation of energy, momentum and angular momentum, rotational kinematics and dynamics, and simple harmonic motion. Emphasis is placed on the application of basic concepts through mathematical problem-solving. Applications of physics to problems in medicine are presented and medical technology is highlighted throughout the course. Applications of elementary and differential and integral calculus to physics are introduced. Laboratory experiments provide experience with various measurement technologies and reinforce the theoretical concepts developed. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

**PHYS 215 - Principles of Physics for Nanobiotechnology**

(4 semester hours)

**Prerequisites:** MATH 120

**Description:** This course covers selected topics from the primary fields of physics including: Newton's mechanics, electromagnetism, optics, thermodynamics, and modern (atomic) physics with an emphasis on applications to nanobiotechnology. Algebraic equations are used throughout the course. Offered Spring Semester, annually.

**PHYS 260 - General Physics II**

(4 semester hours)

**Prerequisites:** PHYS 210

**Description:** This course extends the study of classical physics and covers topics in electrostatics, magneto statics, electric circuits, electromagnetic waves, optics, interference and diffraction, and the quantum theories of atomic and nuclear physics. Mathematical problem-solving skills and applied problems in medical technology are emphasized. Applications of elementary and differential and integral calculus to physics are introduced. The course includes laboratory experiments to expose the student to advanced electronic and radiation measurement technologies and enhance the theoretical development of each topic. Offered Spring Semester, annually.

### **PHYS 301 - Physical Thermodynamics**

(3 semester hours)

**Prerequisites:** CHEM 161-CHEM 162, PHYS 260 and MATH 220

**Description:** This course is designed for the student who has an interest to apply knowledge gained in calculus, physics and chemistry to the study of thermodynamics and chemical equilibrium. Offered Spring Semester, even-numbered years.

### **PHYS 315 - Quantum Mechanics and Spectroscopy**

(3 semester hours)

**Prerequisites:** CHEM 220, PHYS 260 and MATH 260

**Description:** This course integrates knowledge gained in calculus and physics to atoms and molecules of chemistry. Quantum mechanical theory is introduced and applied to understand how electrons are arranged in atoms and molecules and ultimately studied using spectroscopy. Offered Fall Semester, even-numbered years.

### **PHYS 330 - University Physics I**

(4 semester hours)

**Prerequisites:** MATH 261

**Description:** This calculus-based physics course covers the classical physics founded upon Newton's Laws, and the conservation of energy and momentum. Applications of these principles treat topics such as the rotational dynamics of rigid bodies, Newton's theory of gravity, oscillations, fluids and elasticity. The course includes weekly laboratory exercises. Three hours of lecture, three hours of laboratory per week. Offered Fall Semester, annually.

### **PHYS 350 - University Physics II**

(4 semester hours)

**Prerequisites:** PHYS 330

**Description:** This course is a continuation of University Physics I. University Physics II develops the physical principles of electricity and magnetism, DC electric circuits, electromagnetic radiation, interference phenomena, quantification, and quantum theory of the atom. The course makes extensive use of vector calculus. Three hours of lecture, three hours of laboratory per week. Offered Spring Semester, annually.

### **SEMR 050 - Academic Skills**

(0 semester hour)

**Prerequisites:** None

**Description:** This course improves the student's opportunity for success in college-level work by teaching study habits in ten key areas: anxiety, attitude, concentration, information processing, motivation, selecting main ideas, self-testing, study aids, test strategies, and time management. Limited to the student on academic probation or financial aid appeal. Offered As needed.

### **SEMR 100 - Cornerstone**



(1 semester hour)

**Prerequisites:** None

**Description:** This course meets throughout the semester and offers the mentorship of a faculty member in the transition of a first-year or transfer student. The course focuses on daily life at the University: academic requirements and resources, professional etiquette, student activities, and civic engagement. Offered Fall and Spring Semester, annually.

### **SEMR 200 - Steppingstone**

(1 semester hour)

**Prerequisites:** SEMR 100

**Description:** This course prepares the student for the subsequent components of experiential learning. It develops the depth and range of academic and professional skills in areas such as goal setting, time management, communication, interviewing, and career planning. The student is shown the value of and processes to plan and obtain mentorships, projects, and internships. This seminar also emphasizes the development of the civic engagement competency, and advances the planning and construction of the student's ePortfolio. At the conclusion of SEMR 200, the student should have a completed proposal for Project I and know how to plan for an Internship. Offered Fall and Spring Semester, annually.

### **SEMR 300 - Keystone**

(1 semester hour)

**Prerequisites:** SEMR 200

**Description:** This course focuses on the refinement of the student's academic and professional identity. It emphasizes the importance of the University competencies, and the ways to measure, apply, and communicate the successful attainment of them. It further prepares the student for the Internship by reviewing the ways in which an external experience fits into the program of study. If needed, the student is guided through the process of securing an internship. The student advances through active learning in the areas of civic engagement and teamwork, and further develop presentation skills. This seminar facilitates the successful completion of many subsequent components in the experiential program. Offered Fall and Spring Semester, annually.

### **SEMR 400 - Capstone**

(1 semester hour)

**Prerequisites:** SEMR 300, Internship, Project II

**Description:** The capstone challenges the student to reflect upon and integrate academic, experiential and co-curricular experiences in preparation for the workforce or graduate school. Assignments are designed to create a sense of culmination in the fourth year, and prepare the student for the transition to life beyond the University. The student completes the ePortfolio to demonstrate the achievement of competencies and the program of study; this is of potential utility to employers or graduate schools as unique and specialized evidence of the individual student's abilities. Offered Spring and Summer Semester, annually.

# Professional and Continuing Education

Professional and Continuing Education is responsible for all contracted training, non-credit certificates, and professional development offerings for employers and working professionals. The professional development offerings through Harrisburg University provide specific and advanced skills training and certificates within the University's mission of science and technology.

The University works with various organizations to develop a wide range of professional development solutions and programs that include:

- non-credit training events, series, and certificates;
- on-site and off-site credit-based offerings short of a degree such as workshops, institutes, clinics, concentrations, and specializations;
- on-site degree program; and
- academic program evaluation for employer training.

The University partners with various outside agencies including, but not limited to: corporations, government agencies, and school districts to develop customized solutions that contribute to professional development of the existing workforce. In particular, the University's professional development offerings serve:

- science, technology, and management professionals;
- educators and administrators; and
- senior staff responsible for innovation and decision-making.

All professional development programs follow the University's commitment to applied, experiential, and competency-based training and education. They focus on enhancing the ability of professionals to apply what they have learned immediately (and over the long term) to their jobs and careers.

Because the programs offered are demand-driven and change from year to year, up-to-date information on the current offerings is posted online at <https://professionaled.harrisburgu.edu>.

For more information on customized trainings or the calendar of upcoming professional development, contact [ProfessionalEd@HarrisburgU.edu](mailto:ProfessionalEd@HarrisburgU.edu) or call 717.901.5190.

# University Administration

Harrisburg University of Science and Technology is a private, not-for-profit organization providing instruction, research, and service to the community. The University is governed by a Board of Trustees. The immediate regulation and direction of the academic, research, and service activities of the University are delegated by the Board of Trustees to the President and the faculty of the University. A listing of the administration, staff, and full-time and part-time faculty, their titles, and areas of instruction are available at the University website at: <https://harrisburgu.edu/faculty-and-staff-listing/>

## Board of Trustees

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# University Policies and Disclosures

These are some University policies that guide the conduct of the student, faculty, and staff. Additional details can be found in the Student Handbook, Faculty Handbook, and Employee Handbook.

## Family Educational Rights Privacy Act (FERPA)

The University collects a considerable amount of information about each student during the period of enrollment. Almost all this information is contained in educational records protected by the Family Educational Rights and Privacy Act (FERPA). FERPA applies to all schools that receive funds under an applicable program of the U.S. Department of Education.

Under FERPA, students have the right to review their educational records and to challenge content that is inaccurate or misleading. FERPA regulations also stipulate that the University cannot release a student's educational records to anyone but the student without the student's written consent, except to the extent that FERPA authorizes disclosure without consent.

FERPA permits University officials to disclose educational records and certain information to parents, or others, without consent of the student under certain circumstances:

- During a health or safety emergency to protect the student or other individuals;
- Any record to the parent when the student is a dependent for federal income tax purposes;
- Law enforcement unit records, including outside law enforcement authorities;
- Parental information when a student under 21 has violated any law or university policy; and, concerning the use or possession of alcohol or a controlled substance

**University Privacy Notice** - The University is committed to safeguarding the privacy of individuals who share personal data with it and has adopted a Privacy Notice that outlines HU's collection, use, and disclosure of information provided by prospective students, applicants, or third parties. A copy of the University's Privacy Notice is available on its webpage at: <https://harrisburgu.edu/lib/pdf/HU-Privacy-Notice-5-2-19.pdf>.

**Directory Information** - The University may disclose directory information about the student unless the student specifically informs the University in writing that this type of information should not be released. The University defines directory information to include:

- student's name
- both permanent and temporary addresses
- email address
- telephone number(s)
- class year, program of study
- enrollment status
- dates of attendance
- degree(s) and/or awards received
- photograph
- previous educational institution attended
- participation in officially recognized University activities
- eSports Statistics

For additional information on FERPA: <https://www2.ed.gov/policy/gen/reg/ferpa/index.html>

## Campus Crime and Security Disclosure

The Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (Clery Act) requires the distribution of an annual security report on or before October 1 to all current faculty, staff, and students and notice of its availability to prospective students, faculty, and staff. The annual security report includes statistics for the previous three years concerning reported crimes as identified by the Clery Act that occurred on campus or property owned or controlled by the University, and on public property immediately adjacent to and accessible from the campus. The report also includes institutional policies concerning campus security, such as: crime prevention, the reporting of crimes, sexual harassment and assault, domestic violence, timely warnings, and other safety and security matters including public, private, and University resources that are available to the University community.

The University's current Clery Report is available on its website at: <http://harrisburgu.edu/lib/pdf/annual-security-report-clery-report.pdf>

## The Timothy J. Piazza Antihazing Disclosure

Harrisburg University does not tolerate hazing, whether occurring on or off-campus. Students who engage in this behavior may face disciplinary action from HU, and may also face criminal charges under state law, including The Timothy J. Piazza Antihazing Law. This law requires Pennsylvania institutions to adopt a written policy against hazing and "adopt rules prohibiting students or other persons associated with an organization operating under the sanction of, or recognized as an organization by, a University from engaging in hazing or other identifiable offenses. It also requires the publishing of hazing offenses on a bi-annual basis. The University's current antihazing policy and antihazing report are available on its website at: <https://harrisburgu.edu/antihazing/>.

## Electronic Mail Communication Policy

**Policy Statement** - Unless otherwise prohibited by law, the University may send official communications to faculty, staff, and students by e-mail to an account assigned by the University with the full expectation that such e-mails will be read by the recipient on a frequent and consistent basis and in a timely fashion.

**Reason for Policy** - The University must be able to communicate quickly and efficiently with faculty, staff, and enrolled students in order to conduct official University business. E-mail is an available and appropriate medium for such communication. Official communications may include policy announcements, registration and billing information, regulatory compliance disclosures, emergency notifications, and other information of a critical or timely nature. Faculty, staff, and students may not opt-out from receiving official University e-mail communications.

**Assignment of E-mail Accounts** - Students and employees are assigned an account in the HarrisbugU.edu domain. The account is designated as the "[FiLastname@HarrisburgU.edu" or "[Student FiMiLastname]@My.HarrisburgU.edu" e-mail account. [The addressee protocol may vary slightly in the event of Initials/Name duplication]. The e-mail account is generated by the Office of Technology Services and may not be changed without University approval. University communications that are sent by e-mail will be sent to the University-supported e-mail account.

**Responsibilities** - Faculty, staff, and students are expected to review messages received through the University-supported e-mail account on a frequent and consistent basis. Communications may be time-critical. Individuals shall use the e-mail account for all University-related e-mail communications. Faculty shall use the University-supported account for e-mail communication with a student and, conversely, the student shall respond to faculty communications or requests using the University-supported e-mail account and no other email address will be used for official HU business.

**Forwarding of E-mail** - An individual who chooses to forward e-mail received on a Harrisburg University e-mail account to a different e-mail address risks loss of data integrity. The University is not responsible for e-mail, including attachments, forwarded to any e-mail address not supported by the University.

## Third-Party, Web-Based [Cloud] Computer Records Policy

**Policy Statement** - It is the policy of Harrisburg University of Science and Technology that any and all user-generated content developed during the use of third-party, web-based (referred to as "cloud-based") technologies used in the classroom or coursework, which could include cloud-based instructional tools, cloud-based teaching, and learning environments, and cloud-based server storage, is the property of the individual faculty, student, or staff who developed the content and that the University is not responsible, and shall be held harmless, for any theft, damage, manipulation or loss that may be incurred as a result of the failure by the third party to properly maintain or safeguard that content.

**Reason for Policy** - The University encourages and supports the use of new instructional tools and emerging technologies in open, digital teaching and learning environments. The use of web-based applications and cloud-based storage also brings new concerns about intellectual property and privacy. The Family Educational Rights and Privacy Act of 1974 (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is the federal law that protects the privacy of a student's education records. Generally, any work related to a course or program of study created by the individual is considered a part of the "student's education record." Accordingly, any work related to a course or program of study should not include personally identifiable information of the individual. Examples of "personally identifiable information" are: an individual's full name (if not common), Social Security number, date of birth, birthplace, face or fingerprints, credit card numbers, driver's license number, vehicle registration plate number, digital identity, or grades. Any of these data, when combined with other personal information, may identify an individual. Users of third-party, web-based technologies are strongly cautioned to avoid posting personally identifiable information in any computerized application.

A license agreement permits the University to provide access through its servers for the student to utilize the Microsoft *SkyDrive* cloud-based computer server storage utility to store the student's ePortfolio during the period of enrollment in a program of study. The University requires that each degree-seeking undergraduate student develop an ePortfolio. An ePortfolio is defined as: *An organized, media-rich collection of documents, videos, and other exhibits that allows the student to demonstrate competence to a multitude of audiences.* Additionally, faculty, students, or staff are provided access to and use other web-based technologies and social media where user-generated content is stored.

The individual user of a third-party, web-based technology application, when establishing an account, is required to agree to the conditions of a Terms of Service or End-User Agreement, whereby the individual user accepts full responsibility for all content maintained in the application. Furthermore, the user agrees to a condition that, in no event will the software manufacturer be liable for any damages, whether direct, indirect, special, incidental, economic, compensatory, or consequential, arising out of the use of or inability to use the software or user documentation. Accordingly, the user is solely and exclusively responsible for any and all content.

**Action Subsequent to Completion of a Program of Study or Termination of a Period of Employment** - Any and all documents, videos, and other exhibits accumulated in an ePortfolio or other file, folder or collection by an individual who utilizes a third-party, cloud-based application or storage utility during a program of study or period of employment will no longer be accessible through the University's servers following the completion of the program of study or termination of a period of employment. Direct access to the materials held by the provider is conditional upon the Terms of Service or End-User Agreement accepted by the individual when the account was established.

## Equal Opportunity

The University is committed to assuring equal opportunity to all persons and does not discriminate on the basis of race, creed, color, gender, age, religion, national origin, veteran or handicap status, or sexual orientation in its educational programs, activities, admissions, or employment practices as dictated by University policy and as required by federal statutes (Title IX of the Educational Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, Titles VI and VII of the Civil Rights Act of 1964, the Americans with Disabilities Act of 1990 (ADA)) and any other applicable anti-discrimination statutes, including those

of the Commonwealth of Pennsylvania (Pennsylvania Human Relations Act of 1955 (PHRA) and the Pennsylvania Fair Educational Opportunities Act of 1961 (PFEOA)).

Student inquiries concerning compliance and information regarding Title IX, Title VI, Title VII, PFEOA, Section 504, campus accessibility, or ADA accommodations should contact the Office of Student Services.

Faculty and staff inquiries concerning compliance and information regarding Title IX, Title VII, PHRA, Section 504, campus accessibility, or ADA accommodations should contact the Office of Human Resources.

## **Title IX Non-Discrimination Policy and Grievance Procedures**

Title IX of the Education Amendments of 1972 is a federal statute that prohibits discrimination based on sex in educational programs and activities that receive federal financial assistance. To ensure compliance with Title IX, and other federal and state non-discrimination laws, the University has internal policies that prohibit discrimination and sexual misconduct based on sex including sexual harassment and violence, domestic and dating violence, and stalking.

The University's Title IX procedures are contained within its current Clery Report that is available on its website at: <http://harrisburgu.edu/lib/pdf/annual-security-report-clery-report.pdf>. All Title IX procedures are included as part of the University's overall Sexual Misconduct Policy.

## **Sexual Misconduct Policy**

The University's Sexual Misconduct Policy is located in the Student Handbook and contained within the University's current Clery Report that is available on its website at: <http://harrisburgu.edu/lib/pdf/annual-security-report-clery-report.pdf>. The policy applies to faculty, students, staff, and visitors.

## **Non-Discrimination Statute - Commonwealth of Pennsylvania**

The Pennsylvania Fair Educational Opportunities Act of 1961 provides student access to benefits and services of the University and prohibits discrimination without regard to race, color, gender, religious creed, ancestry, national origin, sexual orientation, age, civil union, marital status, veteran status, handicap or disability, perceived handicap or disability, relationship or association with an individual with a handicap or disability, use of a guide or support animal, and/or handling or training of support or guide animals. This statutory obligation includes, but is not limited to, admissions, course offerings, transfer of credit, financial aid, scholarships, student employment, internships, educational and social programs, and student advisement and counseling.

Any complaint of an alleged act of discrimination can be filed by contacting the Pennsylvania Human Relations Commission (PHRC), 1101-1125 Front Street, 5th Floor, Harrisburg, PA 17104-2515, or by calling (717) 787-9784. Complaints must be filed within 180 days of the incident. Complaint forms can also be obtained at the PHRC's website: <https://www.phrc.pa.gov/File-A-Complaint/ComplaintForms/Pages/default.aspx>

## **Emergency Notification System**

When HU becomes aware of criminal incidents that, in the judgment of HU's senior leadership, constitute an ongoing threat to the campus community, a Crime Alert will be issued to notify the HU community. Depending on the circumstances, a timely warning will be issued without delay and the information may be further disseminated by using one or a combination of the following: e-mail distribution, HU website, campus publications, and postings and/or activation of the externally



hosted emergency notification Omnilert alert system to advise the community of the situation. HU withholds as confidential the names of victims. The same notification system will be used for other campus-wide emergencies/disasters such as fire, weather, or restricted access to buildings.

Members of HU's community may subscribe to receive emergency notifications text alerts regarding HU closures or emergency/disaster situations that may impact the HU community. You can subscribe to the system, "Omnilert," (formally e2Campus) through the MyHU portal of HU's webpage. For additional information on any matters, you will be directed to, or you should go to HU's website or social media accounts. Subscribers are subject to text message costs assessed by their cell phone provider.

## Peer-to-Peer ("P2P") File Sharing Information Technology Disclosure

### Introduction

The Higher Education Act of 1965, as amended, under Title IV, Section 285(a)(1)(P) and Section 487(a)(29), effective August 14, 2008, requires the disclosure to users of information technology resources that Harrisburg University of Science and Technology has developed a plan to combat the unauthorized distribution of copyrighted material (including the use of technology-based deterrents) and will, to the extent practicable, offer alternatives to illegal downloading. The illegal distribution of copyrighted material is prohibited and may subject an individual to criminal or civil penalties.

The "Digital Millennium Copyright Act of 1998" (DMCA) states that copyrighted information is protected and that it is illegal to download, upload, or distribute that information in any fashion. The provisions of this law specify a process to deal with any claimed infringement.

### Plans to "Effectively Combat" Unauthorized Distribution of Copyrighted Material

P2P traffic is identified via the Intrusion Prevention System (IPS) that is integrated within the University's Cisco ASA 5500 security appliance. In most cases, a client's connection to the network will be dropped when typical P2P traffic is sensed.

This intrusion system covers the known protocols that popular P2P clients - such as Torrents, Limewire, Bearshare, Kazaa, etc. - utilize to establish connections to potentially transfer files containing copyrighted material. Additionally, the ability for the student to pass files over the Wireless LAN between laptops has been shut down.

### Compliance

Harrisburg University reserves the right to capture, preserve, and/or inspect any information transmitted through, stored on, or used on any IT resource.

### Copyright Infringement and Penalties

Copyright infringement is the act of exercising, without permission or legal authority, one or more of the exclusive rights granted to the copyright owner under § 106 of the Copyright Act of 1976. These rights include, but are not limited to, the right to reproduce or distribute a copyrighted work. In the file-sharing context, downloading or uploading substantial parts of a copyrighted work without authority constitutes an infringement.

Penalties for copyright infringement include civil and criminal penalties. In general, anyone found liable for civil copyright infringement may be ordered to pay either actual damages or "statutory" damages affixed at not less than \$750 and not more than \$30,000 per work infringed. For "willful" infringement, a court may award up to \$150,000 per work infringed. A court can, in its discretion, also assess costs and attorneys' fees, impound the infringing work, and grant temporary and permanent injunctions.

Willful copyright infringement can also result in criminal penalties, including imprisonment and fines.

For more information, please see the Web site of the U.S. Copyright Office at: [www.copyright.gov](http://www.copyright.gov), especially the Frequently Asked Questions at [www.copyright.gov/help/faq](http://www.copyright.gov/help/faq).

## **Infringement of Digitally Copyrighted Material**

The Digital Millennium Copyright Act of 1998 (DMCA) is a federal law that criminalizes production and dissemination of technology, devices, or services intended to circumvent measures that control access to copyrighted works (commonly known as digital rights management or DRM). In addition, the DMCA heightens the penalties for copyright infringement on the Internet.

The designated agent to receive notification of a claimed infringement, in accordance with the provisions of the Digital Millennium Copyright Act, is:

Jacqueline Conforti Barnett  
General Counsel  
326 Market Street  
Harrisburg, PA 17101  
(717) 901-5100 ext. 1671  
[jbarnett@HarrisburgU.edu](mailto:jbarnett@HarrisburgU.edu)

If an infringement claim is submitted to the University by a complainant, appropriate action will be taken to identify the student, faculty, or staff member involved in the complaint.

Written notice to the involved individual by email requires the removal of the copyrighted files or documents from the computer containing the material within 72 hours of the formal notice. A reply confirmation is required when corrective action has been taken to remove the illegal files, documents, or other material.

Upon receipt of the material removal confirmation, the designated agent notifies the complainant of the University's resolution.

If an individual involved in the complaint fails to take the requested corrective action within 72 hours, access to the University's network will be deactivated. Reactivation to the network can only occur at such time that it is confirmed that corrective action was taken.

Copyright violations may also fall under other University policies and subject to discipline.

## **Campus ID Card Policy**

The Campus ID Card serves as the University's student/faculty/staff ID card, provides access to campus buildings and events, and serves as the Library card.

While on campus, the Campus ID Card must be visible at all times and presented upon request to any faculty member, staff, security personnel, or contracted security personnel.

The Campus ID Card is the property of Harrisburg University of Science and Technology and all policies and procedures must be observed to retain the privilege of use. The card is not transferable and is only to be used by faculty, staff, a currently-registered student, and other authorized persons.

The Campus ID Card must be surrendered to the University upon deactivation. A fee may be assessed for any Campus ID Card that is not returned at the end of the expected period of use.

## Campus Card Types

There are two versions of the Campus ID Card:

- Campus ID Card: card contains photo identification, student/employee ID number; and,
- Access-Only Campus ID Card: card without photo identification (typically for the short-term student or visitor).

## Campus Card Usage

The primary purpose of the Campus ID Card is to provide easy identification of the cardholder and to permit access to permitted areas of the University campus. The Campus ID Card also serves as a library card. It is the responsibility of the cardholder to immediately report suspected lost or stolen cards to HU Security at [HUSecurity@HarrisburgU.edu](mailto:HUSecurity@HarrisburgU.edu) or by phone at 717-901-5180.

## Campus Card Activation

The Campus ID Card is activated for faculty and staff following formal contractual employment or position appointment.

The Campus ID Card is activated for a student following admission to the University, payment of the required tuition deposit, and completion of course registration for the semester or other term.

## Campus Card Deactivation

The Campus ID Card is deactivated for faculty and staff following formal cancellation of contractual employment or resignation or termination from the position appointment.

The Campus ID Card is deactivated for a student following a determination of withdrawal, dismissal, graduation or other completion of a scheduled period of enrollment.

## Student Grievance Policy

A situation, circumstance or incident may occur where a student concludes that they have incurred egregious harm as the direct result of an action caused by a member of the faculty or staff. A student in this circumstance may file a formal grievance against a faculty or staff member of the University to seek administrative redress. Examples of adverse behaviors include, but are not limited to: violation of confidentiality; offensive remarks as a deliberate insult individually, in the company of others, or in the classroom; racist or sexist remarks and/or attitudes; inappropriate sexual contact, not limited to sexual intercourse; or, inappropriate relationships with the student which cause a conflict of interest for either the student or faculty or staff.

A student who is compelled to submit a grievance must obtain a Student Grievance Form from Records and Registration. The form must be completed with an explanation of the facts of the allegation, and attach to it any and all documents, testimonies or petitions supporting the student's position as evidence. The completed grievance form should be submitted promptly to the Director of Institutional Compliance.

A grievance cannot be filed on behalf of another person. Grievances may not be used to challenge academic or other policies or procedures of general applicability.

Additional information may be requested from the student while the grievance is being considered. The alleged faculty or staff person is interviewed and asked to sign an affidavit stating facts relative to the alleged incident. Following consultation with the Office of the Provost, a decision shall be rendered by the Director of Institutional Compliance within five (5) business days of the grievance submission. The student then receives a determination letter.

If the student does not receive a satisfactory remedy relative to the grievance, the student may request a further review by a Grievance Committee which consists of: the Director of Institutional Compliance, who shall act as the Committee Chair, an administrator designated by the Provost, the Chair of the Faculty of the Whole, a member of the Office of Student Services, and a student representative that has no previous knowledge of the matter to be considered. The request for review by the Grievance Committee must be submitted in writing to the Director of Institutional Compliance. Formal rules of evidence will not apply, and the panel may consider any evidence considered relevant and reliable. A student is permitted to have a representative to assist them during the proceeding; however, the representative may not be an attorney.

The student will be advised of the date and time of the Grievance Committee meeting so that he or she may participate. The Committee shall deliberate and reach a decision on the grievance in closed session and render its recommendation regarding the grievance within ten (10) days of its meeting. The student will be notified promptly of the Committee's recommendation.

If a student wishes to appeal the decision of the Grievance Committee, he or she must submit a written request to the Provost within five (5) business days after formal notification of the Committee's decision. The Provost's Office will review all of the relevant materials of the matter and notify the student of a final decision within five (5) business days of the appeal submission.

Grievances relating to the alleged denial of access to the benefits and services of the University as a result of discrimination on the basis of gender, race, color, creed, religion, national origin, sexual orientation, age, ancestry, disability, civil union, marital or veteran status should be presented in writing to the Affirmative Action Officer within 30 days of the alleged discrimination. The Affirmative Action Officer will review the written complaint and meet with the individual filing it. After reviewing all the facts and utilizing legal counsel, if appropriate, the Affirmative Action Officer will determine if corrective action is required. The student bringing the complaint will be promptly notified in writing of the determination. If corrective action is required, it will be initiated within 30 days of the determination of the grievance.

## Acceptable Use of Information Technology Policy

### Introduction

Harrisburg University offers comprehensive academic programs that emphasize science and technology. Access to information technology is essential to the pursuit and achievement of the University's instructional, research, administrative, and service missions. As such, the use of information technology is a privilege and all members of the University community are expected to be responsible and ethical users of information technology. This policy applies to all technology acquired by or on behalf of Harrisburg University (wherever used) and all technology (however acquired) used on any Harrisburg University resources<sup>1</sup>.

### Purpose

This policy:

- A. Promotes the responsible and ethical use of computing, information resources, and/or communication systems, collectively known as "information technology" but hereafter known as "IT," administered by the Office of Information Services (OIS).
- B. Defines the rights, responsibilities, and standards of conduct for its faculty, administrators, staff, students, and other authorized users with regard to the use of IT.
- C. Explains the appropriate procedures for enforcing any and all misuse of the University's IT resources and outlines appropriate disciplinary procedures for violating these rules.

<sup>1</sup>Computers, computer systems, networks, electronic communications systems, institutional or third-party cloud data storage media, facilities, peripherals, servers, routers, switches, equipment, software, files, or accounts.

## Responsibilities

- D. It is the responsibility of the University faculty, administrators, staff, or student workers to communicate this policy and its contents to any and all users of IT at, or in affiliation with, Harrisburg University. Not being aware of any part of this policy does not excuse the individual from being responsible for its contents.
- E. The Harrisburg University OIS is responsible for the following:
  - i. Maintaining user accountability requirements including user identification and authentication, account administration, and password integrity.
  - ii. Making every effort to protect the privacy of users and the confidentiality of data<sup>2</sup>.
  - iii. Ensuring fair access to IT.
  - iv. Developing and implementing security policies and standards.
- F. All Harrisburg University IT users are responsible for the following:
  - i. Acting in a responsible, ethical, and legal manner in the use of IT. As such, this use of IT implies consent with any and all applicable university policies and regulations.
  - ii. Using IT for authorized university business only. Excessive use of any IT resource for personal use is prohibited.
  - iii. Safeguarding data including personal information and passwords.
  - iv. Recognizing the limitations to privacy afforded by electronic services.
  - v. Respecting other users and their expectations of privacy, confidentiality, and freedom of expression.
  - vi. Taking precautions to prevent the initial occurrence and/or spread of computer viruses. Therefore, network-connected resources must utilize university-approved anti-virus software.
  - vii. Avoiding any unauthorized or illegal use of IT. This includes but is not limited to the transmission of abusive or threatening material, spam, or communications prohibited by state or federal laws.
  - viii. Using IT in compliance with applicable license and purchasing agreements. Each user is individually responsible for reading, understanding, and adhering to all licenses, notices, and agreements in connection with IT which he or she uses.

## Compliance

- G. Harrisburg University reserves the right to capture, preserve, and/or inspect any information transmitted through, stored on, or used on any IT resource without notice but especially when:
  - i. There is reasonable cause a user has violated this policy.
  - ii. A user or an account appears to be engaged in unusual activity.
  - iii. It is necessary to protect the integrity, security, or functionality of IT resources.
  - iv. It is necessary to protect the University from liability.
  - v. It is permitted or required by law.

## Enforcement and Disciplinary Procedures

- H. Any user who violates any part of this policy may be subject to the following:
  - i. Suspension or revocation of the user's computer account and/or suspension or revocation of access to the University's IT resources.
  - ii. Disciplinary action as described in Harrisburg University's Student Handbook which may include suspension, dismissal, or expulsion from the University.
  - iii. Disciplinary procedures outlined in Harrisburg University's Faculty Handbook or any other documents outlining conduct for faculty, staff, administration, or student employees which may include termination of employment or other disciplinary action.
  - iv. Civil or criminal prosecution under federal and/or state law. Noncompliance with certain provisions of this policy may incur penalties under such laws which may include fines, orders of restitution, and imprisonment.
  - v. Re-instatement of computer privileges shall be examined on a case-by-case basis.

<sup>2</sup> While Harrisburg University recognizes the importance of (and makes every attempt to achieve) privacy, the University cannot promise privacy of information stored on, or sent through, university-owned systems or resources except for certain information pertaining to student records, research, or other proprietary or patentable materials.

## Procedure to Update and/or Amend

Harrisburg University reserves the right to update and/or amend this document to reflect university policy changes and/or state or federal law.

## Credit Card Policy

On July 15, 2004, the Commonwealth of Pennsylvania legislature enacted Act 82 of 2004 requiring universities to adopt a policy that regulates credit card marketing

The Board of Trustees of the University adopted the following statement related to credit card solicitation on October 13, 2004:

"Harrisburg University prohibits the marketing of all forms of credit cards on university property and prohibiting credit card marketers from offering gifts to a student in exchange for completing a credit card application."

## Americans with Disabilities Act of 1990

The Americans with Disabilities Act of 1990 (ADA) is a federal anti-discrimination statute that provides civil rights protections to individuals with disabilities in the areas of employment, public accommodations, State and local government services, and telecommunications. The ADA was designed to remove barriers which prevent qualified individuals with disabilities from enjoying the same opportunities that are available to persons without disabilities. Similar protections are provided by Section 504 of the Rehabilitation Act of 1973 (Section 504).

An applicant or student that requires an accommodation under the Americans with Disabilities Act (ADA) should submit any required documentation in person or by mail to: Office of Disability Services, Harrisburg University of Science and Technology, 326 Market Street Harrisburg, PA 17101. All submitted documentation is confidential. See the Student Handbook for additional details regarding accommodations. If you have questions regarding the documentation policy and guidelines, email Student Services at [ada@HarrisburgU.edu](mailto:ada@HarrisburgU.edu).

## Clery Act Disclosure

It is also HU's policy to continue to comply as a policy with the federal Violence Against Women Act (VAWA) amendments to the Jeanne Clery Disclosure of Campus Security Policy and Campus Crimes Statistics Act (Clery Act), and the accompanying regulations. The University's current Clery Report is available on its website at <http://harrisburgu.edu/lib/pdf/annual-security-report-clery-report.pdf>