Harrisburg University

Of Science and Technology

Graduate Catalog

2025-2026

with July Addendum

The provisions of this Catalog, and its electronic version at 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, to change the medium of how courses and/or degrees are offered, 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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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://www.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 (https://reghelp.harrisburgu.edu/) 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. Founded to address the Capital Region's need for increased educational opportunities in science, technology, engineering and mathematics (STEM) careers, Harrisburg University represents 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 designed to meet the needs of the region's youth, workforce and businesses. The University serves as a catalyst for creating, attracting an expanding economic development and opportunities in Central Pennsylvania 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

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 reaccredited on March 10, 2022, 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 on January 4, 2017.

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).

Authorized under federal law by the Department of Homeland Security - U.S. Immigration and Customs Enforcement (DHS-USCIS-SEVIS) as an eligible institution for the Student and Exchange Visitor Information System (SEVIS) to enroll non-immigrant students.

The Master of Science in Project Management program is accredited by the Global Accreditation Center from the Project Management Institute, 14 Campus Boulevard, Newtown Square, PA (855-746-4849). The M.S. program in Project Management is one of only 110 programs around the world to achieve this accreditation. The Global Accreditation Center (GAC) for Project Management Education Programs is an independent academic accreditation body with policies, procedures, and standards for project, program, portfolio management and related programs.

The Computer and Information Sciences undergraduate program has been awarded ABET accreditation, a prestigious standard that guarantees HU CISC graduates are prepared to excel and lead in their field. ABET, a nonprofit organization, accredits college and university programs in applied and natural science, computing, engineering, and engineering technology at the associate, bachelor, and master degree levels. ABET-accredited programs meet the quality standards that produce graduates prepared to enter a global workforce.

The Masters degree program in nursing at Harrisburg University of Science and Technology is accredited by the Commission on Collegiate Nursing Education (http://www.ccneaccreditation.org).

Diversity Statement

Harrisburg University of Science and Technology, in accordance with applicable federal and state laws and university policies, does not discriminate based on race, color, national origin, sex, age, disability, medical status, sexual orientation, gender identity, or status as a veteran. The university also prohibits sexual harassment. This nondiscrimination policy covers admission, access, operation of university programs and activities, and employment. This policy is in accordance with the following laws, as amended, and their implementing regulations, to the extent and in the circumstances that they are applicable to the university: Titles VI and VII of the Civil Rights Act of 1964; Title IX of the Educational Amendments of 1972; the Americans with Disabilities Act of 1990; and Section 504 of the Rehabilitation Act of 1973.

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 Values

Underlying HU's mission are basic behavioral standards that must be respected and adhered to by all HU employees as a basic tenant of their employment. These standards include, but are not limited to:

- the importance of personal integrity, honesty, and ethical decision-making;
- the right of every individual to be treated with respect and dignity as members 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 diversity regarding race, gender, religion, sexual orientation, age, ability, ethnicity, and political views;
- the freedom from violence aimed at limiting, interfering with, or disrupting HU activities; and

- a recognition that civic engagement is a component of the intellectual development of students and provides a path for knowledge in the service of the community.

Admissions

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.

Philosophy

Graduate Philosophy

Harrisburg University of Science and Technology seeks to admit graduate program students from a variety of backgrounds. The University considers many factors in the review of applicant files and generally admits the qualified individual who has completed a baccalaureate degree with related undergraduate coursework, or those who have a baccalaureate degree but possess related professional experiences or potential.

Graduate education focuses on individualized career advancement in high-growth and high-demand areas of study within science, technology, engineering, management, and mathematics disciplines. This is accomplished by making certain that each student is completely engaged to gain knowledge at an advanced level, is able to specialize or generalize knowledge and skills according to needs and interests and applies what is learned and researched to both practical and professional experience. This is also accomplished by involving corporate faculty members who bring a practical and academic perspective to the program and courses in the design, development and delivery of graduate education. This program is designed for working professionals focused on career advancement and who need flexibility of access and timeliness of content and delivery.

Doctorate Philosophy

Harrisburg University of Science and Technology seeks to admit doctorate program students from a variety of backgrounds. The University considers many factors in the review of applicant files and generally admits the qualified individual who has completed a graduate degree with related graduate coursework, or those who have a graduate degree but possess related professional experiences or potential.

The doctoral program at Harrisburg University focuses on enabling students to make original contributions to their respective fields of study. There are two phases of the doctoral program at Harrisburg University, an initial learning phase that can include coursework, seminars, research, and fieldwork that contributes to the student's knowledge in the program of study; and a second research phase that focuses on student's original research culminating in the final dissertation defense. Upon a student's defense of the dissertation and completion of all other graduate requirements, the student will be awarded the doctoral degree in the program of study.

Admission Process and Requirements

Graduate Admission Process

There is no application deadline. Graduate program applicants are 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). The University uses a portal system for the secure transmission of documents.

Graduate Admission Requirements

Each applicant's candidacy will be evaluated once all admissions materials have been received.

The graduate admission process requires the candidate to:

- complete the application online at www.HarrisburgU.edu/Apply;
- submit final official undergraduate transcript(s) from the college or university at which a baccalaureate degree was conferred, and unofficial or official from any other institution of higher education attended (whether or not academic credit was earned);
    - if the applicant earned the undergraduate degree at a non-U.S. institution, the transcripts must be evaluated by WES/ECE to show the degree is equivalent to a four-year undergraduate degree in the U.S. The evaluation can be sent directly from WES/ECE to Gradtranscripts@Harrisburgu.edu.
- submit a personal goal statement including:
    - future goals: identify career/professional goals; and,
    - leadership or group contributions: describe examples of leadership experience in which you have significantly influenced others, helped resolve disputes, or contributed to group efforts over time;
- submit a resume;
- see programs for additional admission requirements, if any.

Doctorate Program Admission Process

Doctorate program applicants are encouraged to apply at least six months prior to the start of any semester. This application process allows ample time for acceptance and development of an academic schedule. The Admission Committee reviews all documents and will request an interview with the applicant prior to making an admission decision for a limited number of applicants to become resident or non-resident candidates for the degree.

Doctorate Admission Requirements by Program

Data Sciences, Ph.D.

A faculty admission committee will evaluate each applicant's candidacy once all admissions materials have been received. The doctorate admission process requires the candidate to:

- Complete the application online at www.HarrisburgU.edu/Apply.
- Write an essay (in English) on how this degree supports the candidate's academic and career aspirations.
- Submit final official transcript(s) from the college or university at which the highest degree earned was conferred.
- Submission of an official record of Graduate Record Examination scores (GRE) is recommended.
- Provide two letters of recommendation from academic or industry professionals.
- Submit a resume.
- Assemble all the above required documents into a zipfolder and email to PhD@HarrisburgU.edu.
- A faculty review committee may select the candidate for an interview.

Computational Sciences, Ph.D.

A faculty admission committee will evaluate each applicant's candidacy once all admissions materials have been received. The doctorate admission process requires the candidate to:

- Complete the application online at www.HarrisburgU.edu/Apply.
- Write an essay (in English) on how this degree supports the candidate's academic and career aspirations.
- Submit final official transcript(s) from the college or university at which the highest degree earned was conferred.
- Master's degree in science or engineering disciplines with a strong background in applied mathematics, statistics, numerical analysis, simulation and modeling, and programming languages.
- Submission of an official record of Graduate Record Examination scores (GRE) is recommended.
- Provide two letters of recommendation from academic or industry professionals.

- Submit a resume.
- Assemble all the above required documents into a zipfolder and email to PhD@HarrisburgU.edu.
- A faculty review committee may select the candidate for an interview.

Information Systems Engineering and Management, Ph.D.

A faculty admission committee will evaluate each applicant's candidacy once all admissions materials have been received. The doctorate admission process requires the candidate to:

- Complete the application online at www.HarrisburgU.edu/Apply.
- Write an essay (in English) on how this degree supports the candidate's academic and career aspirations.
- Submit final official transcript(s) from the college or university at which the highest degree earned was conferred.
- Minimum GPA: 3.30
- Submission of an official record of Graduate Record Examination scores (GRE). GRE score in the 65th percentile or above in the Quantitative portion. (*The GRE requirement could be waived for a candidate with a Master's Degree from Harrisburg University or another Domestic US Institution, and a high GPA.*)
- Evidence of research potential. Please submit the following as part of your application packet:
    - Any key published articles.
    - Students that are finishing their master's thesis may submit a summary of their thesis indicating the key findings and areas they wish to further pursue in their PhD.
    - Students that have no published article, thesis or other research should have other means of showing research potential, such as graduate courses taken or any significant documented projects. They should also submit a short research proposal.
- Provide two letters of recommendation from academic or industry professionals.
- Submit a resume.
- Assemble all the above required documents into a zipfolder and email to PhD@HarrisburgU.edu.
- A faculty review committee may select the candidate for an interview.

Information Systems Engineering and Management, D.Eng.

A faculty admission committee will evaluate each applicant's candidacy once all admissions materials have been received. The doctorate admission process requires the candidate to:

- Complete the application online at www.HarrisburgU.edu/Apply.
- Write an essay (in English) on how this degree supports the candidate's academic and career aspirations.
- Submit final official transcript(s) from the college or university at which the highest degree earned was conferred.
- Minimum GPA: 3.30
- Submission of an official record of Graduate Record Examination scores (GRE). GRE score in the 65th percentile or above in the Quantitative portion. (*The GRE requirement could be waived for a candidate with a Master's Degree from Harrisburg University or another Domestic US Institution, and a high GPA.*)
- Master's degree in ISEM or related field.
- A research proposal for an applied problem in ISEM, outlining the key issues and possible solution approaches to be explored (*see Requirements for Admissions Research Proposal: Information Systems Engineering and Management, D.Eng below*).
- Relevant professional experience: at least 2 years of full-time working experience beyond a Master's degree is expected, but not mandatory.
- Provide two letters of recommendation from academic or industry professionals.
- A letter of support either from an employer or sponsoring organization is recommended and preferred.

- A co-advisor from the employer or sponsoring organization is recommended and preferred.
- Submit a resume.
- Assemble all the above required documents into a zipfolder and email to PhD@HarrisburgU.edu.
- A faculty review committee may select the candidate for an interview.

Requirements for Admissions Research Proposal: Information Systems Engineering and Management, D.Eng.:

Your research proposal should address an important and complex problem. It should be engaging with a clear presentation of the issues to be addressed, the objectives pursued, the impact of the solution sought on scientific advancement and practical implications.

The Heilmeier Catechism for research evaluation should be used as a guide for creating an impactful research proposal.

1. What are you trying to do? Clearly articulate your objectives.
2. How is it done today, and what are the limits of current practice?
3. What's new in your approach and why do you think it will be successful?
4. Who cares?
5. If you're successful, what difference will it make?
6. What are the risks and the payoffs?
7. How much will it cost?
8. How long will it take?

The admission committee will be specifically looking for answers to the following questions:

- Does the project address an issue of significance?
- Is there a deep scientific premise for the project?
- What industries or organizations will benefit from solving this problem?
- Has the issue been addressed before? You should convince the committee of your knowledge of the literature in this domain and be aware of the limitations of current solutions.
- What is different and novel about the problem and/or the solution?
- What are the significant scientific challenges to overcome?
- How will you address the challenges? Give your thoughts on solution approaches to be researched for the solution.
- Will your solution contribute to new and novel ideas that have scientific merit?
- How impactful are the ideas and the solution to the problem posed? Identify the relevant socio-economic and environmental impacts of your solution.

Proposal outline

The research proposal should be at most 10 pages and organized as follows:

1. Summary of problem and objectives pursued (1 page max)
    1. Short description of the problem, clearly stating its significance and the objectives pursued.
    2. Summarize the research idea and/or novel solutions to be explored.
    3. Clearly state the impact of your solution if successful.
2. Problem description and significance
    1. Describe the problem in greater detail highlighting its importance and significance.
    2. What are the challenges to be solved?
    3. What is novel in your problem or solution?
    4. Describe the impact of solving the problems.
3. Review of current solutions and limitations
    1. Has this problem been addressed in the literature?
    2. Describe current solutions and limitations.
4. Research strategy

1. Clearly state the success criteria of the solution sought.
2. State the main steps of your methodology to solve the problem successfully.
3. Describe possible solution approaches that will be researched.
4. State the innovations in your solution.
5. What is the anticipated length of time required to solve the problem?
6. What skills and expertise are required to solve the problem?
7. Do you have all the skills to solve the problem?
8. What are the possible scientific advancements, or innovations in practice?

5. Describe the impact of solving the problem in terms of socio-economic and environmental significance if applicable.
6. References

Doctor of Physical Therapy, DPT

- Complete the application online at www.HarrisburgU.edu/Apply.
- Write an essay (in English) on how this degree supports the candidate's academic and career aspirations.
- Submit final official transcript(s) from the college or university at which the highest degree earned was conferred. Completion of a bachelor's degree from a regionally accredited institution is required.
- Provide two letters of recommendation from academic or industry professionals.
- Submit a resume.
- The program prefers but does not require a basic exercise science background. It should be noted that most students in the program have completed undergraduate coursework in exercise science, physical therapist assistant, or athletic training program prior to entry into the DPT program.
- Video essay as part of the application process. (Video requirement found on application)
- Volunteer/observational work in the field is not required although it is highly recommended.
- For applicants whose native language is not English, the TOEFL is required with a minimum score of 79 on the iBT
- 3.0 GPA undergraduate cumulative average (on a 4.0 scale)
- Assemble all the above required documents into a zip folder and email to PhD@HarrisburgU.edu.
- A faculty review committee may select the candidate for an interview.
- Completion of all prerequisite coursework, including a minimum of six credit hours of each of the following courses: anatomy and physiology, biology, chemistry, physics.
    - 2.8 GPA and C or greater in all prerequisite courses (on a 4.0 scale)
    - Complete list of acceptable prerequisites are as follows:

Science	Courses that fulfill six credits in each area
Anatomy/Physiology	• Advanced • Animal • COMBINED A&P • Human • Mammalian • Physiology • Vertebrate
Biology	• Exercise Physiology • Neuroanatomy • Neurophysiology • Pathophysiology • Biology: Advanced

	• Biology: Cell • Biology: Embryology • Biology: General • Biology: Genetics • Biology: Histology • Biology: Immunology • Biology: Microbiology • Biology: Molecular • Biology: Zoology
Chemistry	• Chemistry I & II • Biochemistry • Chemistry: Inorganic • Chemistry: Organic
Physics	• Physics I • Physics II • Biomechanics • Kinesiology

International Students

An international student planning to attend the University on a student (F-1) visa must satisfy the appropriate admissions requirements and procedures, demonstrate proficiency in the English language, and provide an affidavit of financial support (bank statement of $27,040 USD or affidavit of support if applicable; applicants with dependents and children must show additional financial support of $5,000 for the first dependent, and $2,500 for each additional dependent).

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), Educational Credential Evaluators (ECE), or AACRAO's Electronic Database for Global Education (EDGE) to determine authenticity and degree

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:

- completed an undergraduate college degree program from a regionally accredited United States institution of higher education;
- completed a full-time semester of graduate studies from a regionally accredited United States institution of higher education with a 3.0 or higher GPA;
- scored above average on the Analytical Writing section of the Graduate Record Examination (GRE);
- earned a TOEFL score of 80 or higher on the web-based version, 200 on the computer version, or 520 on the paper version;
- earned an IELTS score of 6.5 or higher;
- earned an overall score of 115 or higher on the Duolingo English Test; or
- earned a score of 59 or higher on the Pearson Test of English (PTE).

Harrisburg University of Science and Technology is authorized under federal law to enroll non-immigrant alien students.

This approval allows an international student to apply for entry into the United States for study on an F-1 visa only after a complete application package is received and financial documents are deemed sufficient by the University. HU requires a tuition deposit payment of at least $1,000 toward the first semester's tuition to issue an I-20. The SEVIS I-901 fee of $350 is then paid by the student directly to SEVIS prior to attending a Consulate visit for the F1 visa.

Following entry into the United States and arrival at the University, the student will be required to provide a copy of the passport, F-1 visa, I-20, and I-94 arrival/departure record 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 terminate a student's SEVIS record for failure to remain eligible as required by the terms of the F-1 visa.

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

If a student is transferring a SEVIS record, the record must arrive at least one day before the start of the semester. Otherwise, Registration will withdraw the student from classes and defer the student to the subsequent semester. Submit an online SEVIS transfer recommendation request at http://www.HarrisburgU.edu/SEVISTransfer.

It is imperative that the student contact the International Student Office at the SEVP-certified institution where the student's SEVIS record currently resides. The student must notify a DSO/ International Student Advisor at their current school and let them know that the student would like to have their SEVIS record transferred to HU. Every school has its own way of processing such requests, so the student should abide by their school's policy when requesting to be transferred out. The student will need to provide a copy of their HU letter of acceptance to the International Student Advisor at their current school and let them know that they will be receiving an electronic transfer form via email.

Masters Non-Degree Students

Masters Non-Degree Students Admission Process

Each applicant's candidacy will be evaluated once all admissions materials have been received. Offers of admission are made to qualified applicants on a rolling basis.

Complete the non-degree application online at www.HarrisburgU.edu/Apply or a paper application.

If required by a specific certificate or non-degree program, submit final official undergraduate transcript, providing evidence of completion of a bachelor's degree program.

Masters Non-Degree Students Policies

An applicant should enroll under non-degree status when undecided about a graduate-level major or program, not interested in earning a master's degree, interested only in graduate-level professional development courses such as Educator Technology Clinics, or completing work with the intention of transferring the credit earned to another institution.

Non-degree applicants must have earned an undergraduate degree from an accredited institution. A student may apply no more than 12 graduate semester hours completed under non-degree status to a graduate degree program at the University. Non-degree status does not guarantee admission into a degree program. A student must maintain a 2.00 cumulative grade point average to remain enrolled.

An applicant whose native language is not English must submit his or her scores from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) or Duolingo English Test. Please see the HU website at https://www.harrisburgu.edu/admissions/international-admissions/ for a list of countries with English as their primary language and may be exempt from providing an English Proficiency exam. See following section for specifics.

Readmission

Graduate Readmission

The Readmission Application Form is available at Records and Registration and must be completed and submitted to that office at least two weeks before 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 readmitted. 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. Readmission for F1 students must also be approved by the International Student Office. Students must demonstrate compliance with F1 regulations. 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.

Doctorate Readmission

The Readmission Application Form is available at Records and Registration and must be completed and submitted to that office at least two weeks before the start of the semester. A student who left the University on academic warning, probation, or dismissal can only apply for readmission after an absence of one year. Despite the student's academic standing at the time of departure from the university, a student reapplying for admission to the doctorate program is not guaranteed readmission due to the selectivity of the program. The application will be reviewed by a committee appointed by the Provost, who will make the readmission decision. Readmission for F1 students must also be approved by the International Student Office. Students must demonstrate compliance with F1 regulations. 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 graduate tuition, charges, and policies listed in this publication are effective as of July 1, 2025, and are subject to change, without notice, by the University's Board of Trustees.

Admission Application Charge

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

Tuition Deposit

A non-refundable tuition deposit must be paid in advance of course registration for the initial semester of attendance.

Tuition Schedule

Tuition payment or satisfactory arrangement to pay tuition, which includes financial aid resources, is due generally one week prior to the beginning of the semester. Tuition is charged according to the tuition schedule shown below.

Full-time undergraduate tuition charges are for 12 to 17 semester hours. A student registered for more than 17 semester hours is subject to an overload charge at the per-semester hour rate. For example, tuition charges for 18 semester hours will include the full-time rate of $12,300 plus $1,030 for the additional semester hour, resulting in a tuition charge of $13,330. The university services fee brings the total fees for this example to $13,580. A part-time undergraduate student registered for 11 semester hours or fewer is charged the per-semester hour rate multiplied by the number of registered semester hours.

Graduate students are charged a per-semester hour rate. For example, a graduate student registered for 6 semester hours is charged the per-semester hour rate of $955 multiplied by the number of registered semester hours, resulting in a charge of $5,730.

Tuition Schedule		
	Per Credit	Flat Fee Per Semester
Undergraduate		
Part-Time (0-11 Credits)	1,030.00	-
Full-Time (12-17 Credits)	-	12,300.00
Full-Time Overload (18+ Credits)*	1,030.00	12,300.00
Student Activity Fee (Full-Time, Fall and Spring semesters only)	-	250.00
Dual Enrollment (1-11 Credits)	200.00	-
College in the High School	100.00	-
*Per credit charge applies to the number of credits that exceed 17.		

B.S. Exercise Science Pathway Program		
Exercise Science Program	540.00	-
Graduate		
Master's Programs	955.00	-
Doctoral Programs**	955.00	-
**For doctoral students, a 50% tuition discount applies only after completing 12 credits of Doctoral Studies dissertation courses. Once this requirement is met, the tuition rate for additional dissertation credits is $477.50 per credit. All other courses continue to be billed at the standard tuition rate.		
HU Online Programs		
Undergraduate	380.00	-
Graduate	650.00	-

Tuition Payments

Students can make tuition payments in person at the Business Office using cash, check, or money order. For added convenience, electronic payment options-including credit card, debit card, electronic check/ACH, and international payment methods-are available online through the Finance page of MyHU. Registered students can view their account information online. HU does not accept payments over the telephone.

A convenience fee applies to all credit and debit card transactions for tuition payments and other services. However, online ACH/electronic check payments do not incur this fee. HU does not retain any portion of the convenience fee; it is collected by the payment processor.

Graduate Assistantships

A graduate assistantship may be awarded to support the full-time doctoral student who works for faculty in research or as a teaching assistant. Duties may include serving on research teams; collecting, cleaning and analyzing datasets; preparing research publications or grant proposals; lecturing; grading, office hours, and other researching, teaching, or administrative tasks. An assistantship can include an annual stipend and the option to purchase health coverage through the University healthcare plan. An assistantship is awarded based on demonstrated need, academic potential, and faculty recommendation.

Computer Requirements

All programs involving face-to-face or 'in-class' instruction require a laptop computer to be obtained prior to the first day of class. For any fully online programs or for any secondary machine, students are free to use desktop computers that meet the requirements listed on the University's website at https://harrisburgu.edu/hu-experience/it-resource-center/. The cost is approximately $700 to $1,200.

Please note, these are the minimum requirements for the Office365 desktop software. There may be additional degree program software requirements. Some program software may be operating system dependent. Check with your advisor or program director for more information before you make any computer purchasing decisions.

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 bound books, ebooks, journals, 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 $75. Students can find textbook information on the student portal at MyHU. Some courses have textbooks or learning materials embedded in the course structure, provided at no additional cost.

Prior Learning Assessment Charge

A student who submits an application for prior learning assessment is charged per semester hour amount of $350 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 fee will be assessed if the issuing bank returns a check or electronic check/ACH transaction processed for payment.

Delinquent Account Fee and Collections Policy - After a student is no longer enrolled and an account becomes delinquent, the University will issue a final demand for payment. If the balance remains unresolved, the account may be escalated to the University’s Account Resolution office, at which point a non-refundable $115 Account Resolution Fee will be assessed. This is the final step prior to referral to a third-party collections agency. Accounts referred to collections may be subject to additional fees of up to 25% of the outstanding balance and may also be reported to one or more credit bureaus, which can negatively impact the student’s credit rating. Students with unpaid balances are subject to registration and diploma holds, and may be unable to enroll in future terms or receive their diploma until the balance is resolved in full.

Campus ID Card Replacement Charge - Upon enrollment, a student receives, at no cost, a Campus ID to be used for identification, as a library credential, and for building and elevator access. A student is required to have the Campus ID accessible when on campus. If a Campus ID is lost, stolen, or needs replaced, or due to a device change (HID Mobile), a fee may be applied for the replacement. The maximum fee for replacement is 25.00.

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.

Commencement Fee - A charge of $65 (the charge is based on the cost of the cap, gown, and tassel at the time of graduation) will be assessed for the student participating in the Commencement Ceremony.

Diploma Reprints - All Harrisburg University graduates with no financial holds on their student records will receive one diploma per degree earned at no cost. Diplomas are issued to graduates after Records and Registration completes

the degree conferral process (awarding of a degree once it is determined a student has met all degree requirements for graduation).

HU understands that graduates may be asked to provide a copy of their diploma for various purposes (including visa and work permit requirements). For these situations, graduates may request one of the following:

- A Degree Verification Letter, issued by Records and Registration, which outlines details of a degree obtained by a graduate (contact the RegHelp Support Portal at https://reghelp.harrisburgu.edu); or
- Requesting a reprint of the diploma by completing a Diploma Reprint Request form. The fee is $60.00 for the diploma and shipment within the U.S. (international shipments will have additional costs). For additional information about diploma reprints, contact the RegHelp Student Portal at https://reghelp.harrisburgu.edu.

Transcript Requests - The National Student Clearinghouse (NSC) provides an online transcript ordering service for Harrisburg University students and alumni 24 hours a day, 7 days a week. Please click the link below to order your transcripts:

National Student Clearinghouse Transcript Services

Transcripts are processed during business hours within two business days of placing your order. Each official transcript requested will be charged $10.00 per transcript for standard domestic delivery.

Transcripts are processed during business hours within two business days of placing the order. A $10.00 fee for standard domestic delivery applies to each official transcript requested, with varying costs based on delivery method and destination.

Withdrawal Policy

Full Withdrawal Refund Schedule		
A student who fully withdraws from all courses at the University may qualify for a credit of the unearned portion of the tuition charge. For refund purposes, the semester begins on the first day of the semester, subterm, or session, 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. The refund policy applies to tuition charges and does not apply separately to the various payments credited to the student's account. Please see the Academic Calendar at https://harrisburgu.edu/academic-calendar for specific semester start dates and withdrawal deadlines.		
14 Week Semesters		
There is a 100% tuition refund when a student fully withdraws during the add/drop period and a refund schedule for withdrawals occurring in the first three weeks of the semester.		
	Prior to the first day of the semester	100%
	Prior to the end of add/drop	100%
	During the second week	50%
	During the third week	25%
	After the third week	0%

7 Week Subterms/Sessions, including HU Online Programs		
There is a 100% tuition refund when a student fully withdraws during the add/drop period, but no tuition refund when a student withdraws after the add/drop period.		
	Prior to the first day of the module	100%
	Prior to the end of add/drop	100%
	After add/drop	0%

Tuition Add/Drop Policy

Tuition Add/Drop Policy
Suppose a student adds or reduces the number of courses and/or semester hours during the published add/drop period. In that case, tuition will be recalculated based on the adjusted number of semester hours. 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.

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.

In the event that the financial aid recalculation results in an amount to be returned that exceeds the school's portion, the student will be required to repay some funds directly to the U.S. Department of Education.

In the event that a financial aid recalculation results in all outstanding tuition and fees being paid, resulting in a credit balance on the student's account, this credit balance will be refunded to the student within 14 days of the financial aid recalculation date. All refunds are sent by check via U.S. mail.

In accordance with federal regulations, if a student receives all F grades during a semester, the University is required, at the best of its ability, to perform an attendance review to determine if a student ceased attendance during the semester. If it can be definitively determined that a student stopped attending prior to the 60 percent point of the semester, as indicated above, the student 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 that the student stopped attending.

Post-Withdrawal Disbursements: A student may qualify for a post-withdrawal disbursement of their financial aid if the aid earned is more than the amount disbursed to them. The Financial Aid Office will notify a student of their potential eligibility with a post-withdrawal notification letter, sent both email and U.S. mail. The student will have 14 days from the date of the letter to accept or decline the post-withdrawal disbursement. If no response is received from the student, the post-withdrawal disbursement will be forfeited. The University will offer any post-withdrawal disbursement of loan funds within 30 days of the date the school determined the student withdrew. The University will also return any unearned funds and make a post-withdrawal disbursement of grant funds within 45 days of the date the school determined the student withdrew. Finally, if a student withdraws and is entitled to a post-withdrawal disbursement, it will be applied to charges still owed to the University, and any excess will be refunded to the student.

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 Veterans Administration is made to the institution
- 90 days after the date the institution submitted certification of enrollment/tuition and fees to the 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 submit a written request (VA Benefits eForm) as confirmation of their intention to use the entitlement before the Certifying Official can report the Enrollment/Tuition and Fees Certification to the Veterans Administration for processing.

"GI Bill ®" is the U.S. Department of Veterans Affairs (VA) registered trademark. More information about education benefits offered by the VA is available at the official U.S. government website at www.benefits.va.gov/gibill.

Student Financial Aid Programs and Policies

The Office of Financial Aid assists qualified applicants who, without assistance, would otherwise be unable to pursue an advanced degree. The Free Application for Federal Student Aid (FAFSA) and resulting need analysis is used to apply for federal and state 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 or other costs and updates to the financial profile of the student.

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 Status: 6 or more semester hours
Half-time Status: 3 semester hours

The required enrollment status for federal direct loans is half-time. A non-degree student is not eligible for financial aid.

Aid Sources

Federal Direct Loan - A Federal Direct Loan is available to eligible borrowers. Interest accrues on the unsubsidized loan while the student is enrolled. The borrower may opt to pay the interest as it accrues or allow it to accrue and capitalize. The unsubsidized loan is a non-need-based loan program. The maximum Federal Direct Loan per academic year is $20,500 for an eligible degree-seeking graduate student. Maximum loan amounts per semester may also be limited based on the cost of attendance. An international student attending on an F-1 visa or an international student outside the U.S. enrolled in a distance education program is not eligible to borrow a Federal Direct Loan.

Federal PLUS Loan for Graduate Students - A degree-seeking graduate student may be eligible to borrow under the PLUS Loan Program up to the cost of attendance minus other estimated financial assistance in the Federal Direct loan program. The terms and conditions applicable to Parent PLUS loans also apply to Graduate/Professional PLUS loans. The requirements include a determination that the applicant does not have an adverse credit history. Repayment begins 60 days after the date of graduation, withdrawal, or enrollment status below half-time unless the student requests a school deferment. The student must have applied for the annual loan maximum eligibility under the Federal Unsubsidized Direct Loan Program before applying for a Graduate/Professional PLUS loan. An international student attending on an F-1 visa or an international student outside the U.S. enrolled in a distance education program is not eligible to borrow a Federal PLUS Loan for Graduate Students.

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

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

Applying for Financial Aid and Financial Aid Counseling

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 should submit all potential aid applications at least 30 days prior to the start of a semester. Failure to submit all required applications, documentation, and materials requested by the end of the semester could result in a large unpaid tuition bill. Financial aid counseling is always available by phone, Teams meetings, or in person.

Enrollment Status Determination

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 on the census date.

Satisfactory Academic Progress for Financial Aid Recipients

Satisfactory academic progress (SAP) for federal Title IV, Higher Education Act (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 financial aid. As required by federal regulations, the Harrisburg University SAP policy for federal Title IV financial aid recipients is stricter than the University's academic progress policy for students not receiving Title IV financial aid.

It is important to note this policy applies to both full-time and less-than-full-time graduate students. A graduate student must be enrolled in at least 6 credits for the semester to be considered full-time. A graduate student enrolled in less than 6 credits for the semester is considered to be less than full-time.

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 re-established. 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 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. It is the student's responsibility to contact the Financial Aid office in the event of a change of grade, for example, from "I" to "C", to ensure that the SAP status is reviewed for eligibility changes.

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 3.00 or higher is in satisfactory academic standing. If a student has a cumulative grade point average below 3.00 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 normal 2-year, 6-semester programs consisting of 36 semester hours must be completed successfully within 3 years (i.e., 9 semesters, 54 semester hours) to maintain eligibility for federal financial aid program assistance throughout the program of study.

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

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

Students must complete their degree within 150% of the number of credits necessary to complete the educational program. As a result, students are required to be earning a minimum of 67% of their total cumulative attempted credits at the end of each payment period to remain in good satisfactory academic progress standing.

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 Success, 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. If a student is still failing to meet academic progress at the conclusion of the probation semester, financial aid will be suspended, but the student will again be given the opportunity to appeal and be approved for financial aid. In addition to an approved appeal, an academic plan would 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 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 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.

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 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 warnings, probation, and dismissal. 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 Success

Overview

The Office of Student Success provides educational, personal, and professional support to promote student development and success. The Office of Student Success, 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 facility academic success.

Student Life

Housing and Residence Life

There are limited housing options available through HU and HU affiliated housing partners for the Harrisburg location. These facilities vary from the more traditional college-style apartment setting with shared living space to the more independent, fully furnished high-rise apartment. These facilities are within a few blocks of the University. The Office of Student Life can help facilitate a housing consultation meeting to provide more information on campus housing via housing@my.harrisburgu.edu.

New Student Orientation

Orientation sessions precede each semester in order for the student to become familiar with the University, technology services, campus policies and procedures. A new student entering the University will receive information from various functional areas during the enrollment process on the availability and delivery method of orientation content.

Tutoring and Learning Services

A student may request the assistance of a tutor for writing, ESL support, or free one-on-one tutoring. A student can choose to meet with a peer tutor in-person or on-line. In addition, HU also offers free access to tutoring services 24 hours a day, 7 days a week through Brainfuse. Brainfuse™ is an online tutoring service that is free to students. Access Brainfuse through any of your course pages on Canvas. Due to the rigors of an advanced degree, tutors are only able to provide writing support, not subject-specific assistance.

Student Concerns and Complaints

The Office of Student Success 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.

Health and Mental Health Services

Health Services

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

Mental Health Services

Harrisburg University is partnered with BetterMynd, an online therapy platform, to offer students access to free teletherapy sessions from a diverse network of licensed mental health counselors. All students have access to 50-minute

live video sessions that are private, confidential, and can take place from the convenience of the student's laptop or mobile device. Teletherapy sessions are available during the day, at night, and on weekend so that students can get the support they need whenever it's best for them. More details about getting started are available on the Student Success Sharepoint site: https://myharrisburgu.sharepoint.com/sites/StudentServices/SitePages/BetterMynd(1).aspx

Students can also reach out to CARES@harrisburgu.edu with any questions.

HU also provides 24/7 support for all students through the Bettermynd international Crisis Hotline. If a student is feeling overwhelmed and/or is experiencing beyond the norm circumstances and is in need immediate support, they can contact 1(844)287-6963 24 hours per day, 365 days per year.

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 from a medical provider (within 3 years) of any disability that may affect learning to ensure that appropriate accommodations are considered. Please reach out to ADA@harrisburgu.edu for questions regarding proper documentation as well as support services provided.

Textbook Services

A complete textbook listing is made available from the Harrisburg University bookstore (www.harrisburgubookstore.com) at the time of registration. Textbooks are made available for student purchase through the services of Ambassador, which has an online store for new and used textbook purchases or rentals. Textbooks and other supplies (if specified for a course) must be obtained by the student prior to the first day of class. Students are not required to purchase books from Ambassador.

University Library

The mission of the Harrisburg University Library is to support the mission of the University's mission 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 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 media 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 individual 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 the student, 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-for-print, and book check-out 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 OISHelp Support Portal at ithelp.harrisburgu.edu or 717.901.5177 with questions.

Academic Advising

Academic advising can be a critical component of a student's education. Every graduate student is assigned to an academic advisor who is a faculty member. The advisor helps the student explore academic goals and assists in course selection for the academic program. The Office of Student Success supports the faculty role in advising. In addition, it assists the student in accessing resources and developing strategies when non-academic factors affect a student's ability to succeed.

Career Services & Experiential Learning

Career Services and Experiential Learning at Harrisburg University aims to support the institution's diverse community of learners by providing practical and professional experiences to foster careers in science, technology, and beyond. The office offers equitable access to experiential learning and career development opportunities for students and alumni of Harrisburg University by collaborating with faculty and industry partners, allowing students to gain valuable experience both inside and outside the classroom.

The student obtains career coaching from a variety of academic and professional advisors. Through a combination of advising and hands-on experiences, students engage in career development, program exploration, and career advancement experiences. The following services are offered for enrolled students and alumni: career coaching, assessment inventories, career exploration, professional development resources, events and programs, graduate and professional school advising, mock interviews, and resume review. All 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.

Academic Policies

Calendar, Credit System and Final Examinations

The University operates on a semester calendar and uses the semester hour credit system. There are two tracks of semesters per twelve-month period: (Fall, Spring, Summer) and (Late Fall, Late Spring, Late Summer). Students cannot cross over between the two tracks. Each semester consists of fourteen weeks of classes.

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	Student's 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 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 1 posting (requires reading all postings and replying 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 the instructor and/or classmates.	Instructor-Led - 1-hour tour = 1 learning hour (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 email, chat rooms, discussion boards, wikis, and/or face-to-face contact to research, analyze, synthesize, & prepare the project with the 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 the project/thesis with the instructor receiving periodic updates and providing guidance and feedback.	1 hour = 1 learning hour
In-Class Instruction, Presentations, and 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 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 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 students share experiences and reflections with 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 2025-2026 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/concentration requirements published in a future edition of the Catalog. The Master-degree student is expected to fulfill the academic requirements in 3 years from the date first enrolled in the program. The Doctorate-degree student is expected to fulfill the academic requirements in 7.5 years from the date first enrolled in the program.

A student who elects to complete a revised set of program/concentration requirements must notify Records and Registration of this intent by completing a Change of Program form on MyHU. A student that earned 24 credits or more toward their degree requirements cannot change degree programs/concentrations without approval from Records and Registration, in consultation with the faculty advisor justifying academic need.

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

The student is expected to maintain consecutive enrollment, which is defined for certification purposes as either full-time or part-time. Full-time student enrollment is 6 or more semester hours in a semester. Part-time student enrollment is fewer than 6 semester hours in a semester. A student is limited to 6 semester hours for the first semester of enrollment. A student cannot pursue more than one degree at a time.

Consecutive enrollment is expected throughout the program; however, the one-semester break is permitted. F-1 students must meet their status eligibility requirements to take a break. Program lead approval is required if a student requests a second break due to extreme circumstances. Under normal circumstances, if more than one consecutive break is requested, the student would need to withdraw from the program and reapply when ready to return. A student who does not return following a semester break will be unofficially withdrawn and must reapply.

A non-degree student must decide to remain a non-degree student or become a degree-seeking student after completing 12 semester hours of coursework.

An F1 student must remain enrolled for a minimum of 6 credit hours per semester. A minimum of 3 credit hours must be in-person format classes. Falling below 6 credit hours or failing to meet in-person class requirements is a violation of F1 status and will result in SEVIS record termination.

Registration Process

Students complete registration online at MyHU/Academics. There are written and/or video registration instructions available on MyHU. The start and end dates appear on the Academic Calendar, posted on MyHU/Academics and www.HarrisburgU.edu. Students who require an Americans with Disability Act accommodation to complete registration should contact the Office of Student Success at ADA@HarrisburgU.edu.

Course Delivery Modes

In-Person (IP): Required course meetings are delivered in person at a predetermined time and location.

Hybrid (HB): A combination of in-person meetings at a predetermined time and location and synchronous meetings at a predetermined time using virtual classroom technology. The ratio of in-person to virtual instruction is flexible but should be pre-determined.

Synchronous Online (OS): Required course meetings are delivered synchronously at a pre-determined time using virtual classroom technology.

Asynchronous Online (OA): Courses are entirely online, with no required synchronous course meetings (either in-person or virtual).

Notes:

- All required meeting times, both in person and virtual, should be communicated at the point of registration.
- Instructional meetings outside the course modality, if offered, must be optional and/or flexible for students.
- Asynchronous instructional elements may be used in combination with the other three modes without impacting the course delivery definition.

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 open to students with 24 or more credits completed.
2. Directed studies must be necessary. Directed studies are deemed necessary if a student needs a specific course in their program to graduate that can only be met through a directed study.
3. A student must have a minimum GPA of 3.25 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 for both semesters and subterms.

F1 students wishing to drop or withdraw from a course must first consult with the International Student Office to determine eligibility. F1 students must remain enrolled for a minimum of 6 credit hours per semester. A minimum of 3 credit hours must be in-person format classes. Falling below 6 credit hours or failing to meet in-person class requirements is a violation of F1 status and will result in SEVIS record termination.

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 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 wanting to audit a course must notify Records and Registration in writing no later than the end of the Add/Drop Period. The per semester hour tuition rate applies to audited courses. An audited course cannot be subsequently taken for credit.

Class Attendance

Attendance is critical to academic success, and we encourage all students to attend every scheduled class session. Regular attendance is essential for students to fully engage with course materials, participate in classroom discussions, and collaborate with classmates. By attending class consistently, students demonstrate their commitment to their education and are more likely to achieve their academic goals. Therefore, we strongly recommend that all students prioritize attendance and make every effort to attend every class session.

All students are expected to regularly demonstrate academic engagement within each class. It is the instructor's responsibility to set forth, in writing, any special conditions regarding absences from the course at the beginning of a course and the impact on student grades. In many classes, participation in class constitutes a substantial part of the work of the course. Faculty should clarify in the course syllabus how students are expected to demonstrate academic engagement.

Excessive Absences

When a student fails to participate to such an extent that their own progress or that of the class or group is seriously impaired, they may be at risk of being academically withdrawn from the course.

If, in the judgment of the instructor, a student is absent consecutively from class for more than two weeks and 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; and
3. if the student fails to do so, the instructor will notify Records and Registration to recommend withdrawing the student from the course.

Online Courses

Students in an online course must participate in the course weekly, either by submitting assignments or doing discussion posts, quizzes, tests, chats, or team sessions, to be considered in attendance. Logging in and viewing course material is not considered participation. Students that do not participate in their online course within any 14-day period may be administratively withdrawn from their courses.

F-1 Students – Graduate Attendance Policy

United States immigration laws require HU international graduate students with F-1 status to be continually enrolled in full-time status. At HU, this requires maintaining a minimum six-credit course load in every semester of enrollment (one course must be an in-person course).

Graduate students with F-1 status must attend all in-person classes to maintain their status. Missing an in-person class will be reported to the International Student Office, and the student's SEVIS record will be terminated unless there is documented evidence of extenuating circumstances.

Absences may be waived on a case-by-case basis at the discretion of the International Student Office. Documentation of extenuating circumstances leading to an absence must be submitted no later than 11:59 PM Eastern Time on the date of the absence to be considered. Submission of documentation does not guarantee a waived absence.

Verification of Enrollment

At the beginning of each term, Records and Registration verifies the course enrollments of all students. Only students officially registered for a course may attend class. Any student attending class but not appearing on the roster must be added to the class before the end of the add/drop period. Faculty should notify Records and Registration if a student is in attendance but does not appear on the course roster.

Students must demonstrate academic engagement during the add/drop period. Failure to participate, may result in the courses being dropped and the student exited from the program.

Inclement Weather Notice

In the event of inclement weather, HU does not post routine delayed openings, early departures, or closures due to weather with local media outlets.

Students, faculty, and staff should dial 717-901-5199 to access HU's operating schedule commonly called "HU Snowline." Should HU open late, close early, cancel activities, or close for the day due to inclement weather or for any other emergency, a message will be left on HU's voicemail at that number. Additionally, HU will post any changes to its operating schedule on the main page of its website, www.harrisburgu.edu, and update social media outlets.

If HU remains open during or following a weather-related event or other emergency, it is up to each student and employee to make a reasonable decision about whether to travel. Safety and common sense should guide decisions. Students are expected to notify their faculty, and employees are expected to notify their supervisors if they are not reporting to class/work. HU will not make personal calls to students or employees. HU will follow all City of Harrisburg and/or Commonwealth mandated emergency procedures in the event of a weather-related emergency.

Additionally, HU will follow all City of Philadelphia mandated emergency procedures as updated on the Ready Philadelphia/ Office of Emergency Management website: ReadyPhiladelphia | Office of Emergency Management | City of Philadelphia.

Harrisburg University Unplanned Closure Statement

When faced with the unplanned physical closure of Harrisburg University (326 Market Street, Harrisburg, PA 17101, and other physical locations) due to inclement weather or other circumstances, it is understood that teaching and learning will continue. Faculty will decide whether course work will be conducted in asynchronous or synchronous (or combined) format, with equal or greater 'learning hours' to that of the traditional session. Asynchronous format refers to course work that can be done by students independent of the instructor or other students. Synchronous format refers to sessions held in real time involving the students and instructor.

Advanced Standing

A master-degree or doctorate-degree student may earn advanced standing at the University. Transfer credit for graduate courses could be granted in agreement with the with below graduate transfer credit rules. Advanced standing can be earned in one of three ways: transfer of credit from another institution, credit for military training, or prior learning assessment. The parameters for doing so are:

- limit to six (6) credits of transfer credits and six (6) credits of prior learning for master-degree students (capstone courses not eligible), and
- limit to six (6) credits of transfer credits and 12 credits of prior learning for doctorate degree students (research and dissertation/applied project not eligible).

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 on the ACE recommendation and the closeness of the match between the training program and a University course.

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 adults get academic credit, whenever possible, for courses and examinations taken outside traditional channels.

Transfer Credit - 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. The following limitations apply:

- transfer credit is limited to six (6) semester hours from another graduate program;
- the credit must have been earned with final grades of "B" or higher;
- the credit must be reviewed by the student's program advisor and Records & Registration;
- the credit must have been earned no more than five (5) years prior to the student's initial enrollment date in Harrisburg University's program; and,
- a course completed for Continuing Education Units (CEUs) is not eligible for transfer credit consideration.

Domestic -Academic credit earned for graduate work completed for a minimum grade of "B" or higher will be awarded if: 1) the course is a reasonable substitute for a University course or 2) the course(s) is considered graduate-level work worthy of elective credit in the student's program of study.

International - A World Education Services (WES) transcript evaluation, Educational Credential Evaluation (ECE), or AACRAO's Electronic Database for Global Education (EDGE) 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 graduate level and the quality of the completed work is assessed to be at the "B" 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, a semester hour value is assigned for each accepted course. If the student completed courses that are evaluated to be at the graduate 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 an Off-campus Coursework Form at 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, who 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 Harrisburg University's Records and Registration office. If the approved course was completed with a final grade of "B" or higher, the semester hours earned from the course will be posted to the student's record at the University.

Prior Learning Assessment - The University may award graduate 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; and,
- the outcomes of graduate-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 Master of Science 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 University Registrar 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 not receive more than 6 semester hours related to the program based upon prior learning assessment.

The prior learning assessment process is a way to demonstrate to a mentor, who is an expert in the field, graduate-level knowledge in a particular course area. These skills and knowledge may be from applicable work experience, volunteer activities, training programs, hobbies, religious activities, homemaking skills, prior independent reading, or notable 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 graduate-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 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 by the academic advisor, the appropriate faculty member, and the Associate Provost. Capstone credits are not eligible for prior learning assessment. A per semester hour charge 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.

Transfer Credit Appeal

A student who wishes to appeal a transfer credit decision may submit a copy of the syllabus from the course in question to Records and Registration no later than 30 days from the date of the transfer evaluation. Appeals will be reviewed and granted or denied by the program lead and amended on the student's record. When cases of unusual or extenuating circumstances occur, a student may appeal the transfer credit decision beyond the 30-day limit.

Alternative Work Study/Applied Studies

Alternative Work Study/Fieldwork for Masters Degree Program

MS programs at HU are designed for working professionals focused on career advancement who can apply what is learned back to their workplace. In HU's MS programs, the expectation is that degree candidates are working professionals. Therefore, spanning the degree program, each course has multiple applied projects and work-related assignments leading up to a capstone practicum.

Alternative Work Study for International Students on F1 Visas

To fulfill the integration of professional work experience into all phases of the MS degree program, students studying on an F1 visa must request to be approved for CPT, Curricular Practical Training. CPT is defined by the federal government as an alternative work-study, internship, cooperative education employment, or other type of internship or practicum that is an integral part of an established curriculum. Since professional work experience is an assumed integral component tied to each of the Master of Science degree programs offered at Harrisburg University, non-immigrant students on a valid F1 visa and otherwise maintaining status may be authorized to accept internships and work placements via CPT to position themselves for the same academic success enjoyed by their non-regulated counterparts in the classroom.

An F1 student's I-20 must be authorized by one of HU's Designated School Officials (DSO) *prior* to accepting and beginning an alternative work study. F-1 students are only permitted to work in the United States for the company listed during the dates provided on their I-20. For more information on how to apply and when to apply, students should contact the International Student Office (ISO). Students are cautioned to take note: There are SEVP regulations related to off-campus employment and training experiences. Failure to maintain status will jeopardize F1 standing and will result in revocation of the I-20. Students can contact the International Student Office with any questions and/or support they may need.

A student's CPT internship experience or employment must relate to the program of study and may be part-time (20 or fewer hours per week) or full-time (21 or more hours per week). HU allows the period of eligible CPT employment to be extended through the short breaks between semesters if the student is pre-registered for the immediate next semester of enrollment. HU expects academics to be prioritized. CPT may not continue through approved semester-long breaks.

Applied Studies for Doctorate Degree Program for International Students on F1 Visa

The doctorate program at Harrisburg University includes learning components (coursework, seminars, research), and may include fieldwork that can contribute to the student's knowledge in the program of study.

Ph.D. programs at HU recognize the crucial connection between industry/business and research/ development. Scholarly research in the STEM fields cannot be disconnected from those practitioners innovating in their fields.

Therefore, Ph.D. students who are practitioners in their field are highly sought at HU. The expectation is that the active synergy between research and practice in applied studies will go far in solving the worlds challenges through the STEM disciplines.

In order to remove limits and borders for recruiting professional practitioners into the HU PhD programs, HU will approve Curricular Practical Training (CPT) for F1 students who are able to integrate professional experience into the learning environment of their PhD program, meeting the expectation of applied studies during the coursework phase of the program.

With the required approval of the university and benefitted industry parties, doctoral candidates at HU are able to develop their own individual study/research plan with faculty advisors on topics of their choice. Candidates may choose where they would like to conduct their research at

- Harrisburg University laboratory or at a partnering research institutional laboratory
- A non-academic research center/organization or industry/workplace (which requires approval of industry partners)

Applied Studies for International Students on F1 Visas

If applied studies or employment-based research are an integral component of a chosen Doctorate degree program, non-immigrant students on a valid F1 visa and otherwise maintaining status may be authorized for periods of Curricular Practical Training (CPT). CPT is defined by the federal government as an alternative work-study, internship, cooperative education employment, or other type of internship or practicum that is an integral part of an established curriculum.

An F1 student's I-20 must be authorized by one of HU's Designated School Officials (DSO) *prior* to accepting and beginning an alternative work study. F-1 students are only permitted to work in the United States for the company listed during the dates provided on their I-20. For more information on how to apply and when to apply, students should contact the International Student Office (ISO). Students are cautioned to take note: There are SEVP regulations related to off-campus employment and training experiences. Failure to maintain status will jeopardize F1 standing and will result in termination of the student's SEVIS record. Students can contact the International Student Office with any questions and/or support they may need.

A student's CPT internship experience or employment must relate to the program of study and may be part-time (20 or fewer hours per week) or full-time (21 or more hours per week). HU allows the period of eligible CPT employment to be extended through the short breaks between semesters if the student is pre-registered for the immediate next semester of enrollment and the next immediate semester includes a period of continued required field experience. HU expects academics to be prioritized. CPT may not continue through approved semester-long breaks.

A doctoral student who completes all coursework and enters the thesis/dissertation phase of the program may be considered for CPT if the work experience is clearly documented as necessary for the completion of the thesis or dissertation.

Overview of the Program

Overview of the Masters Degree Program

Graduate Education focuses on individualized career advancement in areas of study within the science, technology, engineering, and mathematics disciplines. The University's approach is based on an experiential model that allows the student to gain and apply knowledge and skills at an advanced level and to focus on an area of need or interest particular to the student. Faculty combine corporate and academic perspectives in the design, development, and delivery of graduate programs and courses. Programs are designed for working professionals focused on career

advancement who can apply what is learned back to their workplace. Therefore, each course has multiple applied projects, work-related assignments, and each degree has a practicum requirement of all students.

Harrisburg University's graduate programs are based on the following model:

- All M.S. degrees are granted for 36 semester hours (12 courses) of graduate work.
- Each MS program has 5 or 6 required courses that uniquely define the specific graduate program.
- There are a variety of graduate-level courses that the students in any M.S. program may take as electives. This pool of electives may consist of a wide range of courses from different graduate-level programs.
- There is a 6-credit capstone/applied project/practicum or thesis requirement for all graduate degrees at the University. This practicum synthesizes the key concepts of the program and extends/applies these concepts to real-life practical problems or research investigations. The capstone consists of two courses: a research methodology and writing course, and a Graduate Thesis or Applied Project or a Practicum required of specific programs. The courses leading up to this practicum experience combined with the practical work experience for students are required to complete the applied project. Students authorized by the University for CPT must take the applied project option within their specific degree program.

Overview of the Research Doctorate Degree Program

The research doctoral program offers a course of study that emphasizes a strong foundation in science, technology, engineering, and mathematics disciplines. Doctoral candidates are required to complete six doctoral-level courses (18 semester hours); 6 semester hours in a formal research seminar; and 12 semester hours of dissertation work (research studies). A student cannot take a break after starting the research studies portion of the program unless there are extenuating circumstances.

After completing 18 semester hours of doctoral-level courses, the student is eligible to sit for the qualifying examination. The qualifying examination is designed and administered by the candidate's dissertation committee. The examination is comprised of both oral and written requirements including the committee's approval of the candidate's dissertation proposal.

A doctoral candidate may form a partnership with another institution in order to utilize that institution's facilities for research and project development, enlist doctoral faculty from another institution as dissertation or project committee members, or take appropriate post-master's courses from that institution.

Graduation Requirements

A candidate should apply for graduation after registering for the last semester of the anticipated completion date by submitting an Application for Graduation via MyHU. Once degree requirements are met, the degree will be conferred.

A candidate for graduation must complete all requirements for the degree to be eligible to participate in Commencement. A commencement fee based on the cost of the cap, gown, and tassel at the time of graduation will be assessed for the student participating in the Commencement Ceremony.

Graduation Requirements for Masters Degree Program

A student must satisfy all of the following requirements to receive a Master of Science degree. Verification that the student has met the following requirements is made by Records and Registration.

1. At least 36 semester hours must be successfully completed.
2. A minimum cumulative grade point average of 3.00 is required for graduation from a Master of Science program and graduate advanced study programs.

3. In order for any completed course to satisfy the 36 semester hours required, the course must be completed with a grade of "C" (2.00) or higher.
4. A student must earn a minimum of 30 semester hours in residence toward a Master of Science degree from the University. The number of semester hours that may be transferred from another institution's graduate program is six semester hours.
5. A degree student will demonstrate proficiencies in the field of study and the University's competencies through use of an ePortfolio or a similar technology or evidence-based approach.
6. A student must complete all requirements for the Master of Science degree within 6 years from the first day of attendance as a degree-seeking graduate student.

Graduation Requirements for the Research Doctorate Degree Program

The student must satisfy all of the following requirements to receive a Doctorate degree. Verification the student has met the following requirements is made by Records and Registration.

1. At least 36 semester hours must be successfully completed.
2. A minimum cumulative grade point average of 3.00 is required for graduation.
3. In order for any completed course to satisfy the 36 semester hours required, the course must be completed with a grade of "B" (3.00) or higher.
4. Candidates will schedule their dissertation defenses after receiving approval from the dissertation committee chair (or co-chairs).
5. Candidates must submit (but not yet have published) the results of their dissertation or project work for publication in a refereed journal and/or complete a patent application prior to the conferral of a degree.

Graduation Requirements for the Doctor of Physical Therapy, DPT Clinical Degree Program

Academic Requirements:

1. Learners must complete the prescribed number of credit hours (99) as outlined in the program's curriculum.

2. A minimum cumulative GPA of 3.0 is required by the end of the program.

3. Individual courses must be passed with a grade of "C" or higher.

4. Students must demonstrate proficient skill competency with all lab and clinical skills.

Clinical Education Requirements:

5. Clinical Hours: Must complete the minimum required clinical hours.

6. Receive a benchmark of 7 on the Clinical Internship Evaluation Tool, which defines a competent entry-level professional.

7. Capstone Project: Successfully complete and present a capstone project.

Documentation and Records:

8. Submit all required documentation, including clinical logs, assignments, and other relevant materials by the specified deadlines. Incomplete or missing documentation may impact program progression and/or graduation eligibility.

Requirements for Earning a Second Masters Degree

A person who has earned a master's degree from HU or another accredited college or university may earn a second master'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 M.S. in Learning Technologies, the student cannot pursue a second M.S. in Learning Technologies). If the second program requires more than three course waivers (or two transfer courses and one waiver), the student will need to select a different program.
2. The student must satisfactorily meet all graduation requirements for the second-degree program.
3. A minimum of 30 additional graduate course semester hours within the second degree's program must be successfully completed at HU.
4. No course already successfully taken in the first-degree program may be repeated in the second degree.
5. Six credits may be transferred from the first master's degree to fulfill graduation requirements for the second master's degree. These will not count toward the 30-semester hour residency minimum.

The Request for Second Masters Degree Form must be completed and submitted to Records and Registration at least two weeks before the start of the semester.

Finalizing the Academic Record

The university confers degrees at the end of each of the six semesters (Fall, Late Fall, Spring, Late Spring, Summer, and Late Summer). All final grades and official transcripts for applicable transfer work must be received in order for a degree conferral to occur. According to university policy and federal reporting requirements, degrees must be conferred and finalized once a student has fulfilled all requirements.

Once the degree is conferred, the academic record is considered complete and final. No further changes will be made unless there is a documented clerical error, or the student successfully appeals an academic grievance. It is the responsibility of the student to notify Records and Registration of a clerical error within 30 days of the conferral date.

Course repeats for the purpose of bolstering the final degree GPA are not permitted after a degree is conferred. No transfer work will be accepted after the degree is conferred.

A student may not retroactively seek to have additional majors or concentrations added to a degree after it has been posted. However, a student may seek readmission as either a non-degree seeking student or as a second degree seeker after their initial degree has been conferred.

Grades and Grading

Grade Scale

Grades are awarded to each student for academic credit completed at the University. 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.

Masters Degree Grading Scale:

Grade	Description	Numerical Value
A	Superior achievement	4.00
B	Average achievement	3.00
C	Minimum achievement	2.00

F	Fail	0.00
FD	Fail – Disciplinary	0.00
AU	Audit	Not applicable
CR	Credit	Not applicable
I	Incomplete	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
TP	Transfer Pass	Not applicable
TS	Transfer Satisfactory	Not applicable
W	Withdrawal	Not applicable
WA	Administrative withdrawal	Not applicable
WF	Withdrawal after the period to withdraw with a "W" grade	0.00

Doctorate Degree Grading Scale:

(see the next Grade Scale for the Doctor of Physical Therapy Program)

Grade	Description	Numerical Value
A	Superior achievement	4.00
B	Average achievement	3.00
F	Fail	0.00

FD	Fail – Disciplinary	0.00
AU	Audit	Not applicable
CD	Doctoral Research/Studies Complete	Not applicable
CR	Credit	Not applicable
CX	Doctoral Research/Studies Continued	Not applicable
I	Incomplete	Not applicable
NP	No Pass	Not applicable
NR	Not reported	Not applicable
P	Pass	Not applicable
TR	Transfer credit	Not applicable
TA	Transferred credit earned with superior achievement	Not applicable
TB	Transferred credit earned with above-average achievement	Not applicable
TP	Transfer Pass	Not applicable
TS	Transfer Satisfactory	Not applicable
W	Withdrawal	Not applicable
WA	Administrative withdrawal	Not applicable
WF	Withdrawal after the period to withdraw with a "W" grade	0.00

Doctor of Physical Therapy Grading Scale:

Grade	Description	Numerical Value
A	Superior achievement	4
A-		3.67
B+		3.33
B	Above average achievement	3
B-		2.67
C+		2.33
C	Average achievement	2

F	Fail	0
FD	Fail - Disciplinary	0
AU	Audit	Not applicable
CR	Credit	Not applicable
I	Incomplete	Not applicable
NP	No Pass	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+		Not applicable
TB	Transferred credit earned with above-average achievement	Not applicable
TB-		Not applicable
TC+		Not applicable
TC	Transferred credit earned with average achievement	Not applicable
TP	Transfer Pass	Not applicable
W	Withdrawal	Not applicable
WA	Administrative withdrawal	Not applicable
WF	Withdrawal after the period to withdraw with a "W" grade	0

Grade Definitions

Grades of "AU", "CD", "CR", "CX", "I", "LB", "NP", "NR", "P", "PLA", "TR", "TA", "TA-", "TB+", "TB", "TP", "TS", "W", or "WA" are not included in the calculation of a student's grade point average (GPA). These grades are used by the University in circumstances when grades of "A" through "F" are not appropriate. "WF" and "FD" grades are calculated into the student's GPA. The credit type of AD is not included in the calculation of the grade point average.

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.

Doctoral Studies Complete (CD) - A grade of "CD" is used to indicate that research or doctoral studies are complete.

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 calculating the student's grade point average.

Doctoral Studies Continued (CX) - A grade of "CX" is used to indicate that research or doctoral studies are in progress.

Incomplete (I) - Inability to complete coursework due to documented circumstances beyond the student's control (such as severe illness) may, at the instructor's discretion, result in a temporary grade of incomplete (I).

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.

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.

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.

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 calculating the student's grade point average.

Transfer (TR) - A grade of "TR" is used to indicate on the student's transcript a block of credit earned at another institution 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.

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.

Fail - Disciplinary (FD) - The "FD" grade can be assigned only by the Provost or other designated official. This grade is used when a student earns a failing grade due to academic dishonesty. A request for the FD grade with accompanying documentation will be submitted to Records and Registration, at which point the student will be withdrawn from the course. This grade can be submitted at any time during the semester.

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 semesters completed at the University. All credit-bearing courses completed by the student are calculated into the student's CGPA.

Calculation of the Semester Grade Point Average

Course	Sem. Hrs. Attempted	Grade	Numerical Value	Quality Points
Course A	3	A	4.00	12.00
Course B	3	B	3.00	9.00
Total	6			21.00

Total Quality Points = 21/6 = 3.5

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 3 semester hours who earns a final grade of "A" in that course will earn 12 quality points for that course (3 semester hours x 4.0).*
2. Add the quality points earned for each course in which the student is registered for the semester.
3. Add the number of semester hours attempted for all courses in which a grade of "A" through "F" 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.

Incomplete Grade

A grade of Incomplete (I) is a discretionary decision. The guidelines for incomplete grades are:

- The Incomplete Grade may be assigned if the student's work is of non-failing quality and there is a reasonable likelihood that the student will complete the course material.
- The student must have extenuating circumstances such as illness, accident, serious personal problems, etc.
- The deadline for submitting the outstanding work is up to the discretion of the instructor, but it must be before the end of the add/drop period of the subsequent semester.
- Once the outstanding work has been submitted, the faculty must submit a Change of Grade Form to Records and Registration for the grade to be updated.
- If the outstanding work is not submitted by the end of the add/drop period of the subsequent semester, the instructor should submit a Change of Grade Form so that the grade is changed from the I grade to the grade earned in the course.
- If the instructor fails to submit the change of grade form one week after the end of the add/drop period of the subsequent semester, Records and Registration will convert the Incomplete grade to an F.

If a student needs additional time to submit the work after the add/drop period of the subsequent semester ends, they must submit a Petition for Extension of Coursework for Incomplete Grade. This form can be obtained from Records and Registration by submitting a ticket to https://reghelp.harrisburgu.edu. Students will need to work with faculty to complete the form and obtain approval for the extension. The completed and signed form must be sent to Records and Registration for approval.

Repeated Courses

Repeated Courses for Master's Degree Program

A master's student may repeat a course in which a final grade of "C" or below, "W", "WA", "FD", or "WF" has been received. The original grade will remain on the student's academic record. After the course has been repeated, the most recent grade will be 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.

Repeated Courses for Doctorate Degree Program

A doctorate student may repeat a course in which a final grade of "W", "WA", or "WF" has been received. They can only attempt to repeat it one time. The original grade will remain on the student's academic record. After the course has been repeated, the most recent grade will be used in the calculation of the student's cumulative grade point average. The expectation is a student will be successful. A student receiving an "F" grade will have their academic record and progress reviewed by the Academic Standing Committee and program lead. Considerations for permitting a repeat include the student's overall academic performance, the significance of the course within the program, the reasons for the initial failure, and the availability of academic support.

Course Substitutions

In situations where a student's progression may be impacted or a course substitution may align with the student's research or career development, a faculty advisor may request a course substitution. Course substitutions for Experiential Learning requirements, would need to meet the appropriate designated Experiential Learning course options which have been approved by Curriculum Committee.

Guidelines for Consideration

1. The student is expected to satisfy the requirements of the declared program of study and all other required University degree requirements for the academic year the student is pursuing as a degree candidate.
2. The course to be substituted should be in the same area as the required course or in a closely related area.
3. Substitution of a course for a previously failed required course is seldom granted.
4. Failure to schedule a required course is not sufficient reason for granting permission for a course substitution.
5. Student must have successfully completed or be in progress of the course being considered for substitution.

Steps for Requesting Course Substitution

1. Initiation of Request
    - The faculty academic advisor identifies the need for a course substitution based on the student's individual circumstances.
    - The faculty academic advisor discusses the proposed substitution with the student to ensure understanding and agreement.
2. Documentation
    - The faculty academic advisor prepares a written request for course substitution, including the following details:
        1. Student's name and student HU ID number.
        2. Course requiring substitution.
        3. Proposed substitute course.
        4. Rationale for the substitution, including any relevant supporting documentation.
3. Submission to Records and Registration
    - The completed course substitution request, along with all supporting documentation, is submitted to Records and Registration at RegHelp@Harrisburgu.edu.
4. Review Process
    - Records and Registration reviews the course substitution request to ensure compliance with university policies.
    - Records and Registration may consult with relevant academic functional areas as needed to evaluate the academic appropriateness of the proposed substitution.

- The decision of Records and Registration is communicated to the faculty academic advisor and the student in writing.

5. Implementation
    - If the course substitution is approved, Records and Registration updates the student's academic record accordingly.
    - The faculty academic advisor ensures that the student is aware of any additional requirements or steps resulting from the approved substitution.

Academic Standing Policy

A graduate student with a cumulative grade point average (CPGA) of 3.00 or higher is in satisfactory academic standing. A student whose CGPA falls below 3.00 is not in satisfactory academic standing and will be placed on academic probation. A student who fails to make satisfactory academic progress at the end of a semester 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. The student should work with the Office of Student Services to determine an academic plan to improve the student's CGPA.

Third Consecutive Occurrence - Dismissal
If a student, after three consecutive semesters, has a CGPA that remains below 3.00 or fails to meet the program pursuit percentage, a letter of dismissal will be issued.

Failure to Make Academic Progress - A student that fails to make any academic progress and have a cumulative GPA of 0.00 after two semesters will be dismissed and have the opportunity to appeal as outlined below.

Dismissal 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 from notification of dismissal. 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 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 academic improvement, 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.

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 has 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:

- 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.
- 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.
- 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 email the Office of Student Success at studentsuccess@harrisburgu.edu with an explanation forming the basis of the appeal. All documentation for the appeal should be attached in an organized manner with a detailed explanation of the rationale for the appeal.-A final grade appeal must be initiated on or before the fifth (5th) business day after grades are posted, or other terms as specified in the Academic Calendar posted on MyHU.

The Office of Student Success will review the Final Grade Appeal. The Office of Student Success may ask for additional information for the student, instructor, or program lead and will access Canvas to verify any student submissions or faculty comments.

- If the original final grade is improved and satisfies the student's appeal, the instructor or program lead 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 Office of Student Success will notify Records and Registration confirming the original grade.
- If the Office of Student Success upholds the original grade, the student may request a review of the grade appeal investigation report by the Office of the Provost in email to studentsuccess@harrisburgu.edu. The determination by the Provost or designee will be final.
- If a student would like to appeal a grade during the semester, students should approach the faculty member to resolve this informally. All documentation should be saved. If at the time the final grades is insufficient, the student can file a formal appeal at that time.

Withholding of Records

Student records may be withheld by Records and Registration when directed by the appropriate University officials. More specifically, the student's diploma will not be released, and a student may not be able to 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 complete the Withdrawal Form via MyHU. Should a student have any questions, please contact Records and Registration by telephone (717.901.5136), RegHelp Student Portal at reghelp.harrisburgu.edu/, or in person.

The determination date for withdrawal purposes shall 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 the 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 Success by contacting StudentServices@HarrisburgU.edu or 717.901.5102. Student Success 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.

An F1 student wishing to drop or withdraw from a course for medical reasons must first consult with the International Student Office for options.

Unofficial Withdrawal

A student who discontinues attendance in all courses during a semester and who 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 Title IV, H&A federal student financial aid program implications for a student who unofficially withdraws.

An F1 student who unofficially withdraw will have their SEVIS record terminated immediately.

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.

Disciplinary/Academic Dismissal

The University reserves the right to expel or suspend at any time a student who has misrepresented any part of their 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 a person or property within the University community or under other circumstances, it may result in disciplinary review 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 a disruption of the legitimate academic and administrative processes of the University. Please see the Student Handbook for details on the policies regarding the Code of Conduct, Academic Code of Conduct, or Sexual Misconduct Policies.

If an F-1 student is dismissed from Harrisburg University, their SEVIS record will be terminated.

Additional policy details can be found in the Student Handbook, Doctor of Physical Therapy Program Policies and Procedures Handbook, and Ph.D. Program Guidebook.

Curriculum Overview

Characteristics of Learning Experiences

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 one's self). Competency-based learning outcomes with programs that are intentionally designed to be engaging, integrative, and experiential are emphasized. There are five inter-dependent program characteristics that help define the Harrisburg University experience:

HIGHLY ENGAGED

Learners are not passive recipients of knowledge, but active participants in their learning. Learning experiences are built upon interactions that engage learners with content, other learners, and faculty. These engagement strategies support learners in mastering new content and skills while demonstrating their learning through multiple means and contexts.

- Courses provide diverse interactions with content using strategies such as hands-on laboratories, exercises, simulations, and games.
- Courses provide opportunities for learners to co-construct and clarify knowledge, as well as build a supportive class community, by collaborating with their fellow learners. Strategies include active learning activities such as group discussions, debates, roleplays, group projects, and group laboratory work.
- Courses provide opportunities for learners to ask questions and receive timely and meaningful feedback from faculty. Faculty presence is essential for learner success, especially in online environments.

HIGHLY AVAILABLE

HU serves a diverse community of learners. To support the needs of these learners, the University provides a variety of experiences and programs. Educational opportunities are available through multiple delivery methods (including face-to-face and online), in multiple modalities (synchronous and asynchronous), in multiple locations (including Harrisburg and high schools across the region).

- Course policies, schedules, and expectations are learner-friendly and clearly communicated.
- Course design seeks to achieve Universal Design for Learning.

HIGHLY COLLABORATIVE

Learners develop knowledge and skills best through shared experiences, as opposed to learning in isolation or in competition with one another. Faculty create learning environments based upon the premise that knowledge can be gained from anyone.

- Coursework requires students to work together to solve problems using teamwork, thereby developing skills essential to their future careers.
- Coursework provides opportunities for learners to receive feedback from their peers.
- Learners' achievements are assessed against a common standard rather than against other learners' achievements, such as by grading on a curve.
- Learners have the advantage of learning from classmates, business mentors, and future employers.

- Faculty work together to develop and share learning resources, activities, materials, feedback, and innovative methods that promote student learning.

HIGHLY EXPERIENTIAL

The University deliberately ensures that learning is highly linked to both practical and professional experience. The students benefit from a robust learning model that deliberately prioritizes experience, both inside and outside the classroom.

- Experiential learning is emphasized through research, industry-related experiences, and practica.
- Course activities allow learners the flexibility to explore topics of interest and gain relevant professional experience.
- Courses encourage learners to reflect on their own learning.
- Learners' prior experiences are incorporated into the learning process.

HIGHLY APPLIED

The learning conversation focuses on the practical application of knowledge. The intention is to shift focus from "How do I remember this information?" to "How can I apply this information 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.

- Courses provide practical, meaningful learning experiences that are relevant to the learners' current or future careers.
- Courses deliberately tie theoretical content to relevant, real-world cases and examples via authentic activities and assessments.

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 is 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. The University is committed to improve its program offerings by comparing student assessment outcomes to the program and course goals.

Competencies

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.

Structure of the Program

Structure of the Masters Degree Program

Graduate education focuses on individualized career advancement in areas of study within science, technology, engineering, and mathematics disciplines. The University's approach is based on an experiential model that allows the student to gain and apply knowledge and skills at an advanced level and to focus on an area of need or interest particular to the student. Faculty combine corporate and academic perspectives in the design, development, and delivery of graduate programs and courses. Programs are primarily designed for working professionals focused on career advancement.

MASTER OF SCIENCE DEGREE MODEL

The curriculum requires a minimum of 36 earned semester hours to fulfill the Master of Science degree requirements. The courses are distributed in the following required areas: Core, Experiential, and Electives. Each requirement is detailed as follows:

CORE COURSES - 15 OR 18 SEMESTER HOURS

Each Master of Science program has Core semester hours that uniquely define the specific program.

ELECTIVES - 12 OR 15 SEMESTER HOURS

Any graduate course from any graduate program not required by the program may be applied toward the elective requirement. This component of the program may be used to complete a concentration in a specific topic or may be used to individualize the student's program of study.

EXPERIENTIAL COURSES - 6 SEMESTER HOURS

The experiential course sequence synthesizes the key concepts of the program extending and applying these concepts to real life practical problems or research investigations. It consists of two courses: a research methodology and writing course, and a Graduate Thesis or Applied Project.

MASTER OF SCIENCE DEGREE - TOTAL OF 36 SEMESTER HOURS

Structure of the Research Doctorate Degree Program

(Refer to specific program requirements for the structure of Clinical Doctorate Degree Programs)

Doctorate education focuses on enabling the student to make original contributions to their respective fields of study. The curriculum requires a minimum of 36 earned semester hours to fulfill the Doctorate degree requirements. Requirements of the program include, but are not limited to, credit and non-credit coursework outlined in the below Milestones:

MILESTONE 1

Coursework - 18 to 30 semester hours

Collaborative Institutional Training Initiative (CITI Training)

Qualifying Exam and/or Comprehensive Exam

Degree Audit

MILESTONE 2

Research Seminar - 6 semester hours

Doctoral Dissertation Committee

Proposal Defense Scheduled

MILESTONE 3

Proposal Successfully Defended

MILESTONE 4

Doctoral Studies - 12 semester hours

HU Institutional Review Board Approval

Dissertation Defense Scheduled

MILESTONE 5

Dissertation Successfully Defended

If appropriate, additional non-credit requirements may be required. Any additional requirements can be found on the student's Plan of Study.

Academic Programs

Graduate education focuses on individualized career advancement in areas of study within science, technology, engineering, and mathematics disciplines. The University's approach is based on an experiential model that allows the student to gain and apply knowledge and skills at an advanced level and to focus on an area of need or interest particular to the student. Faculty combines corporate and academic perspectives in the design, development, and delivery of graduate programs and courses. Programs are primarily designed for working professionals focused on career advancement.

Faculty and Administration

Members or 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/,

Graduate Academic Programs

M.S. Analytics

This 36-semester hour program prepares the student by providing depth in analytics during the first year and focused functional study during the second year that can be applied to any discipline or any interdisciplinary area. Data analysts are forging new relationships in virtually every discipline: business, healthcare, geology, mathematics and statistics, biology, chemistry, computer science, information systems and technology, engineering, psychology, behavioral science, operations research and more, in addition to potential interactions between these disciplines, using role-based interaction with information and analytics to enable highly- collaborative, data-driven organizations. The graduate of this program enters the workforce prepared for the complex, information-intensive world.

Program Goals

M.S. Analytics graduates are able to:

- Identify and assess the opportunities, needs and constraints for data usage;
- Make clear and insightful analyses changing direction quickly as required by these analyses;
- Measure, evaluate, and explain the level of quality of a dataset and develop a plan to improve the quality;
- Work effectively in a team to develop data analytic solutions;
- Recognize and analyze ethical issues related to intellectual property, data security integrity, and privacy; and
- Communicate clearly and persuasively to a variety of audiences.

Graduates become data scientists and analysts in finance, marketing, operations, and business intelligence working groups that generate and consume large amounts of data.

Analytics Requirements

The following courses comprise the Master of Science in Analytics program - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 15 semester hours:

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)

- ANLY 512 - Data Visualization (3 semester hours)
- ANLY 620 - Ethics for Data Analytics (3 semester hours)

Complete the following Experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- ANLY 699 - Applied Project in Analytics (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete one of the following Concentrations:

Four Concentrations are offered:

- Individualized (15 semester hours)
- Consumer Behavior and Decision Sciences (15 semester hours)
- Healthcare Informatics (15 semester hours)
- Pharmaceutical Sciences (15 semester hours)

**The student can choose a course from any of the Master of Science programs*

Individualized Concentration (15 semester hours)

The Master of Science in Analytics student can choose electives totaling up to 15 credits from any graduate-level program. This option allows the Analytics student to build their own customized specialization and concentration.

Consumer Behavior and Decision Sciences Concentration (15 semester hours)

Complete the following courses - 15 semester hours:

- ANLY 525 - Quantitative Decision-Making (3 semester hours)
- ANLY 550 - Structural Equation Modeling (3 semester hours)
- ANLY 575 - Applied Research Methodology (3 semester hours)
- ANLY 590 - Digital Marketing and Analytics (3 semester hours)
- Elective (3 semester hours)*

Healthcare Informatics Concentration (15 semester hours)

Complete the following courses - 15 semester hours:

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 515 - Essential Skills (3 semester hours)
- HCIN 520 - Essential Informatics Skills II (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)
- Elective (3 semester hours)*

Pharmaceutical Sciences Concentration (15 semester hours)

Complete the following courses - 12 semester hours:

- BTEC 625 - Pharmacogenomics (3 semester hours)
- PHAR 520 - Pharmacokinetics and Pharmacodynamics (3 semester hours)
- PHAR 525 - Drug Transport (3 semester hours)
- PHAR 540 - Drug Metabolism (3 semester hours)

Choose one of the following courses - 3 semester hours

- BTEC 508 - Omics for Life Sciences (3 semester hours)
- BTEC 540 - Biostatistics (3 semester hours)
- BTEC 610 - Advanced Topics in Drug Discovery and Delivery (3 semester hours)
- BTEC 612 - Regulatory Affairs in Life Science Industries (3 semester hours)
- BTEC 634 - Healthcare Economics: Fundamentals for Providers and Biotech Professionals (3 semester hours)
- BTEC 635 - Clinical Pharmacology (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Analytics Program with an 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.

First Year

Fall Semester

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- ANLY 620 - Ethics for Data Analytics (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)
- ANLY 512 - Data Visualization (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- Elective (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Elective (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ANLY 699 - Applied Project in Analytics (3 semester hours)
  or

- GRAD 699 - Graduate Thesis (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Analytics Program with the Healthcare Informatics Concentration

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

*The student can choose a course from any of the Master of Science programs

**Recommended core course for the student enrolled in Healthcare Informatics Concentration

First Year

Fall

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- HCIN 500 - Healthcare Informatics (3 semester hours)

Total Semester Hours: 6

Spring

- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)

Total Semester Hours: 6

Summer

- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)
- HCIN 515 - Essential Skills (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- ANLY 512 - Data Visualization (3 semester hours)
- HCIN 520 - Essential Informatics Skills II (3 semester hours)

Total Semester Hours: 6

Spring

- ANLY 620 - Ethics for Data Analytics (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer

- ANLY 699 - Applied Project in Analytics (3 semester hours)
- Elective - (3 semester hours)* *(HCIN 550 recommended)*

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Analytics Program with the Pharmaceutical Sciences Concentration

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

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- PHAR 520 - Pharmacokinetics and Pharmacodynamics (3 semester hours)

Total Semester Hours: 6

Spring

- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- BTEC 625 - Pharmacogenomics (3 semester hours)

Total Semester Hours: 6

Summer

- PHAR 525 - Drug Transport (3 semester hours)
- PHAR 540 - Drug Metabolism (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- ANLY 512 - Data Visualization (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring

- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer

- ANLY 620 - Ethics for Data Analytics (3 semester hours)
- ANLY 699 - Applied Project in Analytics (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Analytics program with the Consumer Behavior and Decision Sciences Concentration

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

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- ANLY 620 - Ethics for Data Analytics (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)
- ANLY 512 - Data Visualization (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- ANLY 575 - Applied Research Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ANLY 590 - Digital Marketing and Analytics (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ANLY 525 - Quantitative Decision-Making (3 semester hours)
- ANLY 550 - Structural Equation Modeling (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ANLY 699 - Applied Project in Analytics (3 semester hours)
  or

- GRAD 699 - Graduate Thesis (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

M.S. Biotechnology

The 36-semester hour Master of Science degree in Biotechnology provides a comprehensive work-oriented curriculum that explores the industrial, medical, and regulatory underpinnings of the biotechnology field. The program offers a sound foundation in these multiple areas of biotechnology, while integrating the applied and innovative aspects of the science. With a focus on industry-relevant projects, case studies, and real-world scenarios, the program graduates are prepared with the skills and technical expertise to confidently cater to the needs of an ever-growing biotechnology sector.

This master's program prepares the student for biotechnology careers focusing on research and development, leadership, planning, management and marketing. The flexibility of the general degree allows student customization of the coursework to meet individual career goals. The program offers four different concentrations: biomanufacturing, medical biotechnology, biotechnology business and management, and an individualized program of study.

Program Goals

A successful student of the program gains the following skills (vary according to the degree/concentration taken):

- Research biotechnology concepts and developments to determine their relevance to applications in biotechnology;
- Evaluate research literature, emerging technologies, and commercial developments to design and/or develop innovative biotechnology applications and products;
- Work as part of a project team to plan and manage the production of an innovative biotechnology application or product;
- Analyze the global business environment of biotechnology industry including regulations and finance to make ethical decisions that meet the needs of the organization; and,
- Actively communicate and collaborate as part of the global community of biotechnology researchers and developers.

Biotechnology Requirements

The following courses comprise the Master of Science in Biotechnology - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 18 semester hours:

- BTEC 502 - Biomaterials (3 semester hours)
- BTEC 508 - Omics for Life Sciences (3 semester hours)
- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- BTEC 540 - Biostatistics (3 semester hours)
- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- BTEC 560 - Design of Experiment (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- BTEC 699 - Applied Project in Biotechnology (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete one of the following Concentrations:

Four concentrations are offered:

- Individualized Concentration (12 semester hours)
- Biotechnology Business and Management (12 semester hours)
- Biomanufacturing (12 semester hours)
- Medical Biotechnology (12 semester hours)

**Student can choose a course from any of the Master of Science programs*

Individualized Concentration (12 semester hours)

The Master of Science in Biotechnology student can choose electives totaling up to 12 credits from Biotechnology, Information Systems Engineering and Management, Project Management, and Healthcare Informatics programs at Harrisburg University: This option allows the Biotechnology student to build their own customized specialization and concentration.

Biotechnology Business and Management Concentration (12 semester hours)

Complete 12 semester hours from the following courses:

- BTEC 612 - Regulatory Affairs in Life Science Industries (3 semester hours)
- BTEC 622 - Principles of Accounting and Finance (3 semester hours)
- BTEC 634 - Healthcare Economics: Fundamentals for Providers and Biotech Professionals (3 semester hours)
- BTEC 672 - Legal Affairs and Policies for Life Science Industry (3 semester hours)
- BTEC 675 - Innovation and Improvisation in Research and Development (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)
- Elective (3 semester hours) *

Biomanufacturing Concentration (12 semester hours)

Complete 12 semester hours from the following courses:

- BTEC 618 - Principles of Bioprocessing (3 semester hours)
- BTEC 650 - Fermentation Technologies (3 semester hours)
- BTEC 655 - Industrial Enzymes and Proteins (3 semester hours)
- BTEC 675 - Innovation and Improvisation in Research and Development (3 semester hours)
- BTEC 698 - Biotechnology Graduate Internship (3 semester hours)
- Elective (3 semester hours) *

Medical Biotechnology Concentration (12 semester hours)

Complete 12 semester hours from the following courses:

- BTEC 610 - Advanced Topics in Drug Discovery and Delivery (3 semester hours)
- BTEC 615 - Biomedical Devices and Prototyping (3 semester hours)
- BTEC 620 - Emerging Trends in Diagnostics (3 semester hours)

- BTEC 625 - Pharmacogenomics (3 semester hours)
- BTEC 630 - Cancer Biotechnology (3 semester hours)
- BTEC 635 - Clinical Pharmacology (3 semester hours)
- BTEC 640 - Trends in Regenerative Medicine (3 semester hours)
- BTEC 698 - Biotechnology Graduate Internship (3 semester hours)
- Elective (3 semester hours) *

Recommended Sequence for the Two-Year Master of Science in Biotechnology with a Concentration in Biotechnology Business and Management

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

- BTEC 502 - Biomaterials (3 semester hours)
- Business & Management Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 540 - Biostatistics (3 semester hours)
- Business & Management Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- Business & Management Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- BTEC 508 - Omics for Life Sciences (3 semester hours)
- Business & Management Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 699 - Applied Project in Biotechnology (3 semester hours)

or

- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Biotechnology with a Concentration in Biomanufacturing

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

- BTEC 502 - Biomaterials (3 semester hours)
- Biomanufacturing Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 540 - Biostatistics (3 semester hours)
- Biomanufacturing Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- Biomanufacturing Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- BTEC 508 - Omics for Life Sciences (3 semester hours)
- Biomanufacturing Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 699 - Applied Project in Biotechnology (3 semester hours)

or

- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Biotechnology with a Concentration in Medical Biotechnology

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

- BTEC 502 - Biomaterials (3 semester hours)
- Medical Biotechnology Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 540 - Biostatistics (3 semester hours)
- Medical Biotechnology Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- Medical Biotechnology Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- BTEC 508 - Omics for Life Sciences (3 semester hours)
- Medical Biotechnology Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 699 - Applied Project in Biotechnology (3 semester hours)

or

- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Biotechnology with an 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.

First Year

Fall Semester

- BTEC 502 - Biomaterials (3 semester hours)
- Graduate Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 540 - Biostatistics (3 semester hours)
- Graduate Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- Graduate Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- BTEC 508 - Omics for Life Sciences (3 semester hours)
- Graduate Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 699 - Applied Project in Biotechnology (3 semester hours)

or

- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Certificate in Biomanufacturing

This 12-semester hour certificate program prepares the student for a supervisory or managerial role within a Biomanufacturing company or contract manufacturing organization (CRO). Completing this certificate program provides the student with the essential skills of industrial bioprocessing, including principles underlying the recovery, purification, and formulation of biomolecules. Additional content includes the characterization of molecules' fundamental chemical and physical properties that impact downstream processing and formulation development. This program introduces the student to the various classes of biomaterials and their applications in medical/industrial processes. The student explores critical aspects of the manufacturing processes (up-and downstream) and GMP-GLP issues. This certificate also familiarizes the student with instruments used for biotechnology applications and their principles of operation, including the significance of instrument validation and calibration. As a critical component of the program, the student conceptually designs and optimizes a biomanufacturing specific target product. The student learns the primary methodologies and principles of recombinant DNA (rDNA) in modifying, selecting, and applying recombinant prokaryotic and eukaryotic cells for industrial enzyme and protein production. The GRAD 695 course allows the participant to customize the research proposal for their area of interest within the biomanufacturing industry. A student may complete this certificate program as a non-degree graduate student or a Master of Science degree-seeking student.

Complete all the following courses - 12 semester hours:

- BTEC 618 - Principles of Bioprocessing (3 semester hours)
- BTEC 650 - Fermentation Technologies (3 semester hours)
- BTEC 655 - Industrial Enzymes and Proteins (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Certificate in Medical Biotechnology

This 12-semester hour certificate program prepares the student for a career in several fields in the healthcare industry. A current emphasis on biotechnology that has grown exponentially is developing clinically relevant products, both pharmaceutical agents and medical devices, primarily for *in vitro* diagnostics. Several efforts in these areas have led to innovations in diagnostics, biomarker studies, and drug discovery. This certificate program addresses the basics of these three Medical Biotechnology fields using the available information for developing new targeted therapies for precision medicine. The certificate also exposes the student to various biomedical devices and new technologies related to designing, fabricating, and applying multi-array biochips and micro-fluidic systems. The student explores the concepts of developing and validating novel diagnostics technologies and unique biomarker discovery for personalized therapeutic targeting and companion diagnostics. The certificate also introduces the essential concepts of regenerative medicine, focusing on tissue engineering and gene and cell therapy. Additionally, the certificate program provides the student with the traditional and molecular diagnostics and fundamental principles overview. The GRAD 695 course allows the participant to customize the research proposal for their area of interest within the biomedical/healthcare industry. A student may complete this certificate program as a non-degree graduate student or a Master of Science degree-seeking student.

Complete all the following courses - 12 semester hours:

- BTEC 615 - Biomedical Devices and Prototyping (3 semester hours)
- BTEC 620 - Emerging Trends in Diagnostics (3 semester hours)
- BTEC 640 - Trends in Regenerative Medicine (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Certificate in Regulatory-Legal Affairs in Biotechnology

This 12-semester hour certificate program prepares the student for supervisory, administrative, or other leadership positions within the Biotechnology industry. Courses within this program will explore market dynamics, public policy, and technology. The student will learn the basics of tech transfer policies and IPOs, communicating scientific concepts to investors, and preparing regulatory plans. Some course activities will prepare the student to create and analyze legal documents, including tech transfer, product validation, and responding to recall procedures. The curriculum also provides an overview of key legal concepts and policies that govern the biotechnology industry's research, development, and commercial activities. Upon completing this certificate program, the student will have creative problem-solving skills and other competencies necessary for standard approaches in managing biotech research and development as per regulatory guidelines and federal compliance protocols. The GRAD 695 course allows the participant to customize the research proposal for their area of interest within the regulatory-legal affairs area in the biotechnology industry. A student may complete this certificate program as a non-degree graduate student or a Master of Science degree-seeking student.

Complete all the following courses - 12 semester hours:

- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 612 - Regulatory Affairs in Life Science Industries (3 semester hours)
- BTEC 672 - Legal Affairs and Policies for Life Science Industry (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

M.S. Computer Information Sciences

The 36-semester hour Master of Science degree in Computer Information Sciences provides a challenging opportunity of pursuing a versatile course of study reflecting the student's desire, background and future responsibilities. The program includes a variety of specialties that are covered in depth to probe the frontiers of scientific and engineering knowledge in the domain. A graduate of the program is able to integrate computational, interpersonal and team skills, to secure a professional employment or pursue a doctoral degree in the field.

The Master of Science degree in Computer Information Sciences also provides the student with solid foundations of scientific and practical tools and methodologies to computation, its applications and emerging trends, in a variety of subdomains. The student explores approaches including computing systems architecture, mathematical and data structures techniques for modeling simulation of complex systems; cluster computing and collaborative software development, and efficient methods for organizing, exploring, visualizing, processing and analyzing very large data sets.

Program Goals

A successful student of the program gains the following skills (vary according to the degree/concentration taken):

- Recognize the necessity for conducting theoretical and empirical analysis;
- Master at least one knowledge area or sub-area from the body of knowledge to at least the Bloom Synthesis level;
- Adapt to rapidly changing technology, advanced learning, and entrepreneurship qualities;
- Have strong scientific communication skills;
- Possess excellent teamwork skills;
- Adhere to the ethical standards and moral obligations as a condition of their membership in the profession; and,
- Employ concepts that promote local and global systems for quality of life.

Computer Information Sciences Requirements

The following courses comprise the Master of Science in Computer Information Sciences - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 15 semester hours:

- CISC 520 - Data Engineering and Mining (3 semester hours)
- CISC 525 - Big Data Architectures (3 semester hours)
- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours)
- CISC 610 - Data Structures and Algorithms (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- CISC 699 - Applied Project in Computer Information Sciences (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete one of the following Concentrations:

Three Concentrations are offered:

- Scientific Computing (15 semester hours)
- Software Engineering and Software Testing (15 semester hours)
- Cybersecurity (15 semester hours)

* *Student can choose a course from any of the Master of Science programs.*

Scientific Computing Concentration (15 semester hours)

Complete the following courses - 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 681 - Special Topics in Scientific Computing (3 semester hours)

- Elective (3 semester hours) *
  or
- CISC 691 - Current Topics in Scientific Computing (3 semester hours)

Software Engineering and Software Testing Concentration (15 semester hours)

Complete the following courses - 15 semester hours:

- CISC 592 - Software Architecture and Microservice (3 semester hours)
- CISC 593 - Software Verification and Validation (3 semester hours)
- CISC 594 - Software Testing Principles and Techniques (3 semester hours)

- Elective (3 semester hours) *
  or
- CISC 682 - Special Topics in Software Engineering and Software Testing (3 semester hours)

- Elective (3 semester hours) *
  or
- CISC 692 - Current Topics in Software Engineering and Software Testing (3 semester hours)

Cybersecurity Concentration (15 semester hours)

Complete the following courses - 15 semester hours:

- CISC 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)
- CISC 662 - Ethical Hacking Development Lab (3 semester hours)
- CISC 663 - Cyber Risk Assessment and Management (3 semester hours)

- Elective (3 semester hours) *
  or
- CISC 683 - Special Topics in Cybersecurity (3 semester hours)

- Elective (3 semester hours) *
  or
- CISC 693 - Current Topics in Cybersecurity (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Computer Information Sciences Program with a concentration in Scientific Computing

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

- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 610 - Data Structures and Algorithms (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CISC 520 - Data Engineering and Mining (3 semester hours)
- CISC 600 - Scientific Computing I (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CISC 601 - Scientific Computing II (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- CISC 525 - Big Data Architectures (3 semester hours)
- CISC 614 - Computer Simulation (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Elective (3 semester hours)
  or
- CISC 691 - Current Topics in Scientific Computing (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- Elective (3 semester hours)
  or
- CISC 681 - Special Topics in Scientific Computing (3 semester hours)
- CISC 699 - Applied Project in Computer Information Sciences (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Computer Information Sciences Program with a concentration in Software Engineering & Software Testing

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

- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 610 - Data Structures and Algorithms (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CISC 520 - Data Engineering and Mining (3 semester hours)
- CISC 592 - Software Architecture and Microservice (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CISC 593 - Software Verification and Validation (3 semester hours)
- CISC 603 - Theory of Computation (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- CISC 525 - Big Data Architectures (3 semester hours)
- CISC 594 - Software Testing Principles and Techniques (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Elective (3 semester hours)
  or
- CISC 692 - Current Topics in Software Engineering and Software Testing (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- Elective (3 semester hours)
  or
- CISC 682 - Special Topics in Software Engineering and Software Testing (3 semester hours)
- CISC 699 - Applied Project in Computer Information Sciences (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Computer Information Sciences Program with a concentration in Cybersecurity

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

- CISC 530 - Computing Systems Architecture (3 semester hours)
- CISC 610 - Data Structures and Algorithms (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CISC 520 - Data Engineering and Mining (3 semester hours)
- CISC 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CISC 603 - Theory of Computation (3 semester hours)
- CISC 662 - Ethical Hacking Development Lab (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- CISC 525 - Big Data Architectures (3 semester hours)
- CISC 663 - Cyber Risk Assessment and Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Elective (3 semester hours)
  or
- CISC 693 - Current Topics in Cybersecurity (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- Elective (3 semester hours)
  or
- CISC 683 - Special Topics in Cybersecurity (3 semester hours)
- CISC 699 - Applied Project in Computer Information Sciences (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

M.S. Consumer Behavior and Decision Sciences

This 36-semester hour Master of Science degree in Consumer Behavior and Decision Sciences is an applied behavioral research degree driven by industry and public sector demand for actionable insights into human behavior. The degree prepares students to pursue marketable careers in applied behavioral research (e.g., Consumer Insights Manager, Market Research Analyst, Marketing Manager, Sensory Scientist, and Behavioral Scientist). Graduates will be able to assess consumer (broadly defined) preferences (insights) using a variety of traditional and emergent research methodologies and turn those insights into actionable strategies using quantitative/qualitative decision making.

Program Goals

Graduates of the Master of Science in the Consumer Behavior and Decision Sciences program will be able to:

- Determine the best research methodologies to employ in order to gain robust consumer insights;
- Turn consumer insights into actionable recommendations through the application of appropriate analytic techniques;
- Effectively communicate consumer research to diverse audiences; and
- Innovate consumer research.

Consumer Behavior and Decision Sciences Requirements

The following courses comprise the Master of Science in Consumer Behavior and Decision Sciences - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 24 semester hours:

- ANLY 512 - Data Visualization (3 semester hours)
- ANLY 518 - Statistical Methods for Behavioral Researchers (3 semester hours)
- CBDS 520 - Judgement and Decision Making (3 semester hours)
- CBDS 535 - Quantitative Research Methods (3 semester hours)
- CBDS 545 - Qualitative Research Methods (3 semester hours)
- CBDS 550 - Sampling and Segmentation (3 semester hours)
- CBDS 620 - Marketing Applications (3 semester hours)
- CBDS 680 - Special Topics in Applied Behavioral Research (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- CBDS 695 - Advanced Behavioral Research Methods (3 semester hours)
- CBDS 699 - Applied Behavioral Research Project (3 semester hours)

Complete two of the following elective courses - 6 semester hours:

- ANLY 520 - Natural Language Processing: Text Summarization and Classification (3 semester hours)
- ANLY 530 - Principles and Applications of Machine Learning (3 semester hours)
- HCID 510 - Theories of Human Interaction (3 semester hours)
- HCID 520 - Users and Populations (3 semester hours)
- PMGT 510 - Principles of Project Management (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Consumer Behavior and Decision Sciences

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

First Year

Fall

- ANLY 518 - Statistical Methods for Behavioral Researchers (3 semester hours)
- CBDS 520 - Judgement and Decision Making (3 semester hours)

Total Semester Hours: 6

Spring

- ANLY 512 - Data Visualization (3 semester hours)
- CBDS 535 - Quantitative Research Methods (3 semester hours)

Total Semester Hours: 6

Summer

- CBDS 545 - Qualitative Research Methods (3 semester hours)
- CBDS 550 - Sampling and Segmentation (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- CBDS 695 - Advanced Behavioral Research Methods (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Spring

- CBDS 620 - Marketing Applications (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Summer

- CBDS 680 - Special Topics in Applied Behavioral Research (3 semester hours)
- CBDS 699 - Applied Behavioral Research Project (3 semester hours)

Total Semester Hours: 6

M.S. Cybersecurity Operations and Control Management

The 36-semester hour Master of Science degree in Cybersecurity Operations and Control Management focuses on architecture and engineering of computer network security. The student acquires the skills to secure network information, design computer security architecture, and data security engineering as well as obtain leadership skills, understanding of ethics, and compliance knowledge.

Program Goals

- Examine the many aspects and ramifications of the internet and the wide spectrum of applications;
- Differentiate the working elements of computer networks and infrastructures;
- Apply the latest advances in internet security to protect the networks for a variety of applications;
- Investigate emerging technologies of complex contemporary security measures; and,
- Explore common ethical and public policy problems that arise and how technology/law solve them.

Cybersecurity Operations and Control Management Requirements

The following courses comprise the Master of Science in Cybersecurity Operations and Control Management - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 15 semester hours:

- CYOM 503 - Principles of Computer Networking (3 semester hours)
- CYOM 521 - Cybersecurity Architecture and Resiliency (3 semester hours)
- CYOM 535 - Principles of Cloud Security (3 semester hours)
- CYOM 569 - Securing Software and Application Environments (3 semester hours)
- CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- CYOM 699 - Applied Project in Cybersecurity Operations and Control Management (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete the following Concentration:

** The student can choose a course from any of the Master of Science programs.*

Cybersecurity and Cyber Warfare Concentration (15 semester hours)

Complete the following courses - 15 semester hours:

- CYOM 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)
- CYOM 662 - Ethical Hacking Development Lab (3 semester hours)
- CYOM 663 - Cyber Risk Assessment and Management (3 semester hours)

- CYOM 683 - Special Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or

- Elective (3 semester hours)*

- CYOM 693 - Current Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or
- Elective (3 semester hours)*

Recommended Sequence for the Two-Year Master of Science Cybersecurity Operations and Control Management Program with a concentration in Cybersecurity and Cyber Warfare *(14-week)*

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

- CYOM 503 - Principles of Computer Networking (3 semester hours)
- CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CYOM 521 - Cybersecurity Architecture and Resiliency (3 semester hours)
- CYOM 535 - Principles of Cloud Security (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CYOM 569 - Securing Software and Application Environments (3 semester hours)
- CYOM 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- CYOM 662 - Ethical Hacking Development Lab (3 semester hours)
- CYOM 663 - Cyber Risk Assessment and Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CYOM 693 - Current Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or
- Elective (3 semester hours)

- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CYOM 683 - Special Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or
- Elective (3 semester hours)

- CYOM 699 - Applied Project in Cybersecurity Operations and Control Management (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science Cybersecurity Operations and Control Management Program with a concentration in Cybersecurity and Cyber Warfare *(7-week)*

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

Session 1

- CYOM 503 - Principles of Computer Networking (3 semester hours)

Session 2

- CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- CYOM 521 - Cybersecurity Architecture and Resiliency (3 semester hours)

Session 2

- CYOM 535 - Principles of Cloud Security (3 semester hours)

Total Semester Hours: 6

Summer Semester

Session 1

- CYOM 569 - Securing Software and Application Environments (3 semester hours)

Session 2

- CYOM 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

Session 1

- CYOM 662 - Ethical Hacking Development Lab (3 semester hours)

Session 2

- CYOM 663 - Cyber Risk Assessment and Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- CYOM 693 - Current Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or
- Elective (3 semester hours)

Session 2

- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

Session 1

- CYOM 683 - Special Topics in Cybersecurity Operations and Control Management (3 semester hours)
  or
- Elective (3 semester hours)

Session 2

- CYOM 699 - Applied Project in Cybersecurity Operations and Control Management (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Total Semester Hours: 6

M.S. Healthcare Informatics

The 36-semester hour graduate program in Healthcare Informatics provides clinicians with knowledge and experience that allows them to function as valued team members selecting, installing, adopting, employing, evaluating, and optimizing healthcare-related IT systems, such as Electronic Medical Records (EMRs), in today's healthcare delivery systems. The clinical objectives of healthcare informatics are to enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship. This program emphasizes translational, communication and interpersonal skills during the selection, implementation, and optimization of healthcare IT systems while providing a solid base in informatics practice, analytics tools, and the management, capture, analysis, and governance of healthcare data. These skills are necessary for effective change management of healthcare providers, for knowledge management in the institution, and for effective communication of key information and insights to both colleagues and senior decision makers.

Program Goals

A successful student of the program gains the following skills (vary according to the degree/concentration taken):

- Lead healthcare information technology teams to analyze healthcare-related IT systems;
- Evaluate today's analytic tools to select the appropriate tools for data analyses;
- Lead healthcare information technology teams to develop innovative techniques;
- Leverage insights from analysis of healthcare data and evaluation of the socio-political environment to devise programs aimed at improving the health of the community; and,
- Apply appropriate principles to create clear and effective communications for a variety of audiences.

Healthcare Informatics Requirements

The following courses comprise the Master of Science in Healthcare Informatics - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 15 semester hours:

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 515 - Essential Skills (3 semester hours)
- HCIN 520 - Essential Informatics Skills II (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)
- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- HCIN 699 - Applied Project in Healthcare Informatics (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete the following Concentration:

Individualized Concentration (15 semester hours)

Complete 15 semester hours of graduate-level courses, with the approval of the student's faculty advisor, from the Harrisburg University course catalog. This allows the student to obtain educational experiences that apply directly to personal interests and goals within the broad scope of healthcare informatics. The following courses are likely to be among those selected (15 semester hours):

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- ANLY 502 - Mathematical Foundations for Data Analysis (3 semester hours)
- ANLY 506 - Exploratory Data Analysis (3 semester hours)
- ANLY 510 - Analytics II: Principles and Applications (3 semester hours)
- ANLY 512 - Data Visualization (3 semester hours)
- ANLY 515 - Risk Modeling and Assessment (3 semester hours)
- ANLY 525 - Quantitative Decision-Making (3 semester hours)
- ANLY 545 - Categorical Data Analysis (3 semester hours)
- ANLY 560 - Advanced Programming for Data Analytics (3 semester hours)
- BTEC 634 - Healthcare Economics: Fundamentals for Providers and Biotech Professionals (3 semester hours)
- CISC 520 - Data Engineering and Mining (3 semester hours)
- CISC 525 - Big Data Architectures (3 semester hours)
- HCID 500 - Design Perspectives (3 semester hours)
- HCID 504 - Qualitative Discovery Research (3 semester hours)
- HCID 520 - Users and Populations (3 semester hours)
- HCID 540 - Design Tools and Processes (3 semester hours)
- HCID 570 - Design Patterns and Contexts (3 semester hours)
- HCIN 525 - Healthcare Case Studies Using Predictive Analysis (3 semester hours)
- HCIN 541 - Healthcare Systems (3 semester hours)
- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- ISEM 501 - Introduction to Digital Technologies (3 semester hours)
- ISEM 565 - Business Intelligence and Decision Support Systems (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)
- MGMT 511 - Digital and Global Enterprises (3 semester hours)
- MGMT 520 - Professional Communication (3 semester hours)
- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Healthcare Informatics with an 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.

First Year

Fall Semester

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 541 - Healthcare Systems (3 semester hours)
  or
- Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- HCIN 545 - Healthcare Data (3 semester hours)
- HCIN 515 - Essential Skills (3 semester hours)

Total Semester Hours: 6

Summer Semester

- HCIN 520 - Essential Informatics Skills II (3 semester hours)
- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- Elective (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Elective (3 semester hours)
- GRAD 695 - Research Methodology and Writing (3 semester hours)

Total Semester Hours: 6

Summer Semester

- Elective (3 semester hours)

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- HCIN 699 - Applied Project in Healthcare Informatics (3 semester hours)

Total Semester Hours: 6

Certificate in Healthcare Informatics

This 15-semester hour certificate program in Healthcare Informatics prepares the student with the basics of healthcare informatics in order to function effectively as project champions for healthcare information technology implementations and other basic informatics functions. A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student.

Complete all of the following courses - 15 semester hours:

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 515 - Essential Skills (3 semester hours)
- HCIN 520 - Essential Informatics Skills II (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)
- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

M.S. Human-Centered Interaction Design

The 36-semester hour graduate program in Human-Centered Interaction Design is designed to promote the human-centered collaborative mindsets that are required for careers in the research, specifications, and development of technologically-driven experiences. The program is interdisciplinary, bringing together the application of knowledge drawn from the social and behavioral sciences, information science, software engineering and project management. The student is taught a balance of theories, methods, skills, and processes.

Program Goals

- Demonstrate foundational knowledge of theories and applications from human behavior and design science;
- Communicate, collaborate and coordinate effectively across diverse populations and media;
- Effectively research people, document problems, and determine research relevance;
- Reflect on self as designer and professional; and
- Design and produce engaging interventions facilitated by digital technologies.

Human-Centered Interaction Design Requirements

The following courses comprise the Master of Science in Human-Centered Interaction Design - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 18 semester hours:

- HCID 500 - Design Perspectives (3 semester hours)
- HCID 504 - Qualitative Discovery Research (3 semester hours)
- HCID 510 - Theories of Human Interaction (3 semester hours)
- HCID 520 - Users and Populations (3 semester hours)
- HCID 540 - Design Tools and Processes (3 semester hours)
- HCID 570 - Design Patterns and Contexts (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  and
- GRAD 699 - Graduate Thesis (3 semester hours)

  or

- HCID 695 - Design Research Studio (3 semester hours)
  and
- HCID 699 - Applied Project in Human-Centered Interaction Design (3 semester hours)

Complete the following Concentration:

Individualized Concentration (12 semester hours)

The Master of Science in Human-Centered Interaction Design student must take 12 elective credits (9 credits of existing courses with advisor consultation/approval and a 3 credit HCID 680 Special Topics course). Existing course offerings across Harrisburg University's master's degree programs will provide the student with opportunities to deepen their skills and knowledge of cognate areas in Analytics, Healthcare IT, E-Business, and IS/IT Management, dependent on the student's interest. Upon acceptance to the program, the student will receive one-on-one advising to craft an appropriate program of study that balances the core focus in HCID, with complementary training from other Harrisburg University graduate programs. The intent is to provide the student with personally relevant training in subject and skill areas that align to the student's career goals.

Recommended Sequence for the Two-Year Master of Science in Human-Centered Interaction Design with 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.

First Year

Fall Semester

- HCID 500 - Design Perspectives (3 semester hours)
- HCID 504 - Qualitative Discovery Research (3 semester hours)

Total Semester Hours: 6

Spring Semester

- HCID 510 - Theories of Human Interaction (3 semester hours)
- HCID 520 - Users and Populations (3 semester hours)

Total Semester Hours: 6

Summer Semester

- HCID 570 - Design Patterns and Contexts (3 semester hours)
- HCID 680 - Special Topics in Human-Centered Interaction Design (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- HCID 540 - Design Tools and Processes (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- HCID 695 - Design Research Studio (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- HCID 699 - Applied Project in Human-Centered Interaction Design (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

M.S. Information Systems Engineering and Management

The 36-semester hour graduate program in Information Systems Engineering and Management (ISEM) is designed to educate the leaders who can plan, architect, integrate, and manage the systems needed to support modern digital enterprises. Graduate studies in ISEM cut across the following three active areas of work:

- Information Systems - the latest technologies and approaches (e.g. web-based components, Artificial Intelligence, Machine Learning, Deep Learning, Big Data, cloud and on-premise computing, Internet of Things, Blockchain, management science and continuously emerging technologies);
- Systems Engineering - systems thinking and emphasis on holistic systems engineering instead of individual components; with a focus on stakeholders, requirements and enterprise architectures incorporating people, processes and technologies; and
- Management - strategic planning, strategic management, business strategies, entrepreneurship, planning integration, security, governance, global enterprises, and agile enterprises.

ISEM is a flexible and interdisciplinary program that emphasizes stakeholders, requirements, enterprise architecture, planning and management issues at global levels as well as the technologies and processes that comprise a successful enterprise level information system. These topics are addressed at both technical and management perspectives. An ISEM student may select an individualized concentration that supports flexible, student-driven studies in emerging technologies as well as digital health, digital transformation, entrepreneurship, information security, smart cities, software engineering, IoT, Industry 4.0 and related information system topics. A student also has the option to select a more specific concentration in Artificial Intelligence, Cloud Computing, Management Science or Blockchain and Cryptocurrency.

Program Goals

ISEM graduates are able to:

- Analyze the internal and external environments of the enterprise;
- Apply various developed models for strategic decision making;
- Justify information, engineering, and management systems decisions made to address practical, interrelated problems; and
- Construct the design and planning processes for a restructured operation within the firm.

Information Systems Engineering and Management Requirements

Complete the following Core courses (15 semester hours)

Complete the following courses - 12 semester hours:

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

  Note: The ISEM program also offers ISEM 501 - Introduction to Digital Technologies, which is designed for the student who does not enter the program with a Computer Science (CS) or Information Technology (IT) background. This course is a prerequisite for certain other non-ISEM and ISEM MS courses.

Complete one of the following courses - 3 semester hours:

- ISEM 502 - User-Centered Design (3 semester hours)
- ISEM 534 - Database Design and Management (3 semester hours)
- ISEM 551 - Web-based Software Engineering (3 semester hours)
- ISEM 570 - Principles of ITIL for IT Quality (3 semester hours)
- MGMT 511 - Digital and Global Enterprises (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

Complete one of the following Concentrations:

Five Concentrations are offered:

- Individualized (15 semester hours)
- Artificial Intelligence for Business (15 semester hours)
- Blockchain and Cryptocurrency (15 semester hours)
- Cloud Computing for Business (15 semester hours)
- Management Science, Strategy and Technology (15 semester hours)

**The student can choose a course from any of the Master of Science programs.*

Individualized Concentration - 15 semester hours

The Master of Science in Information Systems Engineering and Management student can choose electives totaling up to 15 credits from any graduate-level program. This option allows the Information Systems Engineering and Management student to build their own customized specialization and concentration.

Artificial Intelligence for Business Concentration - 15 semester hours

- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)
- ISEM 505 - Artificial Intelligence and Systems Engineering (3 semester hours)
- ISEM 564 - Cloud Computing, Big Data Applications and Machine Learning (3 semester hours)
- Elective (6 semester hours)*
  Recommended Electives: ISEM 565 - Business Intelligence and Decision Support Systems and ISEM 582 - Cloud Computing Applications for Business

Blockchain and Cryptocurrency Concentration - 15 semester hours

- ISEM 574 - Bitcoin Blockchain (3 semester hours)
- ISEM 576 - Cryptocurrency and Regulation (3 semester hours)
- ISEM 578 - Decentralized Finance (3 semester hours)
- Elective (6 semester hours)*
  Recommended Electives: ISEM 575 - Ethereum Blockchain and ISEM 577 - Blockchain Scalability

Cloud Computing for Business Concentration - 15 semester hours

- ISEM 536 - IT Infrastructure and Cloud Computing (3 semester hours)
- ISEM 564 - Cloud Computing, Big Data Applications and Machine Learning (3 semester hours)
- ISEM 582 - Cloud Computing Applications for Business (3 semester hours)
- Elective (6 semester hours)*
  Recommended Electives: ISEM 503 - Artificial Intelligence Principles and Applications and ISEM 533 - Distributed Database Management and Security

Management Science, Strategy and Technology Concentration - 15 semester hours

- ISEM 547 - IT Management (3 semester hours)
- ISEM 585 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)
- MGMT 513 - Accounting Principles and Applications (3 semester hours)
- Elective (6 semester hours)*
  Recommended Electives: MGMT 511 - Digital and Global Enterprises, MGMT 512 - Marketing Principles and Applications, or MGMT 560 - Organizational Leadership

Recommended Sequence for the Two-Year Master of Science in Information Systems Engineering and Management Program with 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.

First Year

Fall Semester

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ISEM Core Elective (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- Concentration Electives (6 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or

- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Information Systems Engineering and Management Program with the Artificial Intelligence for Business Concentration

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

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ISEM Core Elective (3 semester hours)
- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ISEM 505 - Artificial Intelligence and Systems Engineering (3 semester hours)
- ISEM 564 - Cloud Computing, Big Data Applications and Machine Learning (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)

or

- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Information Systems Engineering and Management Program with the Blockchain and Cryptocurrency Concentration

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

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ISEM Core Elective (3 semester hours)
- ISEM 574 - Bitcoin Blockchain (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ISEM 576 - Cryptocurrency and Regulation (3 semester hours)
- ISEM 578 - Decentralized Finance (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)

or

- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Information Systems Engineering and Management Program with the Cloud Computing for Business Concentration

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

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ISEM Core Elective (3 semester hours)
- ISEM 564 - Cloud Computing, Big Data Applications and Machine Learning (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ISEM 536 - IT Infrastructure and Cloud Computing (3 semester hours)
- ISEM 582 - Cloud Computing Applications for Business (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)

or

- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Information Systems Engineering and Management Program with the Management Science, Strategy and Technology Concentration

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

- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ISEM Core Elective (3 semester hours)
- ISEM 547 - IT Management (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ISEM 585 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)
- MGMT 513 - Accounting Principles and Applications (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)

or

- ISEM 699 - Research or Applied Project in Information Systems Engineering and Management (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Certificate in Blockchain and Cryptocurrency

This 12-semester hour certificate program is designed for the student with an interest in Blockchain and Cryptocurrency technology. Blockchain and Cryptocurrency are an innovative academic subject with an area of growing jobs and employment. A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student.

Complete all of the following courses - 12 semester hours:

- ISEM 574 - Bitcoin Blockchain (3 semester hours)
- ISEM 575 - Ethereum Blockchain (3 semester hours)
- ISEM 576 - Cryptocurrency and Regulation (3 semester hours)
- ISEM 578 - Decentralized Finance (3 semester hours)

M.S. Learning Technologies and Media Systems

The Learning Technologies and Media Systems is a 36-semester hour program that provides the student with leading-edge approaches and skills to aid in the application of existing and emerging learning technologies in a variety of learning environments. The innovative applied learning technologies program provides the student with immediate career benefits while preparing for anticipated industry needs. The LTMS program supports learning outcome advancements in business and education by cultivating learning leaders with a foundation in instructional design, learning theory, technology application, an understanding of critical issues and an advanced vision for technology-supported learning.

Program Goals

LTMS graduates are able to:

- Analyze performance improvement opportunities to determine appropriate solutions;
- Create engaging learning solutions to improve performance;
- Evaluate the effectiveness and efficiency of learning solutions; and,
- Achieve the management of knowledge through digital communication.

Learning Technologies and Media Systems Requirements

The following courses comprise the Learning Technologies and Media Systems program - 36 semester hours. There are 15 semester hours of required core courses, 15 semester hours of open electives or concentration-based electives and 6 semester hours of an experiential component. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 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 and Instructional Strategies (3 semester hours)

Complete the following experiential courses - 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 (1 to 6 semester hours)
  or
- LTMS 699 - Applied Project in LTMS (3 semester hours)

Complete the following Concentration:

Individualized Concentration (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.

Recommended Sequence for the Two-Year Master of Science in Learning Technologies and Media Systems 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

- LTMS 500 - Macro Instructional Design (3 semester hours)
- LTMS 510 - Learning Technologies and Solutions (3 semester hours)

Total Semester Hours: 6

Spring Semester

- LTMS 514 - Media Selection, Design and Production (3 semester hours)
- LTMS 525 - Learning Theories and Instructional Strategies (3 semester hours)

Total Semester Hours: 6

Summer Semester

- LTMS 518 - eLearning Development (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- LTMS 698 - Learning Technologies Internship (1 to 6 semester hours)
  or
- LTMS 699 - Applied Project in LTMS (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- Concentration Elective (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Pennsylvania Department of Education Instructional Certificate Program in Instructional Technology K - 12

The 24-semester hour graduate program in Instructional Technology prepares the student for the Pennsylvania Department of Education's instructional certificate in instructional technology K -12. A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student.

Complete all of the following courses - 24 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 and Instructional Strategies (3 semester hours)
- LTMS 530 - Managing Technology Resources (3 semester hours)
- LTMS 615 - Coordinating the Learning Technology Infrastructure (3 semester hours)
- LTMS 697 - LTMS ePortfolio (0 semester hour)
- LTMS 698 - Learning Technologies Internship (1 to 6 semester hours) (3)

Certificate in Instructional Design

This 15-semester hour certificate program in Instructional Design prepares the student with the skills, knowledge, and abilities needed to succeed in a career in the training industry. A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student.

Complete all of the following courses - 15 semester hours:

- LTMS 500 - Macro Instructional Design (3 semester hours)
- LTMS 518 - eLearning Development (3 semester hours)
- LTMS 520 - Learning Evaluation and Assessment (3 semester hours)
- LTMS 531 - Designing Serious Games and Simulations (3 semester hours)

- LTMS 525 - Learning Theories and Instructional Strategies (3 semester hours)
  or
- LTMS 540 - The Instructional Designer as Entrepreneur (3 semester hours)

M.S. Nursing

The 36-semester hour Master of Science degree in Nursing consists of advanced training in research, evidence-based practices, quality improvement, process improvement, the foundation in nursing education, leadership, and best practices in the field of nursing. The graduate program offers two tracks to choose from which include Clinical Nurse Leader track and Nurse Educator track. Course offerings in this program will give students a broad understanding of diverse topics in current trends in nursing. These include the promotion of evidence-based practice, the strengthening of interprofessional communication, and an overall mindset of professional development. The program will prepare nurses for careers in clinical and non-clinical healthcare settings.

Additional Requirements for Admission to the MS in Nursing

The following are requirements in addition to those that are part of the general graduate admissions requirements:

- Completion of a bachelor's degree in nursing
- Transcripts from school that shows BSN Degree Completion
- Two Letters of Recommendation
- Current United States issued RN License Number

Program Goals

A successful student of the program gains the following skills (vary according to the degree/concentration taken):

- Demonstrate Collaboratory practice expected of all healthcare professionals;
- Produce a life-long learning plan specific to career advancement and maintaining credentials;
- Utilize evidence-based research to guide healthcare clinical and operation decisions;
- Design and evaluate frameworks required to implement healthcare initiatives; and
- Adhere to regulatory practices associated with the healthcare industry.

Nursing Requirements

The following courses comprise the Master of Science in Nursing - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 18 semester hours:

- HCIN 500 - Healthcare Informatics (3 semester hours)
- NURS 510 - Foundational Concepts for Master Prepared Nurses (3 semester hours)
- NURS 515 - Quality and Safety (3 semester hours)
- NURS 520 - Healthcare Policy (3 semester hours)
- NURS 540 - Advanced Research Methods and Evidenced-Based Practices (3 semester hours)
- NURS 550 - Advanced Pathophysiology/Pharmacology and Health Assessment (3 semester hours)

Complete the following practicum courses - 6 semester hours:

The practicum courses total 500 hours of experiential learning with a preceptor.

- NURS 695 - Nursing Practicum I (3 semester hours)
- NURS 699 - Nursing Practicum II (3 semester hours)

Complete one of the following Concentrations:

Two Concentrations are offered:

- Clinical Nurse Leader (12 semester hours)
- Nurse Educator (12 semester hours)

Clinical Nurse Leader Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- NURS 605 - Foundations for the Clinical Nurse Leader I (3 semester hours)
- NURS 610 - Foundations for Clinical Nurse Leader II (3 semester hours)
- NURS 630 - Epidemiology in Action: Tracking Health & Disease (3 semester hours)
- NURS 635 - Clinical Nurse Leader Evaluation of Health Outcomes (3 semester hours)

Nurse Educator Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- NURS 620 - Theoretical Foundation in Nursing Education (3 semester hours)
- NURS 625 - Curriculum Development (3 semester hours)
- NURS 640 - Nursing Research and Evidence-Based Teaching Models (3 semester hours)
- NURS 645 - Assessment and Evaluation in Education (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Nursing Program with a Clinical Nurse Leader Concentration

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

- NURS 510 - Foundational Concepts for Master Prepared Nurses (3 semester hours)
- NURS 520 - Healthcare Policy (3 semester hours)

Total Semester Hours: 6

Spring

- HCIN 500 - Healthcare Informatics (3 semester hours)
- NURS 515 - Quality and Safety (3 semester hours)

Total Semester Hours: 6

Summer

- NURS 540 - Advanced Research Methods and Evidenced-Based Practices (3 semester hours)
- NURS 550 - Advanced Pathophysiology/Pharmacology and Health Assessment (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- NURS 605 - Foundations for the Clinical Nurse Leader I (3 semester hours)
- NURS 630 - Epidemiology in Action: Tracking Health & Disease (3 semester hours)

Total Semester Hours: 6

Spring

- NURS 610 - Foundations for Clinical Nurse Leader II (3 semester hours)
- NURS 695 - Nursing Practicum I (3 semester hours)

Total Semester Hours: 6

Summer

- NURS 635 - Clinical Nurse Leader Evaluation of Health Outcomes (3 semester hours)
- NURS 699 - Nursing Practicum II (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Nursing Program with a Nurse Educator Concentration

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

- NURS 510 - Foundational Concepts for Master Prepared Nurses (3 semester hours)
- NURS 520 - Healthcare Policy (3 semester hours)

Total Semester Hours: 6

Spring

- HCIN 500 - Healthcare Informatics (3 semester hours)
- NURS 515 - Quality and Safety (3 semester hours)

Total Semester Hours: 6

Summer

- NURS 540 - Advanced Research Methods and Evidenced-Based Practices (3 semester hours)
- NURS 550 - Advanced Pathophysiology/Pharmacology and Health Assessment (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- NURS 620 - Theoretical Foundation in Nursing Education (3 semester hours)
- NURS 625 - Curriculum Development (3 semester hours)

Total Semester Hours: 6

Spring

- NURS 640 - Nursing Research and Evidence-Based Teaching Models (3 semester hours)
- NURS 695 - Nursing Practicum I (3 semester hours)

Total Semester Hours: 6

Summer

- NURS 645 - Assessment and Evaluation in Education (3 semester hours)
- NURS 699 - Nursing Practicum II (3 semester hours)

Total Semester Hours: 6

M.S. Pharmaceutical Sciences

This 36-semester hour Master of Science degree program in Pharmaceutical Sciences at Harrisburg University consists of advanced training in characterizing drug action and disposition. Courses offered in this program will give the student a broad understanding of diverse topics in pharmaceutical science that range from established paradigms to emerging technology and applications. Scientific communication and professional development are stressed in the curriculum and reinforced through coursework and independent study. Graduates may seek a career in research, industry, or continuing to a doctoral program in health sciences or healthcare. Classes that focus on genomics and biopharmaceutics will give the student perspectives on aspects of personalized medicine. This diverse curriculum will prepare graduates for careers in the expanding personalized medicine and biotechnology sectors, as well as in more traditional roles in the pharmaceutical industry. The elective options allow the student to individualize their own coursework based on their career goals.

Additional Requirements for Admission to the MS in Pharmaceutical Sciences

The following are requirements in addition to those that are part of the general graduate admissions requirements:

- Bachelor's degree in a biological, biomedical, or life science
- Minimum GPA: 3.2
- Undergraduate academic requirements by content area:

- Successful completion of Organic Chemistry or equivalent: 8 credit hours
- Successful completion of General Chemistry or equivalent: 4 credit hours
- Successful completion of General Biology or equivalent: 4 credit hours
- Successful completion of General Physics or equivalent: 4 credit hours
- Successful completion of Precalculus or higher math or equivalent: 3 credit hours

Admission requirements are subject to review by the program lead and equivalent coursework is accepted at the discretion of the program lead.

Program Goals

Graduates of the Master of Science in Pharmaceutical Sciences program will be able to:

- Analyze the role of core content areas in pharmaceutical science in the industrial, clinical, and regulatory spheres;
- Recommend and apply established models to predict drug dispositions in patients as part of a multidisciplinary team;
- Design strategies using scientific approaches to accomplish set pharmaceutical goals in an industry or regulatory setting;
- Evaluate primary literature relevant to pharmaceutical sciences and use that literature to solve diverse problems in pharmaceutical science; and,
- Effectively communicate pharmaceutical science information and issues from around the world, orally and written, to individuals with scientific and non-scientific backgrounds.

Pharmaceutical Sciences Requirements

The following courses comprise the Master of Science in Pharmaceutical Sciences - 36 semester hours. The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 18 semester hours:

- BTEC 625 - Pharmacogenomics (3 semester hours)
- BTEC 635 - Clinical Pharmacology (3 semester hours)
- PHAR 520 - Pharmacokinetics and Pharmacodynamics (3 semester hours)
- PHAR 525 - Drug Transport (3 semester hours)
- PHAR 540 - Drug Metabolism (3 semester hours)
- PHAR 690 - Ethics and Trends in Pharmaceutical Science (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PHAR 699 - Applied Project in Pharmaceutical Sciences (3 semester hours)

Complete 12 semester hours from the following courses:

- ANLY 500 - Analytics I: Principles and Applications (3 semester hours)
- BTEC 508 - Omics for Life Sciences (3 semester hours)
- BTEC 540 - Biostatistics (3 semester hours)
- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 610 - Advanced Topics in Drug Discovery and Delivery (3 semester hours)
- BTEC 612 - Regulatory Affairs in Life Science Industries (3 semester hours)
- BTEC 618 - Principles of Bioprocessing (3 semester hours)
- BTEC 630 - Cancer Biotechnology (3 semester hours)
- BTEC 640 - Trends in Regenerative Medicine (3 semester hours)
- BTEC 650 - Fermentation Technologies (3 semester hours)
- BTEC 672 - Legal Affairs and Policies for Life Science Industry (3 semester hours)
- HCIN 525 - Healthcare Case Studies Using Predictive Analysis (3 semester hours)
- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Pharmaceutical Sciences

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

First Year

Fall Semester

- PHAR 520 - Pharmacokinetics and Pharmacodynamics (3 semester hours)
- BTEC 635 - Clinical Pharmacology (3 semester hours)

Total Semester Hours: 6

Spring Semester

- BTEC 625 - Pharmacogenomics (3 semester hours)
- PHAR 540 - Drug Metabolism (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PHAR 525 - Drug Transport (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- Elective (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or

- PHAR 699 - Applied Project in Pharmaceutical Sciences (3 semester hours)
- PHAR 690 - Ethics and Trends in Pharmaceutical Science (3 semester hours)

Total Semester Hours: 6

M.S. Project Management

The 36-semester hour graduate program in Project Management provides each student with a focused, applied and rigorous experience in creating, developing, implementing and assessing projects and the resulting products. To produce a high-quality product or service on time and to the specifications of a client, the skills and knowledge of a typical subject matter expert are not enough. The complexities of modern product development and project management require a professional with specific technical knowledge with strong project management and leadership skills. This program of study leads to a Master of Science degree that prepares the student for career advancement in the field of project management and for positions such as project manager, project coordinator, lead project engineer, enterprise project manager or information technology project manager.

Program Goals

Project Management graduates are able to:

- Apply technical expertise and strategic management knowledge to execute project phases;
- Apply cultural awareness and ethical practices to leadership approaches, integrating trust-building, conflict resolution, and effective stakeholder engagement into professional behavior through inclusive decision-making, respect in team dynamics, and accountability; and,
- Demonstrate strategic and organizational contextual awareness and insight by linking key stakeholder objectives to sustainable strategies to deliver value across operational functions using project management knowledge.

Project Management Requirements

Master of Science in Project Management program is a 36-semester hour program that consists of required core courses (18 semester hours), required project or thesis courses (6 semester hours), and electives from a wide range of management and technology courses (12 semester hours). The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 18 semester hours:

- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)
- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  and
- GRAD 699 - Graduate Thesis (3 semester hours)

  or

- PMGT 695 - Applied Project Management I (3 semester hours)
  and
- PMGT 699 - Applied Project Management II (3 semester hours)

Complete one of the following Concentrations:

Six Concentrations are offered:

- Individualized (12 semester hours)
- Agile Lean (12 semester hours)
- Biotechnology (12 semester hours)
- Cybersecurity (12 semester hours)
- Healthcare Informatics (12 semester hours)
- Human-Centered Interaction Design (12 semester hours)

**The student can choose a course from any of the Master of Science programs.*

Individualized Concentration (12 semester hours)

The Master of Science in Project Management student can choose courses totaling 12 semester hours from any graduate-level program. This option allows Project Management students to build their own customized specialization and concentrations.

Agile Lean Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- PMGT 572 - Agile Scrum Applied Projects (3 semester hours)
  or
- PMGT 573 - Scaling Agile for the Enterprise (3 semester hours)

- PMGT 574 - Lean Thinking (3 semester hours)
- PMGT 576 - Agile Lean Transformational Leadership (3 semester hours)
- Elective (3 semester hours)*

Biotechnology Concentration (12 semester hours)

Complete 12 semester hours from the following courses:

- BTEC 502 - Biomaterials (3 semester hours)
- BTEC 508 - Omics for Life Sciences (3 semester hours)
- BTEC 522 - Graduate Biotechnology Seminar (3 semester hours)
- BTEC 540 - Biostatistics (3 semester hours)
- BTEC 550 - Instrumentation in Biotechnology Industry (3 semester hours)
- BTEC 560 - Design of Experiment (3 semester hours)
- BTEC 610 - Advanced Topics in Drug Discovery and Delivery (3 semester hours)
- BTEC 612 - Regulatory Affairs in Life Science Industries (3 semester hours)
- BTEC 615 - Biomedical Devices and Prototyping (3 semester hours)
- BTEC 618 - Principles of Bioprocessing (3 semester hours)
- BTEC 620 - Emerging Trends in Diagnostics (3 semester hours)
- BTEC 622 - Principles of Accounting and Finance (3 semester hours)
- BTEC 625 - Pharmacogenomics (3 semester hours)

- BTEC 630 - Cancer Biotechnology (3 semester hours)
- BTEC 634 - Healthcare Economics: Fundamentals for Providers and Biotech Professionals (3 semester hours)
- BTEC 635 - Clinical Pharmacology (3 semester hours)
- BTEC 640 - Trends in Regenerative Medicine (3 semester hours)
- BTEC 650 - Fermentation Technologies (3 semester hours)
- BTEC 655 - Industrial Enzymes and Proteins (3 semester hours)
- BTEC 672 - Legal Affairs and Policies for Life Science Industry (3 semester hours)
- BTEC 675 - Innovation and Improvisation in Research and Development (3 semester hours)
- BTEC 698 - Biotechnology Graduate Internship (3 semester hours)

Cybersecurity Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry (3 semester hours)
- CYOM 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)
- CYOM 662 - Ethical Hacking Development Lab (3 semester hours)
- CYOM 663 - Cyber Risk Assessment and Management (3 semester hours)

Healthcare Informatics Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 541 - Healthcare Systems (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)
- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

Human-Centered Interaction Design Concentration (12 semester hours)

Complete the following courses - 12 semester hours:

- HCID 500 - Design Perspectives (3 semester hours)
- HCID 504 - Qualitative Discovery Research (3 semester hours)
- HCID 510 - Theories of Human Interaction (3 semester hours)
- HCID 520 - Users and Populations (3 semester hours)

Recommended Sequence for the Two-Year Master of Science in Project Management with the Individualized Concentration *(14-week)*

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- PMGT 540 - Planning and Executing Projects (3 semester hours)
- MGMT 560 - Organizational Leadership (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- Concentration Electives (6 semester hours)

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)
- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management with the Individualized Concentration *(7-week)*

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

Session 1

- PMGT 510 - Principles of Project Management (3 semester hours)

Session 2

- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- PMGT 540 - Planning and Executing Projects (3 semester hours)

Session 2

- MGMT 560 - Organizational Leadership (3 semester hours)

Total Semester Hours: 6

Summer Semester

Session 1

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)

Session 2

- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

Session 1

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

Session 2

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- Concentration Elective (3 semester hours)

Session 2

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

Session 1

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

Session 2

- Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management Program with a concentration in Agile Lean *(14-week)*

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- PMGT 540 - Planning and Executing Projects (3 semester hours)
- MGMT 560 - Organizational Leadership (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

- PMGT 574 - Lean Thinking (3 semester hours)

Total Semester Hours: 6

Spring Semester

- PMGT 572 - Agile Scrum Applied Projects (3 semester hours)
  or
- PMGT 573 - Scaling Agile for the Enterprise (3 semester hours)

- Concentration Elective (3 semester hours)

PMGT 572 or PMGT 573 recommended *(select the course not previously chosen for Concentration requirement)*

Total Semester Hours: 6

Summer Semester

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)
- PMGT 576 - Agile Lean Transformational Leadership (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management Program with a concentration in Agile Lean *(7-week)*

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

Session 1

- PMGT 510 - Principles of Project Management (3 semester hours)

Session 2

- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- PMGT 540 - Planning and Executing Projects (3 semester hours)

Session 2

- MGMT 560 - Organizational Leadership (3 semester hours)

Total Semester Hours: 6

Summer Semester

Session 1

- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Session 2

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

Session 1

- PMGT 574 - Lean Thinking (3 semester hours)

Session 2

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

Total Semester Hours: 6

Spring Semester

Session 1

- PMGT 572 - Agile Scrum Applied Projects (3 semester hours)
  or
- PMGT 573 - Scaling Agile for the Enterprise (3 semester hours)

Session 2

- Concentration Elective (3 semester hours)

PMGT 572 or PMGT 573 recommended (*select the course not previously chosen for Concentration requirement*)

Total Semester Hours: 6

Summer Semester

Session 1

- PMGT 576 - Agile Lean Transformational Leadership (3 semester hours)

Session 2

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management Program with a Biotechnology Concentration

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring

- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)

Total Semester Hours: 6

Summer

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

- Biotechnology Concentration Elective (3 semester hours)

Total Semester Hours: 6

Spring

- Biotechnology Concentration Electives (6 semester hours)

Total Semester Hours: 6

Summer

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

- Biotechnology Concentration Elective (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management with the Human-Centered Interaction Design Concentration

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- PMGT 540 - Planning and Executing Projects (3 semester hours)
- MGMT 560 - Organizational Leadership (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

- HCID 500 - Design Perspectives (3 semester hours)

Total Semester Hours: 6

Spring Semester

- HCID 504 - Qualitative Discovery Research (3 semester hours)
- HCID 510 - Theories of Human Interaction (3 semester hours)

Total Semester Hours: 6

Summer Semester

- HCID 520 - Users and Populations (3 semester hours)

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management with the Cybersecurity Concentration

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- CYOM 661 - Principles of Cybersecurity & Cyber Warfare (3 semester hours)

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

Total Semester Hours: 6

Spring Semester

- CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry (3 semester hours)
- CYOM 662 - Ethical Hacking Development Lab (3 semester hours)

Total Semester Hours: 6

Summer Semester

- CYOM 663 - Cyber Risk Assessment and Management (3 semester hours)

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

Total Semester Hours: 6

Recommended Sequence for the Two-Year Master of Science in Project Management with the Healthcare Informatics Concentration

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

- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 511 - Introduction to Large Language Model in Project Management (3 semester hours)

Total Semester Hours: 6

Spring Semester

- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)

Total Semester Hours: 6

Summer Semester

- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- HCIN 541 - Healthcare Systems (3 semester hours)

- GRAD 695 - Research Methodology and Writing (3 semester hours)
  or
- PMGT 695 - Applied Project Management I (3 semester hours)

Total Semester Hours: 6

Spring Semester

- HCIN 500 - Healthcare Informatics (3 semester hours)
- HCIN 545 - Healthcare Data (3 semester hours)

Total Semester Hours: 6

Summer Semester

- HCIN 550 - Introduction to Modeling, Optimization and Decision Making (3 semester hours)

- GRAD 699 - Graduate Thesis (3 semester hours)
  or
- PMGT 699 - Applied Project Management II (3 semester hours)

Total Semester Hours: 6

Certificate in Project Management

This 18-semester hour program is designed for an individual with a goal of a certificate in Project Management and an industry certification from the Project Management Institute [either Project Management Professional (PMP), or Certified Associate Project Manager (CAPM)]. The certificate in Project Management program requires 18 semester hours in Project Management, a non-credit PMP preparation course, and the successful completion of the PMP exam or CAPM exam. A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student. The student has one year following the completion of the coursework to take the PMP exam.

Complete all of the following courses - 18 semester hours:

- MGMT 520 - Professional Communication (3 semester hours)
- MGMT 560 - Organizational Leadership (3 semester hours)
- PMGT 510 - Principles of Project Management (3 semester hours)
- PMGT 530 - Risk, Procurement and Contracts (3 semester hours)
- PMGT 540 - Planning and Executing Projects (3 semester hours)
- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)
- PMGT 697 - PMP/CAPM Exam Preparation (0 semester hour)

Certificate in Agile Lean

This 12-semester hour certificate program is designed for the student with a desire to understand the principles and practices of Agile Lean. The student will be provided with a thorough understanding and application of Agile Lean frameworks used in the project management and product development domains. Starting with an Agile Project Management with Scrum course, the certificate then expands to include an experiential course of applying Scrum to actual projects, conducting new product development with Agile Lean, and leading Agile Lean transformations in organizations. The certificate in Agile Lean requires 12 semester hours in Agile Lean and successfully complete (pass) one or more industry certifications (i.e., PSM I - Professional Scrum Master or PSPO - Professional Scrum Product Owner from Scrum.org., or similar certification). A student may complete this program as a non-degree graduate student or as a Master of Science degree-seeking student.

Complete all of the following courses - 12 semester hours:

- PMGT 570 - Agile Project Management with Scrum Methodology (3 semester hours)
- PMGT 572 - Agile Scrum Applied Projects (3 semester hours)
  or
- PMGT 573 - Scaling Agile for the Enterprise (3 semester hours)
- PMGT 574 - Lean Thinking (3 semester hours)
- PMGT 576 - Agile Lean Transformational Leadership (3 semester hours)

M.S. Techpreneurship

This 36-semester hour Master of Science in Techpreneurship combines technology, innovation, and entrepreneurship. The student explores the skillsets to build start-ups or innovate new products or processes in an existing organization. The student is taught to create, recognize, and support innovation in any environment. The student is introduced to the process technologies entrepreneurs use to start and scale high growth companies. Techpreneurship is a flexible program that allows the student to choose elective courses from any existing graduate program to leverage their previous education and work experience. This program provides access to a network of practicing mentors who may share their experiences and provide guidance to the student.

Program Goals

Techpreneurship graduates are able to:

- Start, own, and manage successful innovative and technology-intensive startup businesses;
- Embrace innovation to capitalize economic benefits and to serve as a positive factor in social change;
- Leverage modern technologies to gain a competitive advantage in the business world;
- Become leaders and effective members of the business community; and
- Develop communication skills and the ability to interact with others.

Techpreneurship Requirements

Master of Science in Techpreneurship program is a 36-semester hour program that consists of required core courses (15 semester hours), required project or thesis courses (6 semester hours), and electives from a wide range of management and technology courses (15 semester hours). The semester hour value of each course appears in parentheses ( ).

Complete the following Core courses - 15 semester hours:

- ENTP 500 - Entrepreneurship and Innovation (3 semester hours)
- ENTP 510 - Entrepreneurship: From Traction to Scale (3 semester hours)
- ENTP 520 - Economics of Innovation (3 semester hours)
- ENTP 530 - Financial Sustainability (3 semester hours)
- ENTP 540 - Current Technology Trends Seminar (3 semester hours)

Complete the following experiential courses - 6 semester hours:

- GRAD 695 - Research Methodology and Writing (3 semester hours)

- ENTP 699 - Applied Project in Techpreneurship (3 semester hours)
  or
- GRAD 699 - Graduate Thesis (3 semester hours)

Complete the following Concentration:

Individualized Concentration (15 semester hours)

The Master of Science in Techpreneurship student can choose courses totaling 15 semester hours from any Harrisburg University Master of Science program.

Recommended Sequence for the Two-Year Master of Science in Techpreneurship with 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.

First Year

Fall Semester

- ENTP 500 - Entrepreneurship and Innovation (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- ENTP 510 - Entrepreneurship: From Traction to Scale (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ENTP 520 - Economics of Innovation (3 semester hours)
- ENTP 540 - Current Technology Trends Seminar (3 semester hours)

Total Semester Hours: 6

Second Year

Fall Semester

- ENTP 530 - Financial Sustainability (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Spring Semester

- GRAD 695 - Research Methodology and Writing (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Summer Semester

- ENTP 699 - Applied Project in Techpreneurship (3 semester hours)
  or

- GRAD 699 - Graduate Thesis (3 semester hours)
- Elective (3 semester hours)

Total Semester Hours: 6

Doctorate Academic Programs

Ph.D. Computational Sciences

The Philosophy Doctorate Program in Computational Sciences at Harrisburg University is a pioneering interdisciplinary program designed to advance research in science, math, engineering, and technology. Our mission is to cultivate deep expertise in the design and implementation of contemporary computing systems and their contingency research domains, enabling students to tackle complex technological challenges both critically and creatively. Our curriculum is rigorously structured to develop robust independent research skills, preparing scholars to meet future technological challenges and excel in scientific investigation and innovation. This includes a diverse range of course work, internal and inter-program colloquia, and workshops led by distinguished lecturers.

Mission Statement

The Computational Sciences Ph.D. is committed to making fundamental and impactful contributions to computational sciences and engineering. This commitment is manifested in our support for innovative thinking and entrepreneurship, aiming for significant impacts at both global and local levels. Collaborations with other Harrisburg University graduate programs, external research institutions, and industry partners enrich our research opportunities and provide expert guidance across various specialties. Furthermore, our program is dedicated to maintaining the highest ethical standards and moral obligations in all research and professional practices. We prepare our students not only to enhance their quality of life but also to contribute effectively to society by applying advanced technology and engaging in collaborative problem-solving. Through these efforts, we strive to be at the forefront of shaping the future landscape of computational science and engineering, fostering a generation of leaders equipped to innovate and inspire.

Program Goals

The Ph.D. Computational Sciences Program will produce graduates who:

- Perform independent, competitive scientific research;
- Utilization of the scientific method;
- Realize computational solutions to real-world problems;
- Make contributions to the discipline through disseminated results;
- Adhere to the ethical and moral obligations in all professional activities; and,
- Promote quality of life through local and global computing systems.

*Work experience is a requirement for successful applied learning during the full course of your degree program. If you are an F1 student, eligible CPT authorizations are required. If you are unable to work, you must submit a Waiver of Required Work Experience to your program lead.

Computational Sciences Requirements

The following comprises the requirements for the Ph.D. in Computational Sciences. Requirements include a minimum of 36 semester hours and non-credit program requirements. When applicable, the semester hour value of each course appears in parentheses ( ). Additional information regarding Doctorate programs can be found in the Doctorate Guidebook.

Milestone 1

Complete 9 semester hours from the following doctoral Breadth courses:

- CISC 701 - Contemporary Computing Systems Architectures (3 semester hours)
- CISC 709 - Contemporary Computing Systems Programming (3 semester hours)

- CISC 719 - Contemporary Computing Systems Modeling (3 semester hours)

Complete 6 semester hours from the following doctoral Depth courses:

(A list of potential Computational Science Areas of Study is provided below)

- CISC 727 - Research Explorations in Computational Sciences I (3 semester hours)
- CISC 733 - Research Explorations in Computational Sciences II (3 semester hours)

Complete 3 semester hours of Research Symposium:

- CISC 777 - Research Symposium Paper (3 semester hours)

Collaborative Institutional Training Initiative (CITI) Training

CITI Training includes training modules on human subjects and ethical research. Harrisburg University requires that all research involving human subjects, including the use of secondary and primary data, be reviewed by the University's Institutional Review Board (IRB) to ensure protection of the rights of human subjects.

Qualifying Exam

The student will demonstrate fundamental knowledge by successfully completing a Qualification Examination (QE).

Milestone 2

Complete 6 semester hours of Doctoral Research Seminar:

(specific to the area of research)

- CISC 787 - Doctoral Research Seminar I (3 to 6 semester hours)
- CISC 797 - Doctoral Research Seminar II (3 to 6 semester hours)

Milestone 3

Research Proposal Defense

The student will be required to have a Doctoral Dissertation Committee established.

Institutional Review Board (IRB) Approval

The student will receive approval of research from Harrisburg University's Institutional Review Board (IRB).

Milestone 4

Complete 12 semester hours of Doctoral Dissertation:

- CISC 799 - Doctoral Dissertation (3 to 6 semester hours)

Milestone 5

Dissertation Defense

Potential Computational Science Areas of Study

Research and development topics may include, but are not limited to:

• Contemporary Computing Systems
  o HPC
  o Optical
  o Quantum

• Accelerated Computational Solutions
• Knowledge Engineering
• Next Great Scientific Theory
• Automated Theorem Proving
• Computer Vision & Image Processing
• Digital Signal Processing

Ph.D. Data Sciences

Doctorate education focuses on enabling the student to make original contributions to their respective fields of study. There are two phases of the doctoral program at HU: (1) a learning phase that includes coursework, seminars, research, and fieldwork that contributes to the student's knowledge in the program of study; and, (2) a research phase that focuses on student's original research culminating in his/her final examination. Upon a student's successful completion of all required course work, defense of the dissertation, and completion of all milestones, the student is awarded the doctoral degree in the program of study.

Mission Statement

The mission of the Harrisburg University Data Sciences Program is to create scientifically minded and technically proficient professionals with a comprehensive background in the methodological diversity of the data sciences and the intellectual depth to offer influential perspectives to analytical teams across disciplines.

Program Goals

The Data Sciences Program will produce Ph.D. graduates who:

- Assess the objectives, scope, and methodological limitations for domain-specific problems;
- Conduct appropriate and insightful research;
- Connect domain-specific applications to contributions to the data science field;
- Analyze ethical issues in research related to intellectual property, data security, integrity, and privacy; and,
- Communicate effectively to a variety of audiences.

*Work experience is a requirement for successful applied learning during the full course of your degree program. If you are an F1 student, eligible CPT authorizations are required. If you are unable to work, you must submit a Waiver of Required Work Experience to your program lead.

Data Sciences Requirements

The following comprises the requirements for the Ph.D. in Data Sciences. Requirements include a minimum of 36 semester hours and non-credit program requirements. Additional graduate course requirements for the student entering with a Bachelors degree will be provided on the Plan of Study. When applicable, the semester hour value of each course appears in parentheses ( ). Additional information regarding Doctorate programs can be found in the Doctorate Guidebook.

Milestone 1

Complete 18 semester hours from the following upper-level courses:

Timeline: 1st Year of Program

- ANLY 705 - Modeling for Data Science (3 semester hours)
- ANLY 710 - Advanced Research Design (3 semester hours)
- ANLY 715 - Applied Multivariate Data Analysis (3 semester hours)
- ANLY 722 - Doctoral Research Seminar (3 semester hours)
- Complete one of the following research topic seminars (3 semester hours):
    - ANLY 725 - Research Seminar in Generative AI

- ANLY 730 - Research Seminar in Forecasting
- ANLY 735 - Research Seminar in Predictive AI

- Complete 3 semester hours from the following courses:
  - ANLY 505 - Data Simulation, Bayesian Modeling, and Inference
  - ANLY 515 - Risk Modeling and Assessment
  - ANLY 520 - Natural Language Processing: Text Summarization and Classification
  - ANLY 535 - Principles and Applications of Deep Learning
  - ANLY 540 - Natural Language Processing: Semantic Representations
  - ANLY 550 - Structural Equation Modeling
  - ANLY 555 - Spatial Analytics
  - ANLY 565 - Time Series and Forecasting
  - any Doctorate-level (700/800) ISEM course

Collaborative Institutional Training Initiative (CITI) Training

Timeline: During ANLY 722 - Doctoral Research Seminar

CITI Training includes training modules on human subjects and ethical research. Harrisburg University requires that all research involving human subjects, including the use of secondary and primary data, be reviewed by the University's Institutional Review Board (IRB) to ensure protection of the rights of human subjects.

Milestone 2

Complete 6 semester hours from the following Doctoral Research Seminar:

Timeline: 4th semester

Prerequisite: Completion of Milestone 1

- ANLY 760 - Doctoral Research Seminar (6 semester hours)

Comprehensive Exam

Timeline: During ANLY 760 - Doctoral Research Seminar

The student will demonstrate fundamental knowledge by successfully completing a Comprehensive Exam.

Dissertation Chair and Committee

Timeline: During ANLY 760 - Doctoral Research Seminar

The student will establish a Doctoral Dissertation Chair and Committee.

Milestone 3

Research Proposal Defense

Timeline: At least one full semester prior to graduation

Prerequisite: Completion of Milestone 2

Institutional Review Board (IRB) Approval

Timeline: After proposal is approved

Prerequisite: Dissertation Proposal Defense

The student will receive approval of research from Harrisburg University's Institutional Review Board (IRB).

Milestone 4

Complete 12 semester hours of ANLY 799-Doctoral Studies:

Prerequisite: Completion of Milestone 3

- ANLY 799 - Doctoral Studies (6 semester hours)

Milestone 5

Dissertation Defense

Prerequisite: Completion of all prior Milestones

Recommended Sequence for the full-time Ph.D. Data Sciences Program

The sequence that appears below is based upon the availability of specific courses in each semester and the successful completion of course prerequisites. Doctoral students are recommended to work with program faculty to create an individual plan of study. This recommended sequence can be used as a reference and adjusted as needed.

First Year

Fall Semester Start

1st Semester (Fall)

- ANLY 715 - Applied Multivariate Data Analysis (3 semester hours)
- ANLY 725 - Research Seminar in Generative AI (3 semester hours)
  or
- Elective (3 semester hours)

Total Semester Hours: 6

2nd Semester (Spring)

- ANLY 705 - Modeling for Data Science (3 semester hours)
- ANLY 722 - Doctoral Research Seminar (3 semester hours)

Non-credit Milestone Requirement:

- *CITI Training*

Total Semester Hours: 6

3rd Semester (Summer)

- ANLY 710 - Advanced Research Design (3 semester hours)
- ANLY 735 - Research Seminar in Predictive AI (3 semester hours)
  or
- Elective (3 semester hours) *(if not previously completed)*

Total Semester Hours: 6

Spring Semester Start

1st Semester (Spring)

- ANLY 705 - Modeling for Data Science (3 semester hours)
- ANLY 722 - Doctoral Research Seminar (3 semester hours)

Non-credit Milestone Requirement:

- *CITI Training*

Total Semester Hours: 6

2nd Semester (Summer)

- ANLY 710 - Advanced Research Design (3 semester hours)
- ANLY 735 - Research Seminar in Predictive AI (3 semester hours)
  or
- Elective (3 semester hours)

Total Semester Hours: 6

3rd Semester (Fall)

- ANLY 715 - Applied Multivariate Data Analysis (3 semester hours)
- ANLY 725 - Research Seminar in Generative AI (3 semester hours)
  or
- Elective (3 semester hours) *(if not previously completed)*

Total Semester Hours: 6

Summer Semester Start

1st Semester (Summer)

- ANLY 710 - Advanced Research Design (3 semester hours)
- ANLY 735 - Research Seminar in Predictive AI (3 semester hours)
  or
- Elective (3 semester hours)

Total Semester Hours: 6

2nd Semester (Fall)

- ANLY 715 - Applied Multivariate Data Analysis (3 semester hours)
- ANLY 725 - Research Seminar in Generative AI (3 semester hours)
  or
- Elective (3 semester hours) *(if not previously completed)*

Total Semester Hours: 6

3rd Semester (Spring)

- ANLY 705 - Modeling for Data Science (3 semester hours)
- ANLY 722 - Doctoral Research Seminar (3 semester hours)

Non-credit Milestone Requirement:

- *CITI Training*

Total Semester Hours: 6

Second Year

1st Semester (Fall/Spring/Summer)

- ANLY 760 - Doctoral Research Seminar (6 semester hours)

Non-credit Milestone Requirements:

- *Comprehensive Exam*
- *Dissertation Chair and Committee*
- Proposal Defense
- IRB Approval

Total Semester Hours: 6

2nd Semester (Fall/Spring/Summer)

- ANLY 799 - Doctoral Studies (6 semester hours)

Total Semester Hours: 6

3rd Semester (Fall/Spring/Summer)

- ANLY 799 - Doctoral Studies (6 semester hours)

Non-credit Milestone Requirement:

- *Dissertation Defense*

Total Semester Hours: 6

Doctorate Program in Information Systems Engineering and Management

Doctorate education focuses on enabling students to make original contributions to their respective fields of study. There are two phases of the doctoral program at HU, an initial learning phase that can include coursework, seminars, research, and fieldwork that contributes to the student's knowledge in the program of study; and a second research phase that focuses on the student's original research culminating in their final dissertation defense or complex project. Upon completion of all program requirements the student will be awarded the doctoral degree in their program of study.

ISEM Doctoral Degree Options

Doctoral-level Studies in ISEM provides the following degree choices for students:

- Doctor of Philosophy (Ph.D.) - contributing new theories and concepts, or novel applications of existing theories, to a discipline or area of professional practice. This terminal degree that produces *researchers and academicians* who will add to the body of knowledge in ISEM.

- Doctor of Engineering (D.Eng.) - devising solutions for new complex private, public, national, or global ISEM-related problems. This terminal degree that produces *practitioners* who can lead, plan, implement, and manage the advanced technology-driven public and private organizations of today and tomorrow.

	Ph.D.	D.Eng.
Focus	Advancing knowledge	Practice and application
Usual career timing	Early-career	Mid-career
Employment goal	Academic career, research and technical leadership in industry or public sector	Technical leadership in industry or the public sector
Final product from program	Dissertation and publications	Complex project solution

Mission Statement

The mission of the Harrisburg University Information Systems Engineering and Management Doctorate Program is to create information systems thinkers and leaders with the ability to add to the body of knowledge and practice in today's and tomorrow's academic, public and private organizations.

Program Goals

The Information Systems Engineering and Management Doctorate program will produce graduates who:

- Create original knowledge, understanding, and/or solutions;
- Integrate current theories and concepts; and,
- Disseminate results to peers and the larger community.

**Work experience is a requirement for successful applied learning during the full course of your degree program. If you are an F1 student, eligible CPT authorizations are required. If you are unable to work, you must submit a Waiver of Required Work Experience to your program lead.*

Program Requirements

Ph.D. Information Systems Engineering and Management

Information Systems Engineering and Management, PhD Requirements

The following comprises the requirements for the Ph.D. in Information Systems Engineering and Management. Requirements include a minimum of 36 semester hours and non-credit program requirements. When applicable, the semester hour value of each course appears in parentheses ( ). Additional information regarding Doctorate programs can be found in the Doctorate Guidebook.

Milestone 1

Complete the Breadth Course Requirements

In addition, with permission of the Program Lead, the student may complete any Graduate or Doctorate level course to align with research/project topic.

Students entering with a Baccalaureate Degree

Complete the following courses - 33 semester hours:

- GRAD 509 - Research Methods (3 semester hours)
- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)
- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)
- Complete 6 semester hours from the following courses:
  ISEM 502, ISEM 534, ISEM 551, ISEM 570, or MGMT 511
- ISEM 700 - Smart Enterprises and Strategic Intelligence (3 semester hours)
- ISEM 706 - Research Methods in Information Systems Engineering and Management (3 semester hours)
- ISEM 730 - Intelligent Systems Engineering (3 semester hours)

Students entering with a Masters Degree

Complete 9 to 21 semester hours from the following courses:

The number of semester hours required is based on the student's individual Plan of Study specified by the Admissions Committee.

- GRAD 509 - Research Methods (3 semester hours)
- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)
- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)
- ISEM 700 - Smart Enterprises and Strategic Intelligence (3 semester hours)
- ISEM 706 - Research Methods in Information Systems Engineering and Management (3 semester hours)
- ISEM 730 - Intelligent Systems Engineering (3 semester hours)

Complete the Depth Course Requirements

Complete 9 semester hours from the following courses:

- ISEM 715 - Systems Science (3 semester hours)
- ISEM 725 - Advanced Business Process Modelling and Intelligence (3 semester hours)
- ISEM 735 - Advanced Applications of Machine Learning and Deep Learning (3 semester hours)
- ISEM 740 - Enterprise Engineering (3 semester hours)
- ISEM 745 - Research in Industry Analysis and Technology Patterns (3 semester hours)
- ISEM 750 - Simulation Modeling and Analysis (3 semester hours)
- ISEM 755 - Smart Cities, Societies, and Governments (3 semester hours)
- ISEM 760 - Advanced Topics in Operations Management (3 semester hours)
- ISEM 765 - Large Language Models - Theory and Practice (3 semester hours)
- ISEM 770 - Advanced Topics in ISEM (3 semester hours)
- MGMT 721 - Management Sciences I (3 semester hours)
- MGMT 722 - Management Sciences II (3 semester hours)
- MGMT 731 - Innovation and Entrepreneurship (3 semester hours)
- QISC 715 - Topics in Quantum Information Science (3 semester hours)

Collaborative Institutional Training Initiative (CITI) Training

CITI Training includes training modules on human subjects and ethical research. Harrisburg University requires that all research involving human subjects, including the use of secondary and primary data, be reviewed by the University's Institutional Review Board (IRB) to ensure protection of the rights of human subjects.

Qualifying Exam

The student will demonstrate fundamental knowledge by successfully completing a Qualification Examination (QE).

Milestone 2

Complete 6 semester hours of the Doctoral Research Seminar:

- ISEM 780 - Doctoral Research Seminar (3 to 6 semester hours)

  After consultation with the program lead and advisor, if needed, the student will enroll in ISEM 781 - Doctoral Research Seminar II as a continuation of the Research Seminar requirement.

Milestone 3

Research Proposal Defense

The student will be required to have a Doctoral Dissertation Committee established.

Institutional Review Board (IRB) Approval

The student will receive approval of research from Harrisburg University's Institutional Review Board (IRB).

Milestone 4

Complete Doctoral Studies:

- At least 12 semester hours of ISEM 799 - Doctoral Studies (6 semester hours)

Milestone 5

Dissertation Defense

D.Eng. Information Systems Engineering and Management

Information Systems Engineering and Management, D.Eng. Requirements

The following comprises the requirements for the D.Eng. in Information Systems Engineering and Management. Requirements include a minimum of 36 semester hours and non-credit program requirements. When applicable, the semester hour value of each course appears in parentheses ( ). Additional information regarding Doctorate programs can befound in the Doctorate Guidebook.

Milestone 1

Admission Criteria - Project Proposal

During the Admissions process, the student will provide a project proposal demonstrating the problem's depth, the solution's high impact, and the student's skills for successful completion.

Complete the Breadth Course Requirements

In addition, with permission of the Program Lead, the student may complete any Graduate or Doctorate level course to align with research/project topic.

Students entering with a Baccalaureate Degree

Complete the following courses - 33 semester hours:

- GRAD 509 - Research Methods (3 semester hours)
- ISEM 500 - Strategic Planning for Digital Transformation (3 semester hours)
- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)
- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)
- MGMT 510 - Business Strategy and Management Principles (3 semester hours)
- Complete 6 semester hours from the following courses:
  ISEM 502 - User-Centered Design,
  ISEM 534 - Database Design and Management,
  ISEM 551 - Web-based Software Engineering,
  ISEM 570 - Principles of ITIL for IT Quality, or
  MGMT 511 - Digital and Global Enterprises
- ISEM 700 - Smart Enterprises and Strategic Intelligence (3 semester hours)
- ISEM 706 - Research Methods in Information Systems Engineering and Management (3 semester hours)
- ISEM 730 - Intelligent Systems Engineering (3 semester hours)

Students entering with a Masters Degree

Complete 9 to 21 semester hours from the following courses:

The number of semester hours required is based on the student's individual Plan of Study specified by the Admissions Committee.

- GRAD 509 - Research Methods (3 semester hours)
- ISEM 503 - Artificial Intelligence Principles and Applications (3 semester hours)
- ISEM 530 - Systems Engineering Principles (3 semester hours)
- ISEM 540 - Enterprise Architecture and Integration (3 semester hours)
- ISEM 700 - Smart Enterprises and Strategic Intelligence (3 semester hours)
- ISEM 706 - Research Methods in Information Systems Engineering and Management (3 semester hours)
- ISEM 730 - Intelligent Systems Engineering (3 semester hours)

Complete the Depth Course Requirements

Complete 9 semester hours from the following courses:

- ISEM 715 - Systems Science (3 semester hours)
- ISEM 725 - Advanced Business Process Modelling and Intelligence (3 semester hours)
- ISEM 735 - Advanced Applications of Machine Learning and Deep Learning (3 semester hours)
- ISEM 740 - Enterprise Engineering (3 semester hours)
- ISEM 745 - Research in Industry Analysis and Technology Patterns (3 semester hours)
- ISEM 750 - Simulation Modeling and Analysis (3 semester hours)
- ISEM 755 - Smart Cities, Societies, and Governments (3 semester hours)
- ISEM 760 - Advanced Topics in Operations Management (3 semester hours)
- ISEM 765 - Large Language Models - Theory and Practice (3 semester hours)
- ISEM 770 - Advanced Topics in ISEM (3 semester hours)
- MGMT 721 - Management Sciences I (3 semester hours)
- MGMT 722 - Management Sciences II (3 semester hours)
- MGMT 731 - Innovation and Entrepreneurship (3 semester hours)
- QISC 715 - Topics in Quantum Information Science (3 semester hours)

Collaborative Institutional Training Initiative (CITI) Training

CITI Training includes training modules on human subjects and ethical research. Harrisburg University requires thatall research involving human subjects, including the use of secondary and primary data, be reviewed by theUniversity's Institutional Review Board (IRB) to ensure protection of the rights of human subjects.

Milestone 2

Complete 6 semester hours of the Doctoral Research Seminar:

- ISEM 785 - Doctoral Research Seminar (3 to 6 semester hours)

  After consultation with the program lead and advisor, if needed, the student will enroll in ISEM 781 - Doctoral Research Seminar II as a continuation of the Research Seminar requirement.

Milestone 3

Research Proposal Defense

The student will be required to have a Doctoral Dissertation Committee established.

Institutional Review Board (IRB) Approval

The student will receive approval of research from Harrisburg University's Institutional Review Board (IRB).

Milestone 4

Complete Doctoral Studies:

- At least 12 semester hours of ISEM 798 - Doctoral Studies (6 semester hours)

Milestone 5

Dissertation Defense

DPT Doctor of Physical Therapy

The Harrisburg University Doctor of Physical Therapy program meets the needs of a diverse student population. The program offers innovative educational opportunities that respond to societal needs. The program fosters diverse graduates who are competent, autonomous, and contemporary-movement specialists with a foundation in evidence-informed practice and clinical reasoning. The program prepares critical thinking and reflective practitioners who provide culturally responsive patient-centric care.

*Notice of Accreditation Status:

Graduation from a physical therapist education program accredited by the Commission on Accreditation in Physical Therapy Education, 3030 Potomac Ave., Suite 100, Alexandria, Virginia 22305-3085; phone; 703-706-3245; accreditation@apta.org is necessary for eligibility to sit for the licensure examination, which is required in all states. Candidacy is considered to be an accredited status, as such the credits and degree earned from a program with Candidacy status are considered, by CAPTE, to be from an accredited program. Therefore, students in the charter (first) class should be eligible to take the licensure exam even if CAPTE withholds accreditation at the end of the candidacy period. That said, it is up to each state licensing agency, not CAPTE, to determine who is eligible for licensure. Information on licensing requirements should be directed to the Federation of State Boards of Physical Therapy (FSBPT; www.fsbpt.org) or specific state boards (a list of state boards and contact information is available on FSBPT's website.

Harrisburg University is seeking accreditation of a new physical therapist education program from CAPTE. The program is planning to submit an Application for Candidacy, which is the formal application required in the pre-accreditation stage, on November 1, 2024. Submission of this document does not assure that the program will be granted Candidate for Accreditation status. Achievement of Candidate for Accreditation status is required prior to implementation of the professional phase of the program; therefore, no students may be enrolled in professional courses until Candidate for Accreditation status has been achieved. Further, though achievement of Candidate for Accreditation status signifies satisfactory progress toward accreditation, it does not assure that the program will be granted accreditation.

Program Goals

- Demonstrate the entry-level competencies to effectively implement the patient/client management model, through evidence-informed practice across the lifespan of a diverse human population;
- Apply critical thinking, reflection, ethical decision making, and communication strategies into culturally responsive professional practice, which promotes a collaborative healthcare environment that optimizes outcomes across the lifespan of a diverse human population;
- Integrate the core values of the physical therapy profession into actions that promote socially responsive, just, and equitable healthcare across the lifespan of a diverse human population; and
- Graduates will develop the lifelong learning strategies, entrepreneurial skills, and evidence-informed practices required of an autonomous doctoring professional.

Doctor of Physical Therapy Requirements

The following courses comprise the 99 semester hours required for the Doctor of Physical Therapy, DPT, program. The semester hour value of each course appears in parentheses ( ). Additional details about doctorate programs can be found in the Doctorate Guidebook.

Upper Level Course Work (Lecture) - 31 semester hours

- DPTH 600 - Culturally Responsive Professionalism in Physical Therapy I (2 semester hours)
- DPTH 602 - Clinical Medicine in Physical Therapy Practice I (4 semester hours)

- DPTH 606 - Evidence Informed Physical Therapy Practice I (2 semester hours)
- DPTH 612 - Clinical Medicine in Physical Therapy Practice II (4 semester hours)
- DPTH 624 - Foundational Cardiovascular and Pulmonary Practice (4 semester hours)
- DPTH 628 - Integrated Clinical Experience I (1 semester hour)
- DPTH 700 - Culturally Responsive Professionalism in Physical Therapy II (1 semester hour)
- DPTH 716 - Evidence Informed Physical Therapy Practice II (2 semester hours)
- DPTH 718 - Integrated Clinical Experience II (1 semester hour)
- DPTH 720 - Culturally Responsive Professionalism in Physical Therapy III (2 semester hours)
- DPTH 722 - Clinical Medicine in Physical Therapy Practice III (2 semester hours)
- DPTH 800 - Leadership and Health Informatics in Physical Therapy Practice (3 semester hours)
- DPTH 802 - Physical Therapy in Primary Care and Prevention (2 semester hours)
- DPTH 806 - Service Learning in Physical Therapy (1 semester hour)

Upper Level Course Work (Lab) - 50 semester hours

- DPTH 604 - Movement Science I (4 semester hours)
- DPTH 610 - Physical Therapy Exam and Rehabilitation Principles (4 semester hours)
- DPTH 614 - Movement Science II (4 semester hours)
- DPTH 622 - Neuroscience Fundamentals in Physical Therapy (3 semester hours)
- DPTH 626 - Musculoskeletal Physical Therapy I (4 semester hours)
- DPTH 702 - Neuromuscular Rehabilitation (4 semester hours)
- DPTH 704 - Clinical Integration of Physical Therapy Principles I (3 semester hours)
- DPTH 706 - Musculoskeletal Physical Therapy II (4 semester hours)
- DPTH 710 - Physical Therapy within the Inpatient Continuum of Care (3 semester hours)
- DPTH 712 - Orthotics, Prosthetics, and Assistive Technology in Healthcare (2 semester hours)
- DPTH 714 - Clinical Integration of Physical Therapy Principles II (3 semester hours)
- DPTH 724 - Clinical Integration of Physical Therapy Principles III (3 semester hours)
- DPTH 726 - Pediatric Physical Therapy Practice (3 semester hours)
- DPTH 728 - Physical Therapy for the Aging Adult (2 semester hours)
- DPTH 804 - Clinical Integration of Physical Therapy Principles IV (2 semester hours)
- DPTH 808 - Advanced Practice Elective (2 semester hours)

Clinical Education - 18 semester hours

- DPTH 810 - National Physical Therapy Exam Review (1 semester hours)
- DPTH 816 - Clinical Experience in Physical Therapy I (4 semester hours)
- DPTH 818 - Clinical Experience in Physical Therapy II (4 semester hours)
- DPTH 820 - Physical Therapy Capstone (1 semester hour)
- DPTH 826 - Clinical Experience in Physical Therapy III (4 semester hours)
- DPTH 828 - Clinical Experience in Physical Therapy IV (4 semester hours)

Doctor of Physical Therapy Program Sequence

First Year

Fall Semester

- DPTH 600 - Culturally Responsive Professionalism in Physical Therapy I (2 semester hours)
- DPTH 602 - Clinical Medicine in Physical Therapy Practice I (4 semester hours)
- DPTH 604 - Movement Science I (4 semester hours)
- DPTH 606 - Evidence Informed Physical Therapy Practice I (2 semester hours)

Total Semester Hours: 12

Spring Semester

- DPTH 610 - Physical Therapy Exam and Rehabilitation Principles (4 semester hours)
- DPTH 612 - Clinical Medicine in Physical Therapy Practice II (4 semester hours)
- DPTH 614 - Movement Science II (4 semester hours)

Total Semester Hours: 12

Summer Semester

- DPTH 622 - Neuroscience Fundamentals in Physical Therapy (3 semester hours)
- DPTH 624 - Foundational Cardiovascular and Pulmonary Practice (4 semester hours)
- DPTH 626 - Musculoskeletal Physical Therapy I (4 semester hours)
- DPTH 628 - Integrated Clinical Experience I (1 semester hour)

Total Semester Hours: 12

Second Year

Fall Semester

- DPTH 700 - Culturally Responsive Professionalism in Physical Therapy II (1 semester hour)
- DPTH 702 - Neuromuscular Rehabilitation (4 semester hours)
- DPTH 704 - Clinical Integration of Physical Therapy Principles I (3 semester hours)
- DPTH 706 - Musculoskeletal Physical Therapy II (4 semester hours)

Total Semester Hours: 12

Spring Semester

- DPTH 710 - Physical Therapy within the Inpatient Continuum of Care (3 semester hours)
- DPTH 712 - Orthotics, Prosthetics, and Assistive Technology in Healthcare (2 semester hours)
- DPTH 714 - Clinical Integration of Physical Therapy Principles II (3 semester hours)
- DPTH 716 - Evidence Informed Physical Therapy Practice II (2 semester hours)
- DPTH 718 - Integrated Clinical Experience II (1 semester hour)

Total Semester Hours: 11

Summer Semester

- DPTH 720 - Culturally Responsive Professionalism in Physical Therapy III (2 semester hours)
- DPTH 722 - Clinical Medicine in Physical Therapy Practice III (2 semester hours)
- DPTH 724 - Clinical Integration of Physical Therapy Principles III (3 semester hours)
- DPTH 726 - Pediatric Physical Therapy Practice (3 semester hours)
- DPTH 728 - Physical Therapy for the Aging Adult (2 semester hours)

Total Semester Hours: 12

Third Year

Fall Semester

- DPTH 800 - Leadership and Health Informatics in Physical Therapy Practice (3 semester hours)
- DPTH 802 - Physical Therapy in Primary Care and Prevention (2 semester hours)
- DPTH 804 - Clinical Integration of Physical Therapy Principles IV (2 semester hours)
- DPTH 806 - Service Learning in Physical Therapy (1 semester hour)
- DPTH 808 - Advanced Practice Elective (2 semester hours)

Total Semester Hours: 10

Spring Semester

- DPTH 810 - National Physical Therapy Exam Review (1 semester hours)
- DPTH 816 - Clinical Experience in Physical Therapy I (4 semester hours)
- DPTH 818 - Clinical Experience in Physical Therapy II (4 semester hours)

Total Semester Hours: 9

Summer Semester

- DPTH 820 - Physical Therapy Capstone (1 semester hour)
- DPTH 826 - Clinical Experience in Physical Therapy III (4 semester hours)
- DPTH 828 - Clinical Experience in Physical Therapy IV (4 semester hours)

Total Semester Hours: 9

Course Descriptions

ANLY 500 - Analytics I: Principles and Applications

(3 semester hours)
Prerequisites: None
Description: The first course in analytics covers the core concepts and applications of analytics. The student is introduced to the main concepts and tools of analytics including descriptive, predictive, and prescriptive analytics. During the course, the student uses a variety of statistical and quantitative methods, computational tools, and predictive models to make data-driven decisions. By the end of the course, the student will apply the concepts to real work projects where, by asking some questions about an issue or situation, use analytical tools to respond to it, and present it to technical and layperson audiences.

ANLY 502 - Mathematical Foundations for Data Analysis

(3 semester hours)
Prerequisites: None
Description: This course reviews the fundamental mathematics required to be successful in the analytics program. It is designed to strengthen the mathematical abilities while addressing the requirements for coding/scripting. It presents the mathematical topics as coding/scripting problems. This is intended to further strengthen the ability to develop the subroutines/codes/scripts that are also necessary in an analytics career.

ANLY 505 - Data Simulation, Bayesian Modeling, and Inference

(3 semester hours)
Prerequisites: ANLY 500
Description: This course covers the basic principles of statistical modeling and inference. The course focuses on developing and fitting several types of regression models, multilevel models, and everything in between. Topics included in the class cover, prior predictive simulation, sampling from the posterior, interaction terms, covariance, information criteria, and Markov Chain Monte Carlo estimation. The course also covers measurement error, missing data, and Gaussian process models for spatial and network autocorrelation. This course outlines step-by-step calculations that would normally be automated in the modeling process. This approach ensures that the student understands the details of statistical modeling in order to make reasonable choices and interpretations of their own modeling work. The class utilizes interdisciplinary source material, Program R, and easy to understand metaphors to develop and interpret statistical models. The course's emphasis is on how Bayesian data analysis can be used for causal inference and predicting new data.

ANLY 506 - Exploratory Data Analysis

(3 semester hours)
Prerequisites: ANLY 500
Description: Exploratory data analysis plays a crucial role in the initial stages of analytics. It comprises the pre-processing, cleaning, and preliminary examination of data. This course provides instruction in all aspects of exploratory data analysis. It reviews a wide variety of tools and techniques for pre-processing and cleaning data, including big data. It provides the student with practice in evaluating and plotting/graphing data to evaluate the content and integrity of a data set.

ANLY 510 - Analytics II: Principles and Applications

(3 semester hours)
Prerequisites: ANLY 500 or Consumer Behavior and Decision Sciences Major and Permission of Program Lead
Description: This course takes an applied perspective and provides the statistical tools and analytic thinking techniques

needed to: formulate a clear hypothesis, determine the most efficient method to obtain required data, determine and apply the proper statistical techniques to the resulting data, and effectively convey the results to both experts and laypersons. The course begins with a review of the descriptive analytics concepts (i.e., sampling, and statistical inferences) introduced in ANLY 500 as well as general conventions regarding experimentation and research. It then progresses to predictive and prescriptive analytics techniques such as regression and forecasting that can be used to predict future events. Later sessions focus on issues related to lack of experimental control (e.g., quasi-experimental design and analysis). The course culminates with a research project in which the student applies the concepts learned to their own research interests.

ANLY 512 - Data Visualization

(3 semester hours)
Prerequisites: ANLY 500 or ANLY 518 or HCIN 500 or ISEM 542
Description: The visualization and communication of data is a core competency of analytics. This course takes advantage of the rapidly evolving tools and methods used to visualize and communicate data. Key design principles are used to reinforce skills in visual and graphical representation.

ANLY 515 - Risk Modeling and Assessment

(3 semester hours)
Prerequisites: ANLY 500
Description: This course focuses on risk management models and tools and the measurement of risk using statistical and stochastic methods, hedging, and diversification. Examples of this are insurance risk, financial risk, and operational risk. Topics covered include estimating rare events, extreme value analysis, time series estimation of external events, axioms of risk measures, hedging using financial options, credit risk modeling, and various insurance risk models.

ANLY 518 - Statistical Methods for Behavioral Researchers

(3 semester hours)
Prerequisites: None
Description: A behavioral researcher is only as good as their statistical skill and increasingly their "coding" ability. This is an accelerated course designed to provide the student with the skills needed to manipulate, analyze, and distill insights from data. Course material is presented via lectures, texts (textbook and supplementary readings), student training presentations, and several projects involving hands on data analysis.

ANLY 520 - Natural Language Processing: Text Summarization and Classification

(3 semester hours)
Prerequisites: ANLY 500
Description: Web technologies based on text and Natural Language Processing (NLP) are becoming the backbone of analytic solutions for understanding language as text language processing has come to play a central role in the multilingual information society. This course provides a highly accessible introduction to the field of text analytics focusing on processing text, information extraction with named entity recognition, text summarization and generation, text classification, chatbots, and deep learning toolkits. The course is a practical guide on how to create end to end systems for production in business, research, and other applied fields using *R* and Python programming languages.

ANLY 525 - Quantitative Decision-Making

(3 semester hours)
Prerequisites: ANLY 510
Description: Decision-making in business today requires the use of all resources, particularly information. Analytics supports decision-making quantitatively by applying information received from multiple sources. This course provides

the foundation for quantitative decision-making using a rational, coherent approach and includes decision-making principles and how they are applied to business challenges today.

ANLY 530 - Principles and Applications of Machine Learning

(3 semester hours)
Prerequisites: ANLY 510
Description: This course introduces the student to machine learning. It provides the student with the cognitive, mathematical and analytical foundation required for machine learning. It also provides the student with a broad overview of machine learning, including topics from data mining, pattern recognition and supervised and unsupervised learning. This course prepares the student for the complex, higher-level topics in Machine Learning II.

ANLY 535 - Principles and Applications of Deep Learning

(3 semester hours)
Prerequisites: ANLY 530
Description: Machine Learning II considers complex, high-level topics in machine learning. It builds on the foundation provided by Machine Learning I to develop algorithms for supervised and unsupervised machine learning, to study and develop artificial neural networks, to study, develop and evaluate systems for pattern recognition and to consider trade-offs in models, for example, balancing complexity (e.g. volume, variety and velocity of big data) and performance.

ANLY 540 - Natural Language Processing: Semantic Representations

(3 semester hours)
Prerequisites: ANLY 500
Description: This course is an introduction to computational language models with a focus on semantic representations. Using methods such as topic models and sentiment analysis, the goal of the course is to show how insights can be derived from text focusing on semantic information. Topics range from basic visualizations of text data to text-based recommendation systems. The topics in this course have real-world applications to gaining insight into human attitudes and behaviors across domains.

ANLY 545 - Categorical Data Analysis

(3 semester hours)
Prerequisites: ANLY 506
Description: The goal of this class is to elevate categorical data to be a first-class citizen. To this end, a practical application of categorization will be developed through the semester. This course provides the student with exposure to different ranking functions and predictions. These distributions lay the foundation for the generalized linear modes. Analysis of categorical data in the form of contingency tables are studied. Measures computed from these contingency tables such as ranks, odds, odds ratio, Chi-square. Techniques for visually displaying data in contingency tables will be examined.

ANLY 550 - Structural Equation Modeling

(3 semester hours)
Prerequisites: ANLY 500
Description: This course will cover an in-depth exploration of structural equation modeling (SEM). The student will learn the fundamental concepts of SEM and how to model different types of research questions, as well as interpretation of the implications of your model results. Path analysis, confirmatory factor analysis, and multi-group models will be several types of techniques covered. By the end of this course, the student will be able to analyze complex relationships between measured and latent variables.

ANLY 555 - Spatial Analytics

(3 semester hours)
Prerequisites: ANLY 500
Description: This course introduces spatially referenced data, how to analyze it, and the potential of geographical-based data analysis, using practical skills. Topics include descriptive data analysis, mapping methods, quantitative analysis, qualitative analysis, and introduction to geostatistics and spatial modeling. On the practical side, the student will be introduced to different software: R and GeoDa or ArcGIS for menu-driven application.

ANLY 560 - Advanced Programming for Data Analytics

(3 semester hours)
Prerequisites: None
Description: This course provides the student with the required knowledge and skills to handle and analyze data using a variety of programming languages as well as a variety of programming tools and methods. Depending on current industry standards, the student will be provided with the opportunity to develop knowledge and skills in programming environments such as R, Octave, and Python. In addition, the student is introduced to current industry standard data analysis packages and tools such as those in Matlab, SAS or SPSS.

ANLY 565 - Time Series and Forecasting

(3 semester hours)
Prerequisites: None
Description: This course covers key analytical techniques used in the analysis and forecasting of time series data. Specific topics include the role of forecasting in organizations, exponential smoothing methods, stationary and non-stationary time series, autocorrelation and partial autocorrelation functions, univariate autoregressive integrated moving average (ARIMA) models, seasonal models, Box-Jenkins methodology, regression models with ARIMA errors, transfer function modeling, intervention analysis, and multivariate time series analysis techniques such as Vector Autoregression (VAR), Cointegration and Vector Error Correction Model (VECM).

ANLY 570 - Principles of Spatial Analysis

(3 semester hours)
Prerequisites: None
Description: This course introduces desktop Geographic Information Systems (GIS) through four distinct Units. 1) Spatial data concepts such as spatial data models and management, topology, spatial reference systems and cartographic principles. 2) Standard Spatial Operation tools found in off-the-shelf GIS software such as proximity and overlay analysis. 3) Advanced Spatial Analysis and Statistics to look deeper into geographic patterns, distribution measurement and clustering. 4) Individualized application of spatial analysis tools relevant to the student's industry focus.
On the practical side, the student will be introduced to two instances of GIS desktop software: ArcMap, and ArcGIS Pro. Both packages provide a menu driven introduction to common tools used in Spatial Analytics.

ANLY 575 - Applied Research Methodology

(3 semester hours)
Prerequisites: None
Description: Attaining quality data on attitudes, behaviors, preferences, and opinions can necessitate the development of experiments, surveys, interviews, focus groups, and other observational methodologies. This course will cover how data analysts in marketing, consumer behavior, healthcare, and other domains can create and implement these research designs to gather primary data for analysis and modeling.

ANLY 580 - Special Topics in Analytics

(3 semester hours)
Prerequisites: None
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 analytics. Due to the nature of evolving topics, this course may not be eligible for repeat.

ANLY 585 - Research in Analytics

(3 semester hours)
Prerequisites: None
Description: This program cultivates and supports research partnerships between the student, faculty and other researchers. It provides the student with the opportunity to work on cutting-edge research. Research projects can be at any appropriate and approved level; introductory, participatory or expert. Each project requires an approved proposal, periodic status reports and a final written report with a presentation prepared by the student in collaboration with the research supervisor.

ANLY 590 - Digital Marketing and Analytics

(3 semester hours)
Prerequisites: ANLY 500 and ANLY 510
Description: Digital marketing has revolutionized how organizations connect with their target audiences. Coupled with the power of analytics, businesses now possess tools to measure, refine, and optimize their marketing strategies. This course bridges the gap between theoretical marketing principles and data-driven decision-making. The student will explore key digital marketing channels, the latest trends, and the analytics methods essential for crafting impactful campaigns in today's fast-evolving digital landscape.

ANLY 600 - Optimized Analytics

(3 semester hours)
Prerequisites: ANLY 510
Description: This course introduces the fundamental tool in prescriptive analytics. Optimization is the process of selecting values of decision variables that minimize or maximize some quantity of interest. Optimization models have been used extensively in operations and supply chains, finance, marketing, and other disciplines to help managers allocate resources more effectively and make lower cost or more profitable decisions.

ANLY 610 - Analytical Methods III

(3 semester hours)
Prerequisites: ANLY 560 or ANLY 545
Description: This course provides the student with exposure to the theoretical background for advanced analytical topics and methods. Topics include unstructured data/information and big data. For example, the theoretical background required for the integration of data mining and text analytics or text mining are explored. Additional topics could include the implementation and use of data lakes and ontology evaluation.

ANLY 620 - Ethics for Data Analytics

(3 semester hours)
Prerequisites: None
Description: This course will cover ethical concepts in data analytics and explore ongoing ethical dilemmas in the field. Specifically, this course will cover the legal, moral, and social implications of the analytic process from data collection

to data analysis to data storage to communication and decision-making from insights. The objective of the course is to prepare the student to address the ethical challenges in the evolving field of data science.

ANLY 699 - Applied Project in Analytics

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of analytics. A faculty member will supervise this study.

ANLY 705 - Modeling for Data Science

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course provides a more in-depth presentation of the theory behind linear statistical models, segmentation models, and production level modeling. Further emphasis is placed on practical application of these methods when applied to massive data sources and appropriate and accurate reporting of results.

ANLY 710 - Advanced Research Design

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course will introduce the student to advanced research designs relevant to research in data science. The course will show the student how to determine the data required to answer different types of research questions and implement data collection plans. The course will explore experimental and quasi-experimental designs as well as data mining and dataset creation.

ANLY 715 - Applied Multivariate Data Analysis

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course provides hands-on experience in understanding when and how to utilize the primary multivariate methods Data Reduction techniques, including Principal Components Analysis and Exploratory and Confirmatory Factor Analyses, ANOVA/MANOVA/MANCOVA, Cluster Analysis, Survival Analysis and Decision Trees.

ANLY 722 - Doctoral Research Seminar

First Year PhD Data Science Students
(3 semester hours)
Prerequisites: None
Description: This seminar is designed to prepare the student for their comprehensive exams and dissertation work. This seminar will introduce the student to program expectations and milestones. Through the seminar, the student will explore potential dissertation research topics and gain an understanding of the current data science landscape.

ANLY 725 - Research Seminar in Generative AI

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course follows a research seminar format. The student and faculty develop research proposals, analyses, and reporting in the domain of Generative AI. Topics of special interest in Generative AI are presented by

faculty and the student under faculty direction. Topics of special interest vary from semester to semester. Repeatable for additional content reasons.

ANLY 730 - Research Seminar in Forecasting

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course follows a research seminar format. The student and faculty develop research proposals, analyses, and reporting in the domain of Forecasting. Topics of special interest in Forecasting Data analysis are presented by faculty and the student under faculty direction. Topics of special interest vary from semester to semester. Repeatable for additional content reasons. Cross-listed with ANLY 762 .

ANLY 735 - Research Seminar in Predictive AI

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: This course follows a research seminar format. The student and faculty develop research proposals, analyses, and reporting in the domain of Machine Learning and Predictive AI Modeling. In addition, topics of special interest in Machine Learning and Predictive AI are presented by faculty and the student under faculty direction. Topics of special interest vary from semester to semester. Repeatable for additional content reasons.

ANLY 755 - Advanced Topics in Big Data

(3 semester hours)
Prerequisites: Admission to the Data Sciences Doctoral Program
Description: Topics include the design of advanced algorithms that are scalable to Big Data, high performance computing technologies, supercomputing, grid computing, cloud computing, and Parallel and Distributed Computing, and issues in data warehousing.

ANLY 760 - Doctoral Research Seminar

(6 semester hours)
Prerequisites: Completion of doctoral coursework requirements; pass qualification examination
Description: This seminar provides support to the doctoral student within their specific domains of research. Led by the faculty advisor for that domain, the course is designed to provide a forum where faculty and the student can come together to discuss, support, and share the experiences of working in research.

ANLY 799 - Doctoral Studies

(6 semester hours)
Prerequisites: Completion of doctoral coursework requirements; pass qualification examination
Description: Advancement to candidacy is a prerequisite of this course. This is an individual study course for the doctoral student. Content to be determined by the student and the student's Doctoral Committee. May be repeated for credit.

BTEC 502 - Biomaterials

(3 semester hours)
Prerequisites: None
Description: There is a constant need for new biomaterials in life sciences to support novel technologies. This course is designed to introduce the student to the various classes of biomaterials currently in use and their application in selected subspecialties of medicine/industrial processes. The student will learn about the concepts behind developing materials

for use in medical or industrial biotechnology field. The student will gain an understanding of material properties, various biological responses to materials, and the clinical context of their use. Aspects of manufacturing processes, cost, sterilization, packaging, and regulatory issues will be addressed.

BTEC 508 - Omics for Life Sciences

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Studies on cataloging and characterization of genome and proteome are on the forefront of research. Recently, there has been a considerable amount of work happening with genome and proteome data for selective manipulation of metabolic pathways, the metabolomics. The three fields are aggressively used in several areas for innovation in diagnostics, biomanufacturing, biomarker studies, and drug discovery to name a few. This course covers the basics of these three "omics" fields from the standpoint of using the information for developing new biotechnologies, especially in personalized medicine. The significance of next generation sequencing will be covered.

BTEC 522 - Graduate Biotechnology Seminar

(3 semester hours)
Prerequisites: None
Description: This course introduces the student to fundamental topics in innovation, regulatory practices and ethics for various biotechnology industries and communities. The intention is to allow the student to learn about these diverse but inter-related areas that coalesce science and business disciplines. With the help of industry experts, case studies, and current literature, the student explores the interrelationship of these areas for creating productive collaborations within biotechnology industry with respect to compliance, innovation, and ethical decision-making.

BTEC 540 - Biostatistics

(3 semester hours)
Prerequisites: Undergraduate level Math or by permission of the instructor
Description: This course introduces statistical concepts and analytical methods as applied to data encountered in biotechnology and biomedical sciences. It emphasizes the basic concepts of experimental design, quantitative analysis of data, and statistical inferences. Topics include probability theory and distributions, population parameters and their sample estimates, descriptive statistics for central tendency and dispersion, hypothesis testing and confidence intervals for means, variances, and proportions, the chi-square statistic, categorical data analysis, linear correlation and regression model, and analysis of variance. The course provides the student a foundation to evaluate information critically to support research objectives and product claims and to gain better understanding of statistical design of experimental trials for biological products/devices.

BTEC 550 - Instrumentation in Biotechnology Industry

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Instrumentation and application of various equipment is central to research and commercial production in the biotechnology industry. This course will familiarize the student with which instruments are used for which biotechnology applications and their principles of operation and limitations. Different biomolecules require different and customized protocols for isolation, purification, and characterization. The course offers an overview of instruments such sonicator, ultracentrifuges, spectrophotometers, etc. The course also covers the significance of instrument validation and calibration.

BTEC 560 - Design of Experiment

(3 semester hours)
Prerequisites: BTEC 540, enrolled in the Biomanufacturing graduate certificate program, or by permission of instructor
Description: This course allows the student to design an experiment and learn methodology for data analysis. Components such as major characteristics of a scientific experiment, running statistical analyses to perform various tests to check validity of the data would be covered. In a case-based manner, the student works on design of an experimental protocol for an assigned conceptual research project. Trouble-shooting strategies and analyzing data sets would be covered.

BTEC 610 - Advanced Topics in Drug Discovery and Delivery

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: This course introduces the student to the planning and preparatory phase skills required to develop potential new drugs and biologics efficiently. The student gains a thorough appreciation of FDA regulations and guidelines. It is known that in the drug discovery sector, it is important to plan before the proceeding to the development phase. With emphasis on the process, the course focuses on the final analysis and report before developing the protocols. Other important aspects of drug development covered in the course are preclinical investigations; new drug application (NDA) or biologic license application (BLA) format and content; clinical development plans; product and assay development; the Investigational New Drug (IND) process; and trial design, implementation, and management. Lastly, the course provides an overview of trending concepts such as controlled and targeted drug delivery.

BTEC 612 - Regulatory Affairs in Life Science Industries

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Regulatory affairs (RA) are rules and regulations that oversee and govern product development and post-approval marketing in the life sciences. For US companies, Food and Drug Administration (FDA) establishes and oversees the applicable regulations under several statutes, partnerships with legislators, patients, and customers. The commercializable products for the Biotechnology sector can be food, drugs, biologics, or medical devices. Each type is regulated by a different center within the FDA. This course provides an overview of RA, and its effect on product development. The course covers RA history, various regulatory agencies, methods to access regulatory information, procedures for drug submissions, biologics submissions, and medical device submissions. It also addresses Good Laboratory Practices (GLP), Good Manufacturing Practices (GMP), and FDA inspections. The course includes guest lectures, actual case studies and real world scenarios. As a course project, the student creates a conceptual submission document for a hypothetical drug/biologic/medical device approval.

BTEC 615 - Biomedical Devices and Prototyping

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or any other relevant field or by permission of instructor
Description: This course familiarizes the student with basic principles of biosensors design and applications. Biomedical devices such as Biosensors are one of the most innovative, complex, and fastest growing area of biotechnology today; the interface between biotechnology, nanotechnology and micro-electronics industries. The course covers a variety of biosensors based on whole cells, nucleic acids, proteins, antibodies and enzymes as well as new and emerging technologies related to designing, fabricating, and applying multi-array biochips and micro-fluidic systems (lab-on-the-chip). Practical applications of this technology in health care, environment, medical diagnostics, defense and other areas are explored.

BTEC 618 - Principles of Bioprocessing

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or any other relevant field or by permission of instructor
Description: Bioprocessing deals with the isolation, purification, and characterization of industrial bio-products. This course prepares the student with skills needed in bioprocessing procedures used in industry. Fundamental scientific principles underlying the recovery, purification and formulation of biomolecules, especially proteins, or other industrial bio-products are covered. Identification or delineation of key chemical and physical properties of biomolecules that impact downstream processing and formulation development are emphasized. Introduction to analytical and small-scale purification procedures exposes the student to key scientific principles and small-scale unit operations.

BTEC 620 - Emerging Trends in Diagnostics

(3 semester hours)
Prerequisites: None
Description: This course provides an overview of the fundamental principles of molecular diagnostics and explores the use of molecular techniques in the diagnosis of disease/infection/contaminants. Diagnostics has impacted several fields such as human health, environment, and food and agriculture. Development of novel diagnostics technologies have depended on discovery of biomarkers for multiple applications in fields such as drug discovery, drug delivery, and diagnostics in general. Topics covered in this course include: biomarkers, protein and nucleic acid structure-function, identification and amplification techniques used in infectious disease diagnosis, components of a molecular diagnostics, companion diagnostics, and evaluation of controls to validate results obtained. This course allows innovative use of current literature and technology with an entrepreneurship element. The student has an opportunity to use course material and available technology to design a conceptual assay/device for a chosen target and integrate it into a conceptual course project assignment.

BTEC 622 - Principles of Accounting and Finance

(3 semester hours)
Prerequisites: None
Description: This course is offered to expose the student to a basic introduction to principles of accounting and finance for the life science industry. Accounting and finance take different shades when one compares revenues for giants like Target with that for a pharma company. The student studies life science companies and their accounting procedures. Impact of significant adjustments and estimates on revenue counting, health insurance, managed care, and governmental contracts is covered. Also covered are accounting practices related to multi-round private financing and IPO timing for start-ups. The student is taught the basics of money management, the language and vocabulary of finance, how to communicate scientific concepts to potential investors, and how to generate fiscal plans/milestones. Course activities enable the student to create and analyze financial documents such as a term sheet, a contract and a balance sheet. The student is also presented the concepts of financial risk and the time value of money. This course will use real company scenarios and case studies from life sciences companies.

BTEC 625 - Pharmacogenomics

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: The genetic basis of variability in drug response can contribute to drug efficacy and toxicity, adverse drug reactions and drug-drug interactions. Healthcare professionals need an understanding of the genetic component of patient variability to deliver effective individualized pharmaceutical care. This course offers an introduction to the evolution of pharmacogenetics/pharmacogenomics, the human genome and modern applications of DNA information related to diagnostics, drugs and therapeutics. Emphasis is placed on concepts and methodologies for using an individual's genetic make-up to determine that individual's predisposition towards diseases and ability to respond to drugs. Understanding of the basics of pharmacogenomics enables the student to better understand and manage the new genomics based tools and make best treatment choices.

BTEC 630 - Cancer Biotechnology

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Cancer has a huge impact on our society and is one of the major factors driving biomedical research related to various areas such as imaging, diagnosis, and therapy. This course provides a comprehensive overview of the molecular biology and genetic basis of cancer. Biotechnological research on the molecular mechanisms of cancer has resulted in more effective treatments, sensitive diagnostic procedures and strategies for prevention. The course covers topics such as mutations leading to deregulation of programmed cell death, their impact on cell proliferation, and cell differentiation. Cancer and medical intervention is also reviewed. It allows the student to study traditional treatment methods and new treatment protocols for cancer therapies. The challenges of early diagnostics are also covered.

BTEC 634 - Healthcare Economics: Fundamentals for Providers and Biotech Professionals

(3 semester hours)
Prerequisites: None
Description: Patients, healthcare providers, and biotech industry professionals have an interest in the best possible medical care, but healthcare services and products come at a cost. This course explores economics of topics that impact the cost of healthcare as we know it today, and how the healthcare technologies of the future will be funded. Additional questions, such as who pays and who gets access when healthcare is in limited supply, are discussed. Among the factors explored are market dynamics, public policy, technology, reimbursements and workforce and patient choices. Case studies, course papers, and group discussions are used to offer the course content in an engaging and interactive mode. This course requires no previous study of finance or economics.

BTEC 635 - Clinical Pharmacology

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Clinical pharmacology deals with drug development and drug utilization in therapeutics. This course covers the advancements regarding drug action and efficacy. Concepts of pharmacokinetics, drug metabolism and transport, pharmacogenetics, assessment of drug effects, and drug therapy in special populations are explored. Expert knowledge is shared about drug development and content specialization needed to stay competitive and build opportunities for career options.

BTEC 640 - Trends in Regenerative Medicine

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Tissue engineering (TE) and regenerative medicine (RM) are geared towards developing biological substitutes that restore, maintain, or improve damaged tissue and organ functionality. While tissue engineering and regenerative medicine have hinted at much promise in the last several decades, significant research is still required to provide exciting alternative materials to finally solve the numerous problems associated with traditional implants. This course covers relevant biological, engineering, clinical, legal, regulatory and ethical principles and perspectives to understand the basics of RM. This course also introduces the student to the current state of the RM field, global market trends and opportunities and challenges in process development, manufacturing, and commercialization.

BTEC 650 - Fermentation Technologies

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: Fermentation technology focusses on use of recombinant microorganisms for several industrial processes, i.e. biomanufacturing. This course requires the student to conceptually design a process for biomanufacturing a target product. This includes the basics of strain selection, development, and process optimization. Application of strain morphology, physiology and DNA sequence- based methods are analyzed for industrial processes. The student studies microbial metabolism and its significance to the manufacturing process. Fundamentals of microbial growth, growth stoichiometry, types of growth media (defined, semi-defined, complex) and media optimization are covered. The course provides an overview of fermenter design concepts and operational principles for a fermentation process using bioreactors.

BTEC 655 - Industrial Enzymes and Proteins

(3 semester hours)
Prerequisites: Bachelor of Science degree in Biotechnology, Life Science or other relevant field or by permission of instructor
Description: There is significant commercial activity in the biomanufacturing sector. Key products include vaccines, antibiotics, or various industrial enzymes. The basics of recombinant DNA (rDNA) principles in modification, selection, and application of recombinant microbial strains for industrial enzyme and protein production are studied. Theoretical foundations of microbial production and detection of recombinant protein products such as enzymes, hormones, and antibiotics are covered. The course provides an overview of basic methodologies involved in genetic manipulation of microbes to produce recombinant peptides and proteins. This would focus on use of plasmids, role of promoters and its use in control of gene expression with the end goal of generating enzymes and whole cells for industrial catalytic processes.

BTEC 672 - Legal Affairs and Policies for Life Science Industry

(3 semester hours)
Prerequisites: None
Description: This course provides the student an overview of key legal concepts and policies that govern research, development and commercial activities within the biotech industry. The course is structured from a company's perspective and introduces the student to topics and strategies critical to management while considering new topics and products. Selected cases, videos of speeches, and assigned readings illustrate how the laws that provide protection of society and promotion of social goals operate. Procedures that allow navigating the middle ground while dealing with competition in the biotech and pharma industry would be covered as well. This course requires no previous legal study.

BTEC 675 - Innovation and Improvisation in Research and Development

(3 semester hours)
Prerequisites: None
Description: This course prepares the student for the research and development sector. The student develops creative problem-solving abilities and other skills necessary for innovative approaches in managing research and development units. The resolution of conflicts between Research and Development, manufacturing, and marketing in a high technology firm are studied. The student explores various coping strategies, ways to maintaining entrepreneurial spirit and encourage innovation as the company develops into a formal administrative organization, identify R &D issues and strategies to resolve them. Mass production techniques such as Just-In-Time, On-Job Training and Total Quality Management to the real world of high technology Research & Development (R&D) are studied. As a team project for the course, the student identifies and develops solutions to practical problems or market needs for a hypothetical scenario.

BTEC 698 - Biotechnology Graduate Internship

(3 semester hours)
Prerequisites: Completion of 6 credits in the BTMS program
Description: This graduate internship course provides the student an opportunity to serve as a graduate intern to learn the skills of a certain job in real world situation. It is the student's responsibility to identify an industry or an organization from the field of interest and work on a mutually relevant topic under direct supervision of an employee from that company.

BTEC 699 - Applied Project in Biotechnology

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Biotechnology. A faculty member will supervise this study.

CISC 504 - Principles of Programming Languages

(3 semester hours)
Prerequisites: A Baccalaureate degree in computer science or a related technical field (e.g., electrical and computer engineering, information science, operations research) or permission of CISC grad committee *(This course is designed for the student that does not have a CS background)*
Description: This course explores a topic of collection of topics of special interest that is timely and in response to critical or emerging topics in the broad field of computer information sciences. The student with prior math or engineering education may have a foundation for the statistical concepts they encounter in a computer science graduate program, but not enough programming experience to keep up with the analysis, modeling and creating their own computational solutions. This course is intended to give the student the programming capability and experience required to succeed in their graduate study of master computer information sciences. The course is an application-driven and solution strategies with Python. Furthermore, integration between Python and other languages is also covered. Topics include programming paradigms, functional programming scripting languages, objects, algorithm design and analysis, trees, graphs, sorting and searching. The focus is on how these concepts relate to computational tasks in science and engineering.

CISC 510 - Object-Oriented Software

(3 semester hours)
Prerequisites: Baccalaureate degree in Computer and Information Sciences with a concentration in Software Engineering and Systems Analysis or the equivalent.
Description: This course develops fluency in object-oriented design. The student studies semantics of object-oriented languages, strengths and limitations of the object-oriented approach, processes that can lead to good design outcomes, graphical and textual representations for design including UML, common problems and some of the patterns that can solve them, and refactoring utilizing modern IDEs. The student develops an ability to read and critique designs, and to clearly present and advocate design ideas.

CISC 520 - Data Engineering and Mining

(3 semester hours)
Prerequisites: Baccalaureate degree in Computer and Information Sciences with a concentration in Software Engineering and Systems Analysis or the equivalent.
Description: This course addresses the emerging issues in designing, building, managing, and evaluating advanced data-intensive systems and applications. Data engineering is concerned with the role of data in the design, development, management, and utilization of complex computing/information systems. Areas of interest include database design; meta knowledge of the data and its processing; languages to describe data, define access, and manipulate databases; and strategies and mechanisms for data access, security, and integrity control. Data mining is a rapidly growing field that is concerned with developing techniques to assist managers to make intelligent use of these

data repositories. A number of successful applications have been reported in areas such as credit rating, fraud detection, database marketing, customer relationship management, and stock market investments. The field of data mining has evolved from the disciplines of statistics and artificial intelligence.

CISC 525 - Big Data Architectures

(3 semester hours)
Prerequisites: Baccalaureate degree in Computer Information Systems, Computer Sciences, or related field.
Description: Government, academia and industry have spent a great deal of time, effort, and money dealing with increases in the volume, variety, and velocity of collected data. Collection methods, storage facilities, search capabilities, and analytical tools have all needed to adapt to the masses of data now available. Google paved the way for a new paradigm in Big Data, with two seminal white papers describing the Google File System, a distributed file system for massive storage, and MapReduce, a distributed programing framework designed to work on data stored in the distributed file system. This course introduces the student to the concepts of Big Data and describes the usage of distributed file systems and MapReduce programming framework to provide skills applicable to developers and the data scientist in any facet of industry.

CISC 530 - Computing Systems Architecture

(3 semester hours)
Prerequisites: Baccalaureate degree in Computer and Information Sciences with a concentration in Software Engineering and Systems Analysis or the equivalent.
Description: Modern computer information systems are ever-increasing in complexity and sophistication. As a result, software engineers must be able to make effective decisions regarding the strategic selection, specification, design, and deployment of information systems. Therefore, this course addresses the topics of architectural design that can significantly improve the performance of computer information systems. The course introduces key architectural concepts, techniques, and guidance to software engineers to enable them to make more effective architectural decisions.

CISC 540 - Agile Software Development

(3 semester hours)
Prerequisites: Bachelor of Science in Computer Information Systems, Computer Sciences, or related field.
Description: This course addresses what agile methods are, how they are implemented, and their impact on software engineering. A variety of agile methods are described, including but not limited to: Scrum, Extreme Programming, and Crystal Clear. The concerns associated with planning and controlling agile projects, along with the implications of agile development on the customer-developer dynamic are analyzed.

CISC 550 - Software Engineering in Mobile Computing

(3 semester hours)
Prerequisites: CISC 510 and CISC 520
Description: Recent years have witnessed the advent of wireless mobile and sensor technologies and the proliferation of application scenarios whereby large numbers of pervasive computing devices are connected to a wireless networking infrastructure in an ad hoc manner. The student is shown how to design, implement, and deploy location/context-aware applications that interact with Service Oriented Architecture (SOA) solutions. Topics to be covered include: basic user interfaces, application design, concurrency, and location-aware and other context-aware programming.

CISC 560 - Secure Computer Systems

(3 semester hours)
Prerequisites: Bachelor of Science in Computer and Information Sciences with a concentration in Software Engineering and Systems Analysis or the equivalent.

Description: This course focuses on the design principles for secure computer systems. Topics regarding authentication, access control and authorization, discretionary and mandatory security policies, secure kernel design, secure operating systems, and secure databases are covered from a systems architecture perspective. Emphasis is on the design of security measures for critical information infrastructures. Upon completion of this course, the student is able to design, implement, and manage secure computer systems through the design of a security awareness program.

CISC 570 - Advanced Database Security

(3 semester hours)
Prerequisites: CISC 560
Description: This course focuses on topics related to the design and implementation of secure data stores. Emphasis is placed on multi-level security in database systems, covert channels, and security measures for relational and object-oriented database systems. This course teaches how to recognize the insecurities present within common database systems and how these flaws can leave a database wide open to attack. The course covers how hackers discover and exploit vulnerabilities to gain access to a data store.

CISC 580 - Advanced Network Security

(3 semester hours)
Prerequisites: CISC 560
Description: This course covers fundamental concepts, principles, and practical networking and inter-networking topics relevant to the design, analysis, and implementation of enterprise-level trusted networked information systems. Topics include networking and security architectures, techniques, and protocols at the various layers of the internet model. Security problems in distributed application environments are analyzed and solutions discussed and implemented.

CISC 585 - Principles of Software Architectural Patterns

(3 semester hours)
Prerequisites: A baccalaureate degree in computer science or a related technical field
Description: This course will serve as a catalog of commonly used design patterns, prominent and dominant software patterns, and their applications. This course is divided into three modules. First, Software Architecture Patterns covers the various architectural patterns of object-oriented, component-based, client server, and cloud architecture. The need for software patterns is described. The various architectural patterns are listed and explained in detail in order to convey the what, where, why and how of architectural patterns. Second, Enterprise Integration Patterns covers enterprise application integration patterns and how they are designed. Patterns of service-oriented architecture (SOA), event driven architecture (EDA), resource-oriented architecture (ROA), big data analysis architecture, and microservice architecture (MSA) will be carefully studied. Finally, Patterns for Containerized and Highly Reliable Applications covers advanced topics such as Docker containers, high-performance, and reliable application architectures. Key takeaways include understanding what architectures are, why they are used, and how and where architecture design and integration patterns are being leveraged to build bigger and better systems.

CISC 590 - Information Security Project

(3 semester hours)
Prerequisites: CISC 560
Description: This project course serves as a capstone for the specialization in Information Security. The class focuses on techniques for protecting critical information infrastructures through case studies, application development, and systems assessment, while the project's activities encompass research, development and analysis/synthesis for a particular problem or opportunity.

CISC 592 - Software Architecture and Microservice

(3 semester hours)
Prerequisites: Bachelor of Science in Computer Science or a related technical field (e.g., Electrical and Computer Engineering, Information Science, Operations Research) or permission of CISC grad committee.
Description: This course explores a collection of topics in Software Architecture and Microservices and introduces concepts and best practices of software architecture. It deals with; high-level building blocks that represent the underlying software system, how a software system is structured, and how that system's elements are meant to interact. Fundamentals of software architecture, its principles, elements, components, configurations and architectural structures and styles will also be discussed. Special focus will be given to the interaction between quality attributes and software architecture. Societal and ethical implications of software architecture and microservices will also be discussed

CISC 593 - Software Verification and Validation

(3 semester hours)
Prerequisites: CISC 592
Description: This course will introduce various software testing techniques such as; unit testing, integration testing, system testing, acceptance testing, and regression testing, types of software errors, reporting and analyzing software errors, problem tracking systems, test planning, test case design, and verification & validation. The course also explores functional (black box) methods for testing software systems, reporting problems effectively and planning testing projects. The student will apply testing techniques that they have learned, throughout the course, to a sample application.

CISC 594 - Software Testing Principles and Techniques

(3 semester hours)
Prerequisites: CISC 593
Description: This course explores a collection of topics in Software Testing Principles and Techniques. It introduces testing techniques, software quality fundamentals, and focuses on software quality assurance for the entire software development lifecycle. It covers topics such as; Quality factors, Software Quality Requirements, Reviews, Software Audits, Software Configuration Management, Policies, Processes, and Procedures, Measurement, Risk Management, Software Quality Assurance Plan, Software Quality Models, Test Automation, Testing Tools, Black Box and White Box testing techniques. The Pareto Principle Applied to Software Quality Assurance, and Software Testing Strategies will also be discussed.

CISC 595 - Software Architectural Patterns Design and Implementation

(3 semester hours)
Prerequisites: CISC 585 or NGEN 585
Description: This course will serve as a catalog of commonly used open source software in the design and implementation of software solutions. The student will be exposed to open source project structure, work on an open source project, and be expected to make a significant contribution through their own custom design projects.

CISC 600 - Scientific Computing I

(3 semester hours)
Prerequisites: A baccalaureate degree in computer science or a related technical field (e.g. electrical and computer engineering, information science or operations research).
Description: This course provides an overview of scientific computing and covers: Solution of Linear Algebraic Equations, Interpolation and Extrapolation, Integration and Evaluation of Functions, Random Numbers, and Sorting. The course uses C++ programming language as the base language to solve the problem sets. The student may choose to use another programming language as well. The course is conceived as an introduction to the thriving field of numerical simulation for computer scientists, mathematicians, engineers, or natural scientists without an already strong background in numerical methods.

CISC 601 - Scientific Computing II

(3 semester hours)
Prerequisites: CISC 600
Description: Scientific Computing II covers: root finding and nonlinear sets of equations, minimization or maximization of functions, eigensystems, fast Fourier transform, Fourier and spectral applications, statistical description of data, and modeling of data. The course uses C++ programming language as a base language to solve the problem sets, or a student can choose another programming language. The course is intensely practical with fully worked examples and graded exercises.

CISC 603 - Theory of Computation

(3 semester hours)
Prerequisites: CISC 530 and CISC 610
Description: This course contains abstract models of computation and computability theory including formal languages, finite automata, regular expressions, context-free grammars, pushdown automata, Turing machines, primitive recursive and recursive functions, and decidability and un-decidability of computational problems.

CISC 610 - Data Structures and Algorithms

(3 semester hours)
Prerequisites: CISC 504
Description: This course emphasizes fundamental algorithms and advanced methods of algorithmic design, analysis and implementation. This class overs techniques used to analyze problems and algorithms (including asymptotic, upper/lower bounds, best/average/worst case analysis, amortized analysis, complexity), basic techniques used to design algorithms (including divide and conquer/greedy/dynamic programming/heuristics, choosing appropriate data structures) and important classical algorithms (including sorting, string, matrix, and graph algorithms) and data structures.

CISC 611 - Network Operating Systems

(3 semester hours)
Prerequisites: CISC 530 and CISC 610
Description: This course introduces the principles and implementations of operating systems and networking. The operating system manages hardware resources and provides a simplified interface for programs to use these resources. Networking allows different computers to communicate and potentially act as a larger virtual system. These topics are closely related; networking is often managed by the operating system (and always requires use of the hardware it manages) and the operating system uses the network to provide services like the file system. C++ language is needed to facilitate out study to these topics which provides low-level access to the hardware and is often used in operating systems and networking.

CISC 612 - Elements of Computing Systems

(3 semester hours)
Prerequisites: CISC 611
Description: This course is an integration process of key notions from algorithms, computer architecture, operating systems, compilers, and software engineering into one unified framework. This is done constructively, by building a general-purpose computer system from the ground up. In the process, many ideas and techniques are used in the design of modern hardware and software systems, and discuss major trade-offs and future trends. This is a hands-on course, evolving around building the full set of HW and SW modules including the chip set of simple computers using a simulator, developing the assembler, building part of the virtual machine translator and a simple compiler all the way to a simple programming language and a simple game.

CISC 614 - Computer Simulation

(3 semester hours)
Prerequisites: CISC 601
Description: This course is about the use of simulation to make better business decisions in application domains from healthcare to mining, heavy manufacturing to supply chains, and everything in between. It is written to help both technical and non-technical users better understand the concepts and usefulness of simulation. The student can use the programming languages of their choice or use an off-the-shelf software to implement their projects.

CISC 620 - Principles of Machine Learning

(3 semester hours)
Prerequisites: CISC 530, CISC 600, and CISC 610
Description: This course introduces the basic idea of machine learning and the application to data from real world problems. Topics include: Classification as a Problem-Solving Tool, Similarity Measures and Clustering. The Classification Process, Classification for Sentiment Analysis, Advanced Recommendations, FFT Classifiers, Computer Vision & Pattern Recognition, Dimensionality Reduction, and Big Data & Machine Learning.

CISC 621 - Statistical Pattern Recognition

(3 semester hours)
Prerequisites: CISC 610, equivalent, or permission of the instructor
Description: Statistical pattern recognition techniques are used to design automated systems that improve their own performance through experience. This course covers the methodologies, technologies, and algorithms of statistical pattern recognition from a variety of perspectives. The objective is to provide a reasonable answer for all possible data and to classify input data in to objects or classes based on certain features. After taking the course, the student should have: a clear understanding of the design and construction and a pattern recognition system; major approaches in statistical and syntactic pattern recognition; some exposure to the theoretical issues involved in pattern recognition system design such as the curse of dimensionality and clear working knowledge of implementing pattern recognition techniques.

CISC 625 - Digital Image Processing

(3 semester hours)
Prerequisites: CISC 621, equivalent, or permission of the instructor
Description: This course focuses on explaining and demonstrating the limitations and tradeoffs of various digital image representations, such as computed 3-D images, grayscale versus color, and tools such as wavelet transforms and image compression techniques. Additionally, displaying the ability to manipulate both binary and grayscale digital images using morphological filters and operators to achieve a desired result; showing how higher-level image concepts such as edge detection, segmentation, representation, and object recognition can be implemented and used.

CISC 661 - Principles of Cybersecurity & Cyber Warfare

(3 semester hours)
Prerequisites: None
Description: The course introduces the student to the interdisciplinary field of cybersecurity. Topics include the evolution of information security into cybersecurity and exploring the relationship of cybersecurity to organizations and society. The analyses of the threats and risks to/in these environments are examined. The ultimate goal of this course is for the student to acquire the advanced knowledge required to develop the skills needed to integrate knowledge from this course into a workplace environment. Cross-listed with CYOM 661.

CISC 662 - Ethical Hacking Development Lab

(3 semester hours)
Prerequisites: None
Description: This course integrates cyber risk management into day-to-day operations. Additionally, it enables an enterprise to be prepared to respond to the inevitable cyber incident, restore normal operations and ensure that the enterprise assets and the enterprise's reputation are protected. This course focuses the student on a broad range of topics relative to risk-based planning for enterprise cybersecurity. The intent is to focus on creating risk assessment and modeling approaches to solve cybersecurity issues, so organizations can build security framework and sustain a healthy security posture. This course analyzes external and internal security threats, failed systems development and system processes and explores their respective risk mitigation solutions through policies, best practices, operational procedures, and government regulations. Cross-listed with CYOM 662.

CISC 663 - Cyber Risk Assessment and Management

(3 semester hours)
Prerequisites: CISC 661 or CYOM 661
Description: This course integrates knowledge accumulated from the prerequisites and serves as a capstone for the concentration in Computer Security. Attention is focused on the techniques for protecting critical information infrastructures and the process of identifying the risk to data and information using case studies, application development, and systems assessment. Cross-listed with CYOM 663.

CISC 664 - Advanced Digital Forensics

(3 semester hours)
Prerequisites: CISC 662
Description: Digital Forensics is "the application of computer science and investigative procedures for a legal purpose involving the analysis of digital evidence." Digital forensics encompasses much more than just laptop and desktop computers. Mobile devices, networks, and "cloud" systems are very much within the scope of the discipline. It also includes the analysis of images, videos, and audio (in both analog and digital format). The goal is to provide digital evidence that are obtained (both in direct and indirect ways) from digital media. The course focuses on the analysis of authenticity, comparison, and enhancement as the main vehicle to obtain digital evidences (both in direct and indirect ways) from digital media.

CISC 665 - Biometric Security Systems

(3 semester hours)
Prerequisites: CISC 662
Description: Biometric security systems is a rapidly evolving field with applications ranging from accessing one's computer to gaining entry into a country. Biometric systems rely on the use of physical or behavioral traits, such as fingerprints, face, voice, and hand geometry, to establish the identity of an individual. The deployment of large-scale biometric security systems in both commercial and government applications increases the public's awareness of this technology. This rapid growth also highlights the challenges associated with designing and deploying such systems. The core computational component of biometric systems is biometric identification (or recognition), and it is indeed a grand challenge in its own right. The purpose of this course is to expose the student to current biometric identification techniques and systems, teach them to coin their own biometric security applications through capturing human biometric traits, creating unique identifications for them, build classification systems that can identify individuals, and make decisions to maintain security parameters.

CISC 680 - Special Topics in Computer Information Sciences

(3 semester hours)
Prerequisites: None
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 computer information sciences. Due to the nature of evolving topics, this course may not be eligible for repeat.

CISC 681 - Special Topics in Scientific Computing

(3 semester hours)
Prerequisites: CISC 614 or permission of 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 scientific computing in computer information sciences.

CISC 682 - Special Topics in Software Engineering and Software Testing

(3 semester hours)
Prerequisites: CISC 593 or permission of 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 software engineering and software testing in computer information sciences.

CISC 683 - Special Topics in Cybersecurity

(3 semester hours)
Prerequisites: CISC 663 or permission of 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 cybersecurity in computer information sciences.

CISC 690 - Current Topics in Computer Information Sciences

(3 semester hours)
Prerequisites: None
Description: This course explores a topic or collection of current topics that are timely and in response to critical or emerging topics in the broad field of computer information sciences.

CISC 691 - Current Topics in Scientific Computing

(3 semester hours)
Prerequisites: CISC 614 or permission of instructor
Description: This course explores a topic or collection of current topics that are timely and in response to critical or emerging topics in the broad field of scientific computing computer information sciences.

CISC 692 - Current Topics in Software Engineering and Software Testing

(3 semester hours)
Prerequisites: CISC 593 or permission of instructor
Description: This course explores a topic or collection of current topics that are timely and in response to critical or emerging topics in the broad field of software engineering and software testing in computer information sciences.

CISC 693 - Current Topics in Cybersecurity

(3 semester hours)
Prerequisites: CISC 663 or permission of instructor
Description: This course explores a topic or collection of current topics that are timely and in response to critical or emerging topics in the broad field of cybersecurity in computer information sciences.

CISC 699 - Applied Project in Computer Information Sciences

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Computer Information Sciences. A faculty member will supervise this study.

CISC 701 - Contemporary Computing Systems Architectures

(3 semester hours)
Prerequisites: Admissions to the Computational Sciences Doctoral Program or permission of instructor
Corequisites: CISC 709
Description: This course attempts to change the way students learn and think about the design, organization and hardware of a computing system architecture to meet goals and functional requirements of future technological developments, demystify computer architecture through an emphasis on cost-performance-energy trades-offs and good engineering design. This will help the student to build rigorous quantitative foundation of long-established scientific and engineering disciplines. A special emphasis will be put on demonstrating these concepts through the "Putting It All Together" approach at the end of the set of necessary modules. Modules include pipeline organizations and memory hierarchies of the ARM Cortex A8 processor, the Intel core i7 processor, the NVIDIA GTX-280 and GTX-480 GPUs, and one of the Google warehouse-scale computers, to apply the cost-performance-energy principles to this material, and memory is critical resource for the rest of the modules.

CISC 709 - Contemporary Computing Systems Programming

(3 semester hours)
Prerequisites: Admissions to the Computational Sciences Doctoral Program or permission of instructor
Corequisites: CISC 701
Description: This course discusses and advocates a structured approach to parallel programming. This approach is based on a core set of common and composable patterns of parallel computation and data management with an emphasis on determinism and scalability. By using these patterns and also paying attention to a small number of factors in algorithm design (such as data locality), programs built using this approach have the potential to perform and scale well on a variety of different parallel computer architectures. A special emphasis will be put on both collective "data-parallel" patterns as well as structured "task-parallel" patterns such as pipelining and superscalar task graphs. The structured patter-based approach, like data-parallel models, addresses issues of both data access and parallel task distribution in a common framework. Optimization of data access is important for both many-core processors with shared memory systems and accelerators with their own memories not directly attached to the host processor. Extensive use of pertinent and practical examples from scientific computing will be made throughout. The programming languages used will be Python, Fortran, or C++. Both the shared and distributed paradigms of parallel computing will be covered via the OpenMP and MPI libraries.

CISC 719 - Contemporary Computing Systems Modeling

(3 semester hours)
Prerequisites: CISC 701 & CISC 709, or permission of instructor
Description: Real-world problems entail a hierarchy of systems that interact in complex ways. This causes such complex problems not to lend themselves to easy solutions with computational methods like classical parametric machine learning. The complexity arises from three main causes: high-dimensionality, unknown function properties, and computationally expensive analysis and simulation. These challenges with the presence high volume/velocity streaming data severely aggravate the difficulty and become the bottleneck for any computational solution. This course helps the student to explore some advanced modeling and optimization methods that can help solve such problems. Deep Learning (DL) allows computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction. DL has the ability to discover convoluted structure in large data sets by using say the backpropagation algorithm to indicate how a machine should change its internal parameters

that are used to compute the representation in each layer from the representation in the previous layer. Deep convolutional nets have brought about breakthroughs in processing images, video, speech and audio, whereas recurrent nets have shone light on sequential data such as text and speech. A special emphasis will be put on how to build applications using this approach that have the potential to perform and scale well on a variety of different previously studied parallel computing systems. Extensive use of parallel programming models like CUDA, C, Python, OpenMP and may be Fortran will be to conduct weekly projects.

CISC 727 - Research Explorations in Computational Sciences I

(3 semester hours)
Prerequisites: CISC 701 & CISC 709, or permission of instructor
Corequisites: CISC 719
Description: This course is about leading the student to explore some heavy research on a certain high-dimensional problem under the supervision of a research scientist in one of the computational sciences subdomains. The course outcome is expected to be the foundational part of a published research paper to be presented (later after augmented with other research work) in a research symposium. Special emphases put on how to build programs using this approach that have the potential to perform and scale well on a variety of different previously studied parallel computing systems. Extensive use of parallel programming models like CUDA, C, Python, OpenMP and may be Fortran will be to conduct weekly projects.

CISC 733 - Research Explorations in Computational Sciences II

(3 semester hours)
Prerequisites: CISC 727 or permission of instructor
Corequisites: CISC 777
Description: This is the second of the depth-level research explorations courses. The goal of this course is to continuous the realization efforts from course work of CISC 727. A published research paper on a computational solution in deep learning for the real-world problem selected in the prerequisite course is the expected outcome for this course. The paper is to be presented later after augmented with other research work in a research symposium. This paper should be a step toward choosing the research topic for the doctoral dissertation for the degree.

CISC 777 - Research Symposium Paper

(3 semester hours)
Prerequisites: CISC 727
Corequisites: CISC 733
Description: The course is of two parts: one, to allow the student to make progress on their research in a structured way and to help fulfill program requirements, and two, to present professionalization information crucial to success in the field. The course is organized largely around working on the research paper, with the goal of making it a conference-presentable and journal-publishable work.

CISC 787 - Doctoral Research Seminar I

(3 to 6 semester hours)
Prerequisites: CISC 777
Description: This course is the first of the two Doctoral Research Seminar courses. The course provides the student with the theoretical background and practical application of various research methods that can be used in computational sciences. The course provides a look to the research process and literature review and study the correlation and experimental research methods and design. Students will analyze several existing research studies and design and conduct studies. The principal work in this course is the research and writing of a substantial paper in a field related to the Ph.D. dissertation of each student. The student is expected to have a research topic and primary source base identified and the topic approved by the dissertation adviser.

CISC 797 - Doctoral Research Seminar II

(3 to 6 semester hours)
Prerequisites: CISC 787
Description: This course is the second of the two Doctoral Research Seminar courses. The course provides a deeper look to the research process, implementation methodology and research findings. The student will analyze several existing research studies and design and conduct studies. This course emphasizes advanced research goals and mastery of the relevant sub field. approved by the dissertation adviser.

CISC 799 - Doctoral Dissertation

(3 to 6 semester hours)
Prerequisites: CISC 797
Description: This is an individual study course for the doctoral student that culminates in a Ph.D. Thesis. Content to be determined by the student and the student's Doctoral Committee. The Computational Sciences thesis is an implementation of a serious experimental research that involves the formulation of a deductive model that makes novel and unforeseen predictions which should be then tested objectively and confirmed under conditions unfavorable to the hypothesis. In addition to a well written thesis, the student is required to deliver the computational solution in a specific domain. In support of their findings, the student is required to introduce a software package that meets the criteria of excellent software requirement. The thesis needs to show that the writer can produce their extended piece of work, in perfect English, and respects the standards of form and structure. May be repeated for credit.

CBDS 520 - Judgement and Decision Making

(3 semester hours)
Prerequisites: None
Corequisites: ANLY 518
Description: Human Behavior is the result of complex interactions between physiological and psychological processes. This is an accelerated course designed to give the student a firm understanding of these processes, as well as insight into how this knowledge can be used to garner unique insights which can be leveraged to influence behavior. Foundational topics such as perception, learning and memory, emotion, and cognitive biases and attempt to exploit them via nudging are covered through lectures, discussion or current applied research, and a team project developing an applied behavioral research plan.

CBDS 535 - Quantitative Research Methods

(3 semester hours)
Prerequisites: ANLY 518 and CBDS 520
Description: The easiest way to find out about people is to ask them questions. As a result, much of the data used to generate insights comes from simple survey questions. This course is designed to teach the student how to develop efficient questions and to deploy surveys in person, telephonically, or online (mobile). Statistical methods for determining question and construct reliability are covered. Course material is presented via lectures, texts (textbook and supplementary readings), and several projects.

CBDS 545 - Qualitative Research Methods

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, and CBDS 535
Corequisites: CBDS 550
Description: Innovative ideas often come from spontaneous conversation and interactions. Focus groups (panels) and observational research methods facilitate the discovery of these unique consumer insights. This course provides an overview of the proper use of focus groups, panels, and observational designs in consumer research. Central

topics include question design, planning, implementation, moderation/observation techniques, virtual panels, data processing, and qualitative and quantitative analysis strategies. Course materials are presented via lectures, guest lectures, as well as individual and team projects.

CBDS 550 - Sampling and Segmentation

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, and CBDS 535
Corequisites: CBDS 545
Description: To generate actionable insights and implement them effectively we need to know how consumers are distributed across the population, what segments will want a product or service, and how we can sample from relevant segments so that our data is representative of relevant populations. This is an advanced course designed to provide an overview of these topics from an applied analytic perspective. The first half of the course focuses on sampling methods for data collection such as: Stratification, cluster sampling, systematics selection, multistage sampling, and probability proportional to size sampling. The second half of the course focuses on analytic methods for the four main types of market segmentation: Demographic, behavioral, psychographic, and geographic. Material is presented via lectures, discussions, immersive labs, and an applied team project.

CBDS 620 - Marketing Applications

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, and CBDS 535
Description: Bespoke marketing tools and methods of approach underly much of today's marketing research. This course is separated into three sections related to appealing to your customer base: The first covers conjoint analysis tools used to determine the value of product/services features as viewed by the customer and to assess (attractive) market prices. The second provides an overview of market mix modeling allowing for an efficient marketing plan to be deployed. The final section covers customer relationship management (CRM). An overview of what CRM is, what CRM has and has not yet delivered, popular CRM technologies, and how analytic techniques can be employed to determine customer equity, customer lifetime value, and predict customer loyalty and churn is provided. Material is presented via lectures (guest lectures), discussions of current research and theory, case studies, labs, and applied projects.

CBDS 680 - Special Topics in Applied Behavioral Research

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, CBDS 535, CBDS 550, CBDS 620, and CBDS 695
Corequisites: CBDS 699
Description: Theories of human behavior and behavioral research methods are constantly evolving. This seminar is designed to provide an overview of the state-of-the-art in applied behavioral research. Each session will consist of a discussion of recent advances in consumer research and/or a relevant story pulled from the headlines. Guest lectures from academia, industry, and the public sector will also present their work and their views on the future of applied behavioral research.

CBDS 695 - Advanced Behavioral Research Methods

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, and CBDS 535
Description: As technology advances so do applied behavioral research methodologies. This frequently updated course provides the knowledge and skills needed to conduct innovative applied behavioral research using emergent methodologies. Research applications covered include: Decision time analysis, mouse tracking, eye tracking, affect measurement, and practical neural measurement techniques (e.g., NIRS and ECG/EEG). Material is presented via lectures (guest lectures), discussions of transformative research, labs, and an immersive research project.

CBDS 699 - Applied Behavioral Research Project

(3 semester hours)
Prerequisites: ANLY 518, CBDS 520, CBDS 535, CBDS 550, CBDS 620, and CBDS 695
Corequisites: CBDS 680
Description: This seminar is designed to assist the student as they produce the final deliverable of their studies - an applied behavioral research project. In the first weeks the student will deliver an overview of their project and what stage they are currently in. During the following weeks the student will deliver status updates allowing them to seek out feedback and advice for how to approach issues encountered (e.g., implementation and analysis problems), while also benefitting from their classmates' experiences. In the final weeks the student will give a presentation which will be in the format of a "mini-defense".

CYOM 503 - Principles of Computer Networking

(3 semester hours)
Prerequisites: A Baccalaureate degree in computer science or a related technical field (e.g., electrical and computer engineering, information science, cybersecurity) or permission of instructor
Description: Information networking lays the groundwork for analysis of concepts that form the foundation to study Cybersecurity. The Internet contains a constant flow of information in the form of packets over interconnected network devices. This topic covers protocols, software, hardware, and functions that support networking services, such as switching/routing, virtual networking concepts, domain name services, directory services, and other Internet required protocols.

CYOM 521 - Cybersecurity Architecture and Resiliency

(3 semester hours)
Prerequisites: A Baccalaureate degree in computer science or a related technical field (e.g., electrical and computer engineering, information science, cybersecurity) or permission of instructor
Description: To understand security architecture, you must first understand architecture in general. At first glance, security and architecture are diametrically opposed. Security is freedom from, or resilience against, potential harm. Architecture is meant to build things up to make them more useful. Security architecture is the design, development, and implementation of resilient networks and systems to protect the information that is stored, transmitted, and processed.

CYOM 535 - Principles of Cloud Security

(3 semester hours)
Prerequisites: Completion of BS-Cybersecurity Operations and Management Core Courses or Graduate Standing
Description: This course provides guidelines for data security utilizing cloud computing by determining the boundaries of the cloud service provider (CSP) responsible for ensuring that customer data is properly secured. Depending on the cloud services (i.e. IaaS, PaaS, SaaS), the security of the data is the responsibility of the Cloud Service Consumer (CSC) themselves. For example, in some cases the CSP may be responsible for restricting access to the data, while the CSC remains responsible for deciding which cloud service users (CSUs) should have access to it, and the behavior of any scripts or applications with which the CSU processes the data. This course identifies the security controls protecting CSC data that can be used in the different stages of the full data lifecycle.

CYOM 569 - Securing Software and Application Environments

(3 semester hours)
Prerequisites: Graduate Standing
Description: Cybersecurity for applications and software provides the security architecture as it applies to the continuous development and deployment of application and software. This course demonstrates the techniques to

improve the organization's security at every level, including the application and software layer. By combining development operations and security with consideration for cloud services, an integrated approach is used to ensure the cyber protections are implemented at all levels of the infrastructure. This course will provide the skills to implement security at each layer, such as web application, cloud infrastructure, communication, and service delivery. Topics include exploring core security aspects of blocking attacks, fraud detection, cloud forensics, and incident response. Additionally, cybersecurity topics on extending development operations (DevSecOps) security practices, risk assessment, threat modeling, and continuous security monitoring.

CYOM 599 - Leadership, Ethics, and Compliance in Cybersecurity Industry

(3 semester hours)
Prerequisites: None
Description: In this course, the student will explore leadership and ethical business decision making as related to the use of technology. 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. Personal leadership helps us to be sure that we take full responsibility for our moral choices and their consequences. This course addresses professional leadership and ethics in information technology as it applies to practical business managers and systems. This course teaches the student how to gain knowledge and understanding of a number of aspects, including: the types of harms the public can suffer as result of misuse of information technology; the importance of an individual privacy of information; legal and constitutional rights to protect information; and obligations of organizations to protect the public and ethical decision making.

CYOM 661 - Principles of Cybersecurity & Cyber Warfare

(3 semester hours)
Prerequisites: None
Description: The course introduces the student to the interdisciplinary field of cybersecurity. Topics include the evolution of information security into cybersecurity and exploring the relationship of cybersecurity to organizations and society. Analysis of the threats and risks to/in these environments are examined. The ultimate goal of this course is for the student to acquire the advanced knowledge required to develop the skills needed to integrate knowledge from this course into a workplace environment. Cross-listed with CISC 661.

CYOM 662 - Ethical Hacking Development Lab

(3 semester hours)
Prerequisites: None
Description: This course integrates cyber risk management into day-to-day operations. Additionally, it enables an enterprise to be prepared to respond to the inevitable cyber incident, restore normal operations and ensure that the enterprise assets and the enterprise's reputation are protected. This course focuses the student on a broad range of topics relative to the tools used to protect the enterprise from today's cyber-threats. The intent is to focus on creating risk-based assessment tools for modeling approaches to solve cybersecurity issues, so organizations can build security framework and sustain a healthy security posture. This course analyzes external and internal security threats, failed systems development and system processes, and explores their respective risk mitigation solutions through policies, best practices, operational procedures, and government regulations. Cross-listed with CISC 662.

CYOM 663 - Cyber Risk Assessment and Management

(3 semester hours)
Prerequisites: CISC 661 or CYOM 661
Description: This course integrates knowledge accumulated from the prerequisites and serves as a capstone for the concentration in Computer Security. Attention is focused on the techniques for protecting critical information infrastructures and the process of identifying the risk to data and information using case studies, application development, and systems assessment. Cross-listed with CISC 663.

CYOM 683 - Special Topics in Cybersecurity Operations and Control Management

(3 semester hours)
Prerequisites: CYOM 663 or permission of 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 Cybersecurity Operations and Control Management.

CYOM 693 - Current Topics in Cybersecurity Operations and Control Management

(3 semester hours)
Corequisites: CYOM 663 or permission of instructor
Description: This course explores a topic or collection of current topics that are timely and in response to critical or emerging topics in the broad field of Cybersecurity Operations and Control Management.

CYOM 699 - Applied Project in Cybersecurity Operations and Control Management

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Cybersecurity Operations and Control Management. A faculty member will supervise this study.

ENTP 500 - Entrepreneurship and Innovation

(3 semester hours)
Prerequisites: Graduate Standing
Description: Entrepreneurship and innovation are drivers of transformative change. This course introduces the concepts of innovation and entrepreneurship and strategies to take an idea into execution. Moreover, entrepreneurial and innovation ecosystems, and innovation within corporations are studied by utilizing case studies of some Silicon Valley companies.

ENTP 510 - Entrepreneurship: From Traction to Scale

(3 semester hours)
Prerequisites: None
Description: This course introduces the theoretical knowledge and practical skills needed to successfully navigate through the second stage of the business start-up, which is to gain traction and scale. The student is taught the Lean Method to take their start-up from raising investment to scale. Moreover, this course will provide hands-on training in the technologies and strategies used by small and large corporations in all aspects of running a start-up business.

ENTP 520 - Economics of Innovation

(3 semester hours)
Prerequisites: Graduate Standing
Description: This course introduces the role of innovation and technological change in business practice and economic growth. It analyzes sources of innovation in science, technology, and commercialization. Among others, the following topics are covered: the founding of new industries and new markets, commercialization of new technologies, incentives and organization of science, openness and proprietary/controlled innovation. Moreover, selected public policies toward invention and innovation are considered.

ENTP 530 - Financial Sustainability

(3 semester hours)
Prerequisites: None
Description: Financial sustainability is the goal of every start-up and new business unit. Starting from a discussion of common business models, the course covers business models, financial projections, and pro forma statements., funding models, institutional venture capital investment, social entrepreneurship, crowdfunding, corporate investment, etc. The course also covers administrative, operations, and legal issues.

ENTP 540 - Current Technology Trends Seminar

(3 semester hours)
Prerequisites: None
Description: This graduate-level seminar course aims to explore and analyze current trends in technology, focusing on their impact on society, industries, and the future. Through readings, discussions, presentations, and hands-on projects, the student will gain a comprehensive understanding of the latest advancements, emerging technologies, and their implications. Offered as needed.

ENTP 699 - Applied Project in Techpreneurship

(3 semester hours)
Prerequisites: GRAD 695 and permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Techpreneurship. A faculty member will supervise this study.

GRAD 509 - Research Methods

(3 semester hours)
Prerequisites: None
Description: This course introduces the student to the package of study design and research methods employed in a variety of operational practices. Lessons are structured around foundational research methodologies as well as the execution and reporting thereof. The student will engage in learning about and practicing research skills and methods in order to develop the capacity needed to research the people, processes, contexts and contemporaries of the design and study of modern systems, contexts, and surrounding populations. Through readings, discussions and the exploration of examples, guidelines, and heuristics, the course engages the student in the methodological aspects of empirical research strategies incorporating both human-facing and technology-oriented domains.

GRAD 690 - Graduate Independent Study

(3 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. 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 course.

GRAD 695 - Research Methodology and Writing

(3 semester hours)
Prerequisites: Completion of at least 18 graduate semester hours; must be taken prior to GRAD 699 or enrolled in one of the following graduate certificate programs: Biomanufacturing, Medical Biotechnology, or Regulatory-Legal Affairs in Biotechnology
Description: This course guides the student to develop and finalize a selected research problem and to construct a proposal that effectively establishes the basis for either writing a thesis or launching an experiential capstone project.

The course provides an overview of strategies for effective problem investigation and solution proposal. Research methodology is studied and applied as part of suggesting a solution to a problem. Writing and formatting techniques are also explored and applied as a communication tool for cataloging the investigation and recommending the solution.

GRAD 699 - Graduate Thesis

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: In consultation with the advisor, the student conducts research designed in GRAD 695 to address a problem as identified in the solution proposal.

HCIN 500 - Healthcare Informatics

(3 semester hours)
Prerequisites: None
Corequisites: None
Description: This is the survey course for the Program in Healthcare Informatics, both for the certificate and the master's degree. The student is exposed to the full range of healthcare informatics as it is employed in today's workplace. This course discusses issues, trends, challenges, and applications related to the role of the Informaticist in Healthcare Systems and Institutions including big data management, electronic medical records systems, eHealth, data governance and data sharing. Case-based and project-based approaches are used for discussion and assignments. The student does not require academic healthcare system knowledge beyond that contained in ISEM541 Healthcare Systems, although clinical experience facilitates more rapid assimilation of content material and a deeper understanding of the overall curriculum. The overall goal of the course is familiarity with the potential contributions of informatics to both health outcomes and business operations so that successful learners return to their workplaces with sufficient knowledge to immediately function more effectively and efficiently as Informaticists. Cross-listed with ISEM 542.

HCIN 515 - Essential Skills

(3 semester hours)
Prerequisites: None
Description: This is the first half of the keystone course for the Program in Healthcare Informatics, both for the certificate and the master's degree. The student engages in a 3-credit executive format course which provides them with a robust set of tools for devising customized potential solutions to a range of Healthcare Information Technology (HIT) implementation challenges facing healthcare systems today. Interactive sessions are needed to facilitate mastery of interpersonal skills. The goal of the course is familiarity with basic techniques and current best practices for the planning, evaluation, implementation, adoption and optimization of healthcare IT systems. The successful learner will be able to plan and execute HIT projects, facilitate change, communicate effectively with all staff, and intervene with problem adopters. Cross-listed with ISEM 512.

HCIN 520 - Essential Informatics Skills II

(3 semester hours)
Prerequisites: HCIN 515
Description: This is the second half of the keystone course for the Program in Healthcare Informatics, both for the certificate and the master's degree. The student engages in a 3-credit executive format course that provides them with a robust set of tools for devising customized potential solutions to a range of Healthcare Information Technology (HIT) implementation challenges facing healthcare systems today. Interactive sessions are needed to facilitate mastery of interpersonal skills. The goal of the course is familiarity with basic techniques and current best practices for the planning, evaluation, implementation, adoption and optimization of healthcare IT systems. The successful learner will be able to lead multidisciplinary teams, plan and execute HIT projects, work in an Agile/Lean environment, leverage adult learning theory, optimize the human-computer interface, and advise on HIT compliance issues.

HCIN 525 - Healthcare Case Studies Using Predictive Analysis

(3 semester hours)
Prerequisites: ANLY 512 or permission of the instructor
Description: This course is an elective course for graduate students studying Healthcare Informatics, Nursing, Pharmacy, Information Systems Engineering and Management, or Analytics and is intended to develop their understanding of using patient and administrative data to predict relevant outcomes and develop healthcare models. The course explores foundational concepts in data management, processing, statistical computing, and dynamic visualization. In this course, the student will investigate patterns, derive predictions in healthcare areas, and build models using selective predictive analysis techniques such as nonlinear regression, decision trees, probabilities, staffing models, queuing theory, event prediction, time series, rule-based modeling, and data visualization. The instructor will use case studies, and practical applications, small group projects, individual assignments, and a major course project to introduce students to simulations using existing data to master the various predictive models of healthcare analysis.

HCIN 541 - Healthcare Systems

(3 semester hours)
Prerequisites: None
Description: This course covers the basic principles, models and approaches of healthcare systems and introduces healthcare administration topics. The focus of the course is not on technologies but instead on the business and management aspects of healthcare. The course introduces the student to a wide range of healthcare topics such as healthcare business processes and business patterns, healthcare business process re-engineering and integration, healthcare clinical systems and services (patient care, physician support systems, health networks), hospital systems, management concerns, and government regulations. In addition, varied approaches and models of healthcare administration at local, national and international levels are discussed. Cross-listed with ISEM 541.

HCIN 545 - Healthcare Data

(3 semester hours)
Prerequisites: None
Description: This course addresses the central role of healthcare data in both health outcomes and business operations. This is the basic course in healthcare data management for the ISEM graduate program as well as the program in Healthcare Informatics, both the certificate and master's degree. The goal of the course is familiarity with basic techniques and current best practices for the governance, collection, cleaning, storage, sharing and handling of healthcare data. Case-based and project-based approaches are used for discussion and assignments. Prior experience in healthcare systems is not required, but knowledge of material contained in ISEM 541 Healthcare Systems is helpful in establishing context. Cross-listed with ISEM 545.

HCIN 550 - Introduction to Modeling, Optimization and Decision Making

(3 semester hours)
Prerequisites: None
Description: This is the analytics survey course for the Program in Healthcare Informatics, both for the certificate and the master's degree. Graduate students are exposed to the wide range of analytics tools and techniques used in today's workplace. The ultimate goal of the course is familiarity with the strengths and limitations of these tools so that successful learners return to their workplaces with sufficient knowledge to ask appropriate questions of the available data, choose the appropriate tools and techniques used to analyze the available data, and explain the strengths and weaknesses of any inferences made. Master's Degree students in Healthcare Analytics desiring more in-depth analytics application knowledge will pursue elective courses in ANLY. The student does not require mathematical knowledge beyond high school level algebra, although introductory calculus knowledge facilitates understanding in a few areas such as matrices, vectors, and rates of change. Cross-listed with ISEM 585.

HCIN 560 - Finance and Insurance Informatics for Healthcare

(3 semester hours)
Prerequisites: HCIN 545 and HCIN 550
Description: Healthcare finance is at the core of issues surrounding quality healthcare delivery and reform in the U.S. healthcare system. It involves balancing the need to manage/control costs, while simultaneously investing in strategic opportunities. This course emphasizes basic financial management theory related to the healthcare industry. This course also investigates the financial relationships between the healthcare provider, the patient, the employer group, and the payer (insurer). Course's focus is on budgeting, cost control, cost reimbursement, revenue, cost incentive programs, and financial analysis specific to healthcare. Moreover, healthcare billing practices from a variety of healthcare delivery systems are presented including an examination of insurance and reimbursement practices in terms of today's healthcare industry, and Medicare and Medicaid in terms of payment and governmental policy.

HCIN 699 - Applied Project in Healthcare Informatics

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Healthcare Informatics. A faculty member will supervise this study.

HCID 500 - Design Perspectives

(3 semester hours)
Prerequisites: None
Description: This course will introduce the student to the design perspectives encountered most often in human-centered interaction design. Design perspectives are attitudes towards how to do 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 delves into the foundations of design practice through different standpoints, histories, frames of reference and interpretations of different views of the 'best' way to design.

HCID 504 - Qualitative Discovery Research

(3 semester hours)
Prerequisites: None
Description: This course will introduce the student to the package of study design and research methods employed within human-centered interaction design. In this process-driven course, the lessons will be structured around design research methodology, execution, and reporting. The course will take place as a series of situation studios, in which the student engages their evolving design eye and research skills 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 ethical and entrepreneurial aspects of design research within design practice.

HCID 505 - Design Ethics

(3 semester hours)
Prerequisites: None
Description: Design solutions often require us to confront fundamental ethical issues. Ethical design involves considering the values of all involved parties, such as designers, corporate employers, intended users, and unintended users. Ethical design involves applying values, derived from theory, in every stage of the design process.
In this course, the student will examine a range of ethical theories, from the classical Western canon to feminist and Confucian theories, in order to analyze designs in fields from mobile apps to architecture, from military technologies to financial products, and will examine in depth the ethical challenges of AI. The student will perform in-depth ethical analyses, applying theories of their choice to better understand design decisions in their fields of interest, and will participate actively in weekly discussions, applying ethical theory to existing and future design solutions.

HCID 510 - Theories of Human Interaction

(3 semester hours)
Prerequisites: None
Description: This course will introduce the student to the theories and perspectives of human social behavior that are employed most often in HCID. Drawing on canonical and new sociotechnical science literature, the course will present the student with overviews of theories of information, action, sociality, conflict, and interaction within traditional and digital environments. Through readings and examples, the course includes attention to sociotechnical theories around communities of practice, online communities, social media, and enterprise knowledge management. This seminar 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.

HCID 512 - Design of Smart Technologies

(3 semester hours)
Prerequisites: None
Description: This applied overview course focuses on designing and integrating smart technologies into private and public spaces through a human-centered lens. The student will learn about opportunities and challenges with the integration of smart technologies and ambient environments into human life. The student will consider the social impacts and ethical considerations and trade offs when designing intelligent, multisensory human-technology interactions.

HCID 515 - Service Design

(3 semester hours)
Prerequisites: None
Description: Businesses maintain a competitive edge by offering a combination of products and services. How well interactions with a product go for users can determine the success or failure of the product. This course will discuss creating successful product service systems (PSS), and how to create desired outcomes for customers that are also valuable to the business. Service designers are at the forefront of carrying out research to answer these questions. In this course, the student will learn service design frameworks and research methodologies that tackle these service design prompts and usability issues. Class sessions will consist of lectures, discussions, sketching, design thinking exercises, presentations, and critiques. Work will be done individually in the first two assignments and in teams for the final assignment.

HCID 518 - Deceptive Design

(3 semester hours)
Prerequisites: None
Description: This course will focus on the identification, critique, and implementation of common deceptive or dark patterns designers employ that prey on people's innate cognitive biases to manipulate them to perform actions. In this class, the student will learn about the different cognitive biases and logical fallacies, their use in deceptive design patterns, and if there is a way to use this knowledge for user betterment through ethical persuasive design. By examining existing practices with a psychological perspective and critically comparing established techniques, the student can identify elements of deceptive design in contemporary solutions and how to employ that knowledge with beneficence in their work.
Becoming an ethical designer starts with recognizing unethical and manipulative techniques. With this knowledge, designers can choose not to use these patterns and can work to create more user-centric and ethical designs.

HCID 520 - Users and Populations

(3 semester hours)
Prerequisites: None
Description: This course will introduce the student to the design-based theories and contexts of users and populations, as found in human-centered interaction design. The course will be structured around three design contexts: cohorts; environments; and capabilities. The course will take 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 design eye for contextual integration of user and population theory within design practice.

HCID 540 - Design Tools and Processes

(3 semester hours)
Prerequisites: HCID 510 and HCID 520 or permission of instructor
Description: This course offers 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. Using an example project supplied by the professor, the course is run as a series of studios. After using tools and processes in each stage of the design process, the student reflects on the suitability and use case for each tool and reflect of their evolving sense of self as a designer. The course covers the tools, processes, and techniques necessary to professionalize the student's design practice.

HCID 570 - Design Patterns and Contexts

(3 semester hours)
Prerequisites: HCID 510 and HCID 520 or permission of instructor
Description: This course introduces the student to the contextual design of patterned interfaces in human-centered interaction design. The course is structured as a series of seminars around four design area: contexts; visuals; patterns; and actions. Taking the approach of goal-driven design, the student will engage in reading, discussing, experimenting, and presenting design rationales for design choices around traditional and new digital interfaces. The course builds on what the student learned in the other courses and intensifies the student's development of their design eye for contextually sensitive interaction design. The student will be challenged to consider areas of conflict and divergence within design thinking. While employing their own evolving capacity for design, the student will learn to manage conflicts between goal orientations, contextual needs, and environmental challenges.

HCID 680 - Special Topics in Human-Centered Interaction Design

(3 semester hours)
Prerequisites: Based on topic(s) covered or permission of instructor
Description: The in-program elective choices may vary each year, depending on needs and abilities of students, faculty, and external clients. Some co-teaching across the university's technology programs is expected to occur.

HCID 695 - Design Research Studio

(3 semester hours)
Prerequisites: Human-Centered Interaction Design major and completion of all core courses
Description: This course is a one-on-one student-focused research preparation studio. This course requires the student to conduct original research and document a design space within the domain of human-centered interaction design. The course is the first of two experiential learning classes for the completion of the HCID. The course will prepare the student for the GRAD699 portion of the degree, within which the student ideates, produce, and test a conceptual prototype that addresses the design problem identified through the research and analysis done in this studio course.

HCID 699 - Applied Project in Human-Centered Interaction Design

(3 semester hours)
Prerequisites: HCID 695
Description: In consultation with the academic and/or industry advisor, the student will execute on the findings and recommendations derived in HCID 695, towards a proof-of-concept of their work.

ISEM 500 - Strategic Planning for Digital Transformation

(3 semester hours)
Prerequisites: None
Description: This course introduces the principles of strategic planning of modern enterprises with a particular focus on digital transformation. This course is a mixture of business and technologies -- it concentrates on how digital technologies enable and drive modern business strategies. Initial topics include concepts of digital enterprises, stages of digital transformation, and planning strategies to compete and succeed in the digital age. The core of the course revolves around the building blocks of modern information systems that span business processes, enterprise applications, databases, computing platforms, web technologies, knowledge management, AI and network services. The final segment explores how global systems can be planned, engineered, integrated, secured, and managed by using the latest developments. Extensive case studies and hands-on assignments are used throughout the course. The student is encouraged to pursue their own areas of interest in team projects.

ISEM 501 - Introduction to Digital Technologies

(3 semester hours)
Prerequisites: None *(This course is designed for the student that does not have a CS or IT background.)*
Description: This course provides the basic background in the rapidly advancing field of digital technologies. It offers a rigorous overview of the current, as well as emerging, digital technologies building blocks that enable and drive modern enterprises. The first part of the course introduces the student to the key building blocks (enterprise applications, computing platforms, databases, and networks) of the modern IT infrastructure. The emphasis is on the Internet, broadband wired and wireless networks, classical Web, Semantic Web, XML, Web 2.0, social networking, and mobile computing. The second part of the course introduces the student to the main aspects of software development processes through hands-on projects. Basic software concepts are explored within this context by developing simple websites using HTML and then using JavaScript, Java applets, and XML to introduce more sophisticated features. The student has an opportunity to learn database technologies and run simple database queries using SQL.

ISEM 502 - User-Centered Design

(3 semester hours)
Prerequisites: None
Description: A high level of end-user and client involvement is absolutely critical in creating usable and effective software and technology that attracts audiences and/or generates revenue. User- centered design (UCD) describes an approach to business analysis and technology development that demands user interaction and user feedback in all stages of the development lifecycle. The UCD process involves a collection of activities and techniques that can be used to create the more usable, intuitive, and effective technology possible. This course covers the full range of UCD methods and demonstrates the importance of these techniques in designing and building interactive technology, focusing mostly on software applications.

ISEM 503 - Artificial Intelligence Principles and Applications

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: Interdisciplinary presentation of artificial intelligence as a coherent body of knowledge to acquaint the student with the key concepts and applications in business, science and engineering. The course covers models of intelligent behavior, including problem solving, knowledge representation, reason, planning, decision making, learning,

perception, pattern recognition, action, communication and interaction. Recent developments in knowledge management, expert systems, computer-aided consulting and integrated intelligent systems are covered through a wide range of case studies, examples and hand-on experiments.

ISEM 505 - Artificial Intelligence and Systems Engineering

(3 semester hours)
Prerequisites: ISEM 503
Description: Artificial Intelligence, Deep Learning and Machine Learning are technologies that must be individually set up and managed for each problem to be addressed and solved. To do so responsibly, the student needs a deep understanding of all the solution requirements as well as be able to draw out, setup, and maintain the environments in the student's business and organization where those technologies will live. This course is interdisciplinary. It introduces the student to AI-based systems in order to teach how AI interacts with the real world. The course introduces algorithms that transform inputs to outputs, how data is handled, computer architectures and problem-solving techniques for different fields and business areas. Discussions will focus on how to take a problem and idea to a model developed by a data scientist and deploy it as part of a scalable and maintainable system. Although modeling and algorithms are important components, the course also focuses on working relationships with a data scientist and issues of design, implementation, and operation of the systems. The student will understand the specific challenges of working with the AI components required to get a prototype model into production in order to solve real problems in industry.

ISEM 512 - Essential Skills

(3 semester hours)
Prerequisites: None
Description: This is the first half of the keystone course for the Program in Healthcare Informatics, both for the certificate and the master's degree. The student engages in a 3-credit executive format course which provides them with a robust set of tools for devising customized potential solutions to a range of Healthcare Information Technology (HIT) implementation challenges facing healthcare systems today. Interactive sessions are needed to facilitate mastery of interpersonal skills. The goal of the course is familiarity with basic techniques and current best practices for the planning, evaluation, implementation, adoption and optimization of healthcare IT systems. The successful learner will be able to plan and execute HIT projects, facilitate change, communicate effectively with all staff, and intervene with problem adopters. Cross-listed with HCIN 515.

ISEM 528 - Industry Analysis and Technology Patterns

(3 semester hours)
Prerequisites: None
Description: Complex interdependencies exist between various industry sectors and emerging technologies. This course is designed to prepare the student for a broad understanding of industries and their dependence on emerging technologies. Topics include analysis of the key industry sectors in the digital age and an examination of their financial and logistical interdependencies. Focus is on industry ecosystem as the network of organizations - including suppliers, distributors, customers, competitors, government agencies, and others - involved in the delivery of a specific product or service through competition, cooperation, and organizational learning. Particular attention is paid to the role of substitute technologies that could disrupt an entire industry ecosystem. Several real-life case studies and examples with particular focus on supply chains will be used to illustrate the key points.

ISEM 530 - Systems Engineering Principles

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: This course prepares the student to analyze business information systems to strategically build conceptual analysis models and logical designs. The emphasis at the beginning of this course is on understanding business

requirements, business processes, system life cycles and project-management elements and building conceptual models that support analysis and documentation of the business requirements. The second part of this course prepares the student to design complex systems and to develop designs and architectures with security and integration considerations. The course emphasizes business process modeling, object orientation, design patterns, and component-based design approaches.

ISEM 533 - Distributed Database Management and Security

(3 semester hours)
Prerequisites: None
Description: This course covers the fundamental principles of distributed database management, big data processing, cloud computing and AI security. The student will learn the theory of distributed systems, design, specification, implementation considerations, and performance management, as well as approaches to maintaining the consistency, concurrency, integrity, and reliability of distributed systems. In addition to these topics, the course also explores some basic concepts of big data processing techniques and the use of cloud computing platforms for scalable and distributed data storage and processing. The student will gain an understanding of how these technologies can be used to solve real-world problems in data-intensive applications. Overall, this course is designed to provide the student with a basic understanding of distributed database management within the perspectives of big data processing, cloud computing and AI security. By the end of the course, the student will have gained hands-on experience with a variety of tools and technologies used in these domains and will be well-equipped to tackle distributed data management problems.

ISEM 534 - Database Design and Management

(3 semester hours)
Prerequisites: None
Description: This course emphasizes the practical aspects of the design and administration of modern Database Management Systems (DBMSs) that host enterprise data. Specific topics include the role of data in modern enterprises and the data life cycle that spans conceptual database design, database query languages such as SQL, database integrity rules, database administration, and data warehouses. This course utilizes commercially available relational DBMSs for hands-on experiments and explore how to create an entity-relationship data model, translate that model into relational schema, build and use a relational database that implements the schema, create SQL queries to retrieve and manipulate needed data, provide access to remote databases from web browsers, and experiment with DBA (Database Administration) capabilities. The student also investigates recent developments in database technologies (e.g. NoSQL). This course prepares the student for database design and administration positions and will also provide the necessary background for more specialized courses in database systems.

ISEM 536 - IT Infrastructure and Cloud Computing

(3 semester hours)
Prerequisites: None
Description: This course concentrates on the practical aspects of Internet technologies, architectures and administration. Topics include: IT infrastructure, Internet Service Providers (ISPs), communications network principles, Internet Protocols, IPv4, IPv6, TCP sockets, and Internet of Things (IoTs). Administrative topics are network management, website administration, introduction to network security, wireless technologies and mobile computing. Classroom projects expose the student to network architectures for small to large enterprises. This course prepares the student for network planning administration positions and provides the necessary background for more specialized courses in communication networks.

ISEM 540 - Enterprise Architecture and Integration

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: Modern digital enterprises are characterized by increased automation, mobile services, extended B2B

operations with global business partners, and on-demand business services. This course presents a 'systems' perspective based on service-oriented architecture (SOA) that combines processes, people and technologies, and highlights the role of information and communication technologies, enterprise models, and emerging SOA standards to develop flexible and integrated business architectures.

ISEM 541 - Healthcare Systems

(3 semester hours)
Prerequisites: None
Description: This course covers the basic principles, models and approaches of healthcare systems and introduces healthcare administration topics. The focus of the course is not on technologies but instead on the business and management aspects of healthcare. The course introduces the student to a wide range of healthcare topics such as healthcare business processes and business patterns, healthcare business process re-engineering and integration, healthcare clinical systems and services (patient care, physician support systems, health networks), hospital systems, management concerns, and government regulations. In addition, varied approaches and models of healthcare administration at local, national and international levels are discussed. Cross-listed with HCIN 541.

ISEM 542 - Health Informatics and Information Systems

(3 semester hours)
Prerequisites: Graduate Standing
Description: This course introduces the basic concepts of healthcare information systems and explains the role of information and communication technologies in current and future healthcare systems. The course reviews the role of different players in healthcare: providers, physicians, and insurance companies. Topics covered in healthcare informatics include: health information networks (HINs) at local, regional, national and global levels; information technology systems and applications; standards and interoperability topics; electronic health records (EHR) and EMR; clinical decision support; computer physician order entry (CPOE), and e-prescriptions, privacy and security concerns, financial/administrative systems, and examples of IT infrastructure for healthcare. Cross-listed with HCIN 500.

ISEM 543 - Digital Health

(3 semester hours)
Prerequisites: Graduate Standing
Description: This course explains the basic principles of e-Health and m (mobile)-Health through case studies and examples. The student is shown how to effectively develop and administer e-Health systems using web technologies. A wide range of case studies and examples of e-Health systems are used. The course also examines how wireless networks and mobile computing applications are used in healthcare informatics. The student investigates the latest developments in the field and identifies research topics of importance.

ISEM 545 - Healthcare Data

(3 semester hours)
Prerequisites: None
Description: This course addresses the central role of healthcare data in both health outcomes and business operations. This is the basic course in healthcare data management for the ISEM graduate program as well as the program in Healthcare Informatics, both the certificate and master's degree. The goal of the course is familiarity with basic techniques and current best practices for the governance, collection, cleaning, storage, sharing and handling of healthcare data. Case-based and project-based approaches are used for discussion and assignments. Prior experience in healthcare systems is not required, but knowledge of material contained in ISEM 541 Healthcare Systems is helpful in establishing context. Cross-listed with HCIN 545.

ISEM 547 - IT Management

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: This course introduces the core principles and practical methods and techniques for effectively managing Information Technology (IT) systems and organizations. The emphasis is on business and information technology for planning, investing, budgeting, assessing value and risks, as well as governing and securing Information Technology organizations and assets. Topics include management and leadership roles and challenges associated with IT manager in the digital enterprise, organizational design for flexible IT organizations, corporate and IT governance frameworks, IT policies and controls for the business, risk assessments and response planning, IT finance and budgeting, and the role of close-based IT services in modern organizations. Extensive practical exercises and case study method will be used throughout the course.

ISEM 550 - Cybersecurity Management

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: This course covers the technical and administrative aspects of security, privacy and control that are vital to IS management. A comprehensive overview of security and IT control principles and practices that are needed to satisfy the IS systems integrity, confidentiality and availability requirements are addressed. Topics include security awareness, IS Security and Control Practices, IT audit principles and standards, risk analysis, and process-flow analysis for auditing.

ISEM 551 - Web-based Software Engineering

(3 semester hours)
Prerequisites: None *(previous IT/CS background or degree preferred)*
Description: This course is an introduction to web-based software engineering environments, design patterns, frameworks and key architectural aspects of robust enterprise applications. Topics for software development technologies include development languages and frameworks (e.g., .Net, Java, open-source), various tools used during the development lifecycle, and key components of an application in terms of the data, process and presentation layers. Architectural topics include prevalent design patterns such as model-view-controller (MVC), Web Services, and service-oriented architecture (SOA). The student uses computer-aided software engineering (CASE) environments and develops software architectures of real-life enterprise applications.

ISEM 558 - IoTs and Industry4.0

(3 semester hours)
Prerequisites: Graduate Standing
Description: This course is an introduction to the area of Internet of Things (IoTs) with a special focus on Embedded Systems and their applications. The course addresses a wide breadth of technologies and standards used to support this rapidly evolving domain. This includes the embedded system hardware, software, and operating systems. It also goes through wireless connectivity systems used for IoT, as well as the cloud support. The student will have an opportunity to explore current and future applications of IoTs and embedded systems in healthcare, energy, manufacturing, agriculture, transportation, and other vial sectors.

ISEM 564 - Cloud Computing, Big Data Applications and Machine Learning

(3 semester hours)
Prerequisites: None
Description: This course concentrates on the practical aspects of Cloud Computing and Big Data applications, architectures and analytics. Topics include data models, query languages, storage, retrieval techniques, distributed computing challenges. Classroom projects expose the student to cloud-based and real-world big data applications in business, healthcare, and public safety. The student will grasp the connection between big data and cloud computing

and various components such as machine learning and data security. By utilizing cloud services, the student can learn about different cloud platforms.

ISEM 565 - Business Intelligence and Decision Support Systems

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
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 business intelligence and knowledge management in modern enterprises and discusses how the decision support and expert systems tools can be used for effective decision making in organizations.

ISEM 570 - Principles of ITIL for IT Quality

(3 semester hours)
Prerequisites: ISEM 500 or permission of the instructor
Description: The information technology product is central to most business systems. Quality of the IT systems and their delivery are represented by accuracy, reliability, repeatability, and specific customer requirement standards. In this course, you will learn the various techniques to understand the quality processes best practices associated with the Information Technology Infrastructure Library (ITIL) framework as well as other relevant frameworks such as PMI principles and others. ITIL is about structure. IT services are complex, and so is a business infrastructure. The goal of an ITIL specialist is to marry the two together. This skilled professional aligns IT services with the needs of the company. ITIL is a core set of practices that offer a systematic and no-nonsense approach to structuring Internet technology within a business - mapping out a system that goes from customer needs to end user application utilizing the most proficient path.

ISEM 572 - Smart Cities and Strategic Intelligence

(3 semester hours)
Prerequisites: ISEM 500 or permission of instructor
Description: This course addresses advances in research, technologies, systems, and applications as related to "strategic intelligence." Strategic intelligence (SI) refers to the intersection of Business Intelligence, Knowledge Management, and Competitive Intelligence for improving the strategic decision making in Smart Cities. Instead of intelligence on one topic area, smart cities need strategic intelligence that covers multiple topic areas. This course discusses methodologies, trends, challenges, and applications as related to knowledge management, intelligent systems, automated planning and scheduling systems, analytics, and Big Data.

ISEM 574 - Bitcoin Blockchain

(3 semester hours)
Prerequisites: None
Description: Bitcoin and its underlying blockchain technology are disruptive innovations which are having a major impact on the financial industry and other industries. This course provides a technical introduction to Bitcoin, Blockchain, cryptography, keys and addresses, wallets, transactions, decentralized consensus, mining, and other Bitcoin technologies.

ISEM 575 - Ethereum Blockchain

(3 semester hours)
Prerequisites: None
Description: Ethereum is an exciting alternative to Bitcoin that provides support for Smart Contracts and Decentralized Applications (DApps) that are not possible to create on Bitcoin. This course offers not only a core developer experience

for the Ethereum platform with Web3 and the Solidity programming language, but also offers a comprehensive survey of how the Ethereum platforms have contributed to a completely new offering of DApps. Topics that are covered include Metamask wallet, Remix integrated development environment, transactions, keys and addresses, decentralized consensus, oracles, tokens, smart contract security, and other Ethereum technologies.

ISEM 576 - Cryptocurrency and Regulation

(3 semester hours)
Prerequisites: None
Description: After the emergence of Bitcoin, thousands of cryptocurrencies have surfaced with a vast supportive infrastructure for exchange of this value. This has resulted in diverse responses from governments and other regulating bodies. This course contains a comprehensive history of crypto assets and infrastructure, including exchanges, wallets, tokens, central bank-issued digital currencies, and the state of regulations. This course gives the student an introduction of blockchain assets, as well as explain how government jurisdictions are responding to this unique disruption.

ISEM 577 - Blockchain Scalability

(3 semester hours)
Prerequisites: None
Description: Blockchain Technology has ushered in a range of blockchain technologies. Different blockchains have selected different trade-offs in terms of scalability, interoperability, and decentralization. This course begins with a basic introduction to growth challenges faced by blockchains and how that has evolved in the blockchain ecosystem. This course describes different approaches to scalability including the Lightning Network, channels, sidechains, plasma, rollups, appchains, and hyperchains.

ISEM 578 - Decentralized Finance

(3 semester hours)
Prerequisites: None
Description: Blockchain is a fundamental disruption in the history of ledger technology, and it will deeply impact the future of all ledger-centric institutions such as central banks, commercial banks, companies and exchanges, as well as the currencies and assets that are transacted and traded inside them. This course covers Decentralized Finance (DeFi), the innovations and risks of DeFi, the range of existing DeFi applications and protocols, the extent to which DeFi is disrupting traditional finance, Fungible Tokens and Non-Fungible Tokens (NFTs), and Central Bank Digital Currencies (CBDCs).

ISEM 580 - Special Topics in Information Systems Engineering and Management

(3 semester hours)
Prerequisites: None
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 engineering and management. Due to the nature of evolving topics, this course may not be eligible for repeat.

ISEM 581 - Independent Study in Information Systems Engineering and Management

(1 to 3 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. 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.

ISEM 582 - Cloud Computing Applications for Business

(3 semester hours)
Prerequisites: ISEM 564
Description: This course introduces the student to Cloud systems impact and its relation to business operations. It addresses analytics and computations involving data sets that may be very large. Course goals are to teach advanced methods and tools utilized in the data science field in different business areas. The student will learn how to use and administer cloud computing resources and useful utilities. The lectures and discussions will help aid the student in understanding business drivers and changing business models. The student will also learn the latest solutions augmented by case studies. The course will provide hands-on cloud applications in order to provide an understanding of cloud computing and how businesses can best use it. The class will consist of lectures, hands-on in-class labs, homework assignments and in-class discussions. The student will gain experience working with different tools, including Amazon and Google Cloud services, through course assignments.

ISEM 585 - Introduction to Modeling, Optimization and Decision Making

(3 semester hours)
Prerequisites: None
Description: This is the analytics survey course for the Program in Healthcare Informatics, both for the certificate and the master's degree. Graduate students are exposed to the wide range of analytics tools and techniques used in today's workplace. The ultimate goal of the course is familiarity with the strengths and limitations of these tools so that successful learners return to their workplaces with sufficient knowledge to ask appropriate questions of the available data, choose the appropriate tools and techniques used to analyze the available data, and explain the strengths and weaknesses of any inferences made. Master's Degree students in Healthcare Analytics desiring more in-depth analytics application knowledge will pursue elective courses in ANLY. The student does not require mathematical knowledge beyond high school level algebra, although introductory calculus knowledge facilitates understanding in a few areas such as matrices, vectors, and rates of change. Cross-listed with HCIN 550.

ISEM 699 - Research or Applied Project in Information Systems Engineering and Management

(3 semester hours)
Prerequisites: GRAD 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Information Systems Engineering and Management (ISEM). Either a Research or Applied Project proposal, successfully developed in an ISEM GRAD 695 course, is the required input for this course. A faculty member will supervise this study.

ISEM 700 - Smart Enterprises and Strategic Intelligence

(3 semester hours)
Prerequisites: Admission to ISEM Doctoral Program
Description: Smart Enterprises are the next generation of digital enterprises that heavily rely on artificial intelligence (AI) to deal with customers, suppliers/partners, government agencies and employees. This course highlights advances in research, technologies, systems, and applications as related to intelligent digital enterprises such as smart cities, smart towns, smart healthcare, smart islands, industry4.0, and automated planning environments. The emphasis is on "strategic intelligence" (SI) that refers to the intersection of Business Intelligence, Knowledge Management, and Competitive Intelligence for improving the strategic decision making in Smart Enterprises. Instead of intelligence on one sector, SI concentrates on intelligence that cuts across multiple sectors. The course uses case-based and project-based approaches for discussion and assignments, but the focus is on research directions in this broad area of work. The student is expected to produce a research paper as the final output of this course.

ISEM 706 - Research Methods in Information Systems Engineering and Management

(3 semester hours)
Prerequisites: GRAD 509 and Admission to ISEM Doctoral Program, or permission of instructor
Description: This course builds on the introduction to research methods provided in GRAD 509 to examine and practice advanced methods of research and study design. The aim of this course is to learn and use the research methods and techniques relevant to Quantitative, Qualitative and Design Science research. Topics covered include research theorizing and model development, instrument development and validation, multivariate techniques, experimental design, structural equation modeling, qualitative research design, data analysis and implementation strategies, grounded theory approach, and significant study of design science research.

ISEM 715 - Systems Science

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: This is a research-focused course that demands extensive student research (readings), academic writing and presentation. This course introduces the student to the discipline of "Systems Science", which is characterized by multiple definitions but represents a field of scientific inquiry focused on the study of "systems". The concept of "System" is introduced and discussed in a mathematical form. The relationship between mathematics, computer technology and systems science is also explored. Conceptual frameworks within which to characterize Systems Science are discussed. A Systems Methodology is presented as a guide within which to address system problems, including the development of systems models. The topics of complexity and complexity reduction are also discussed. The history and the current future states of Systems Science research are also explored.

ISEM 725 - Advanced Business Process Modelling and Intelligence

(3 semester hours)
Prerequisites: Admission to ISEM Doctoral Program
Description: In-depth coverage of current practical, conceptual, and theoretical techniques of process modeling, simulation, and intelligence. Primary emphasis is given to understanding and applying various modeling techniques and languages (such as BPEL), types of simulations (such as discrete event simulation), and to using various techniques and tools (such as PROM) to develop data-driven models/prescriptions of process models. All the foregoing will be considered within the context of the development of solutions to both practical and cutting-edge problems. The student conducts a focused literature review on some advanced aspect of the studied material and issues.

ISEM 730 - Intelligent Systems Engineering

(3 semester hours)
Prerequisites: Admission to ISEM Doctoral Program
Description: This course integrates advanced systems engineering principles with AI/ML to design and analyze complex intelligent systems. The student will learn a requirements-driven approach, covering system testing, performance evaluation, and tools for managing system requirements. The student will explore the intersection of systems engineering, deep learning, and AI applications across various industries through research and hands-on exercises.

ISEM 735 - Advanced Applications of Machine Learning and Deep Learning

(3 semester hours)
Prerequisites: Completion of at least 18 graduate semester hours and knowledge of Machine Learning/Deep Learning approaches/applications (equivalent to ISEM 503 or ANLY 530) or Admission to ISEM Doctoral Program
Description: This course concentrates on how the latest thinking/ideas/applications in Machine Learning/Deep Learning (ML/DL) can be used in large scale and complex enterprise problems. Instead of exploring new ML/DL algorithms and techniques, this course explicitly focuses on advanced applications of ML/DL techniques to solve digital enterprise problems that span Health, Education, Public Safety, Public Welfare, Utilities, Smart Cities and

Communities, B2B Networks, and other Industrial Eco-systems. The students will select an applied research problem that could be possibly published as a conference paper and/or demonstrated as a solution prototype.

ISEM 740 - Enterprise Engineering

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: This course recognizes that the systems that we call enterprises must be (re)designed and (re)engineered. This course will provide an opportunity to gain fluency in theories and techniques of enterprise engineering through a study of enterprise ontology, modelling, and organizational design.

ISEM 745 - Research in Industry Analysis and Technology Patterns

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: This course will provide the tools and knowledge necessary for students to conduct analyses of single- and cross-industry ecosystems. After a brief review of existing tools, such as Porter's Five-Forces model, PEST analysis, and SWOT analysis, the course will turn to the use of various databases, research, and other sources of data, information and tools that allow description and prediction of industry trends and technologies that course shape industrial, socio-technical, and societal forces and outcomes.

ISEM 750 - Simulation Modeling and Analysis

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: Simulations and simulation tools provide a valuable means for modeling and analyzing complex systems, especially when analyzing real-world systems and objects which are not amenable to manipulation or data collection. This course will provide in-depth exposure to simulation modeling, simulation software, simulation analysis, relevant probability distributions, agent-based modeling and simulation, system dynamics, discrete-event simulation, and multi-method modeling.

ISEM 755 - Smart Cities, Societies, and Governments

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: This course will concentrate on smart cities, societies and governments as human cyber-physical systems. Students will use theory, concepts and techniques to investigate large-scale human collectives as "sociotechnical ecosystems of people, technology, organizations, and information." (Cassandras, C. (2016). Engineering, vol. 2 (2)). Topics will include, but not be limited to, big city data, sensing and sensors, IoTs, smart grids and energy, smart services, information and data ethics, smart transportation, and dynamic resource allocation.

ISEM 760 - Advanced Topics in Operations Management

(3 semester hours)
Prerequisites: Admission to ISEM Doctoral Program
Description: This course discusses how Operations are designed in modern digital organizations and how managers can use Information Technology (IT) to support these operations. Business operations in modern organizations are defined based on business strategies. The main focus of this course is to learn a) how business strategies are designed and implemented, b) how business operations are defined and managed, and c) how IT is used to enable the business operations. Recent research and industry trends in the field of operations management are discussed in some detail. The course systematically guides the student to conduct a focused literature review on some advanced aspect of the studied material and produce a research paper. The student uses hands-on tools for practical insights.

ISEM 765 - Large Language Models - Theory and Practice

(3 semester hours)
Prerequisites: Completion of Doctoral Breadth course requirements or permission of instructor
Description: This course explores Large Language Models (LLMs) by combining foundational principles with hands-on applications. The student will learn cutting-edge techniques for building, optimizing, and deploying LLM-powered solutions to enhance decision-making, automate workflows, and integrate LLMs into enterprise systems. Emphasizing real-world impact, the course examines LLM-driven innovation across manufacturing, retail, finance, and healthcare. A key objective of this course is to expose the student to open research challenges in LLMs, including issues of interpretability, efficiency, bias, and scalability-many of which represent "Ph.D.-hard" questions suitable for dissertation research.

ISEM 770 - Advanced Topics in ISEM

(3 semester hours)
Prerequisites: Completion of 12 semester hours of Breadth or Depth doctoral courses
Description: This course discusses overall research and industry trends in intelligent digital enterprises, industry4.0, intelligent planning and scheduling systems, next generation of digital infrastructure, business models, systems engineering, and other extant areas of work such as artificial intelligence, big data and analytics. The exact topics discussed will change with time. The main focus is on guiding the student to emerging relevant trends and to expose the student to a repository of potential "Ph.D. hard" questions (i.e., the questions that require Ph.D. level research).

ISEM 780 - Doctoral Research Seminar

Proposal Preparation & Defense
(3 to 6 semester hours)
Prerequisites: Completion of all Breadth and Depth course requirements; pass qualifying examination; Doctorate of Philosophy (PhD)-Information Systems Engineering and Management student
Description: This course provides support to the doctoral student within their specific domains of research. Led by the faculty advisor for that domain, the course is designed to provide a forum where faculty and the student can come together to discuss, support, and share the experiences of working in research. Research topics in the broad area of information systems engineering and management are discussed. Topic areas may concentrate on industry sectors (e.g., health, education, manufacturing, transportation, energy, environment, agriculture and others), emerging digital technologies and their impacts on the digital enterprises, and/or latest developments in systems engineering principles such as planning, architectures, integration, engineering/re-engineering, and engineering management. Each topic area will be studied in-depth to educate the student in conducting independent research. May be repeated for credit.

ISEM 781 - Doctoral Research Seminar II

(6 semester hours)
Prerequisites: ISEM 780 or ISEM 785
Description: This seminar is a continuation of ISEM 780 - Doctoral Research Seminar/ISEM 785 - Doctoral Research Seminar and provides continued support to the doctoral student within their specific domains of research. Led by the faculty advisor for that domain, the course is designed to provide a forum where faculty and the student can come together to discuss, support, and share the experiences of working in research.

ISEM 785 - Doctoral Research Seminar

Proposal Preparation & Defense
(3 to 6 semester hours)
Prerequisites: Completion of all Breadth and Depth course requirements; Doctorate in Engineering (D.Eng.)-Information Systems Engineering and Management student

Description: This course provides support to the doctoral student within their specific domains of research. Led by the faculty advisor for that domain, the course is designed to provide a forum where faculty and the student can come together to discuss, support, and share the experiences of working in research. Research topics in the broad area of information systems engineering and management are discussed. Topic areas may concentrate on industry sectors (e.g., health, education, manufacturing, transportation, energy, environment, agriculture and others), emerging digital technologies and their impacts on the digital enterprises, and/or latest developments in systems engineering principles such as planning, architectures, integration, engineering/re-engineering, and engineering management. Each topic area will be studied in-depth to educate the student in conducting independent research. May be repeated for credit.

ISEM 798 - Doctoral Studies

Complex Project
(6 semester hours)
Prerequisites: ISEM 785
Description: Advancement to candidacy is a prerequisite of this course. This is an individual study course for the doctoral student that culminates in a D.Eng. Thesis. Content to be determined by the student and the student's Doctoral Committee. May be repeated for credit.

ISEM 799 - Doctoral Studies

Research and Publication
(6 semester hours)
Prerequisites: ISEM 780; pass comprehensive examination
Description: Advancement to candidacy is a prerequisite of this course. This is an individual study course for the doctoral student that culminates in a Ph.D. Thesis. Content to be determined by the student and the student's Doctoral Committee. May be repeated for credit.

ITPM 515 - Business and Requirements Analysis Fundamentals

(3 semester hours)
Prerequisites: None
Description: This course is designed to help the student prepare for a career in management, building on their technical and professional background and education. The field of business analysis is a fast-growing profession that offers a global certification. Business analysis is a key function on a project team that promotes understanding of what the customers want the project team to build for them; it is essential to project success. Through the use of real life project examples, the student gains expertise in planning, eliciting, writing, and managing customer requirements for IT and other types of projects. Cross-listed with PMGT 515.

ITPM 580 - Special Topics in IT Project Management

(3 semester hours)
Prerequisites: None
Description: This course explores a topic of special interest that is timely and in response to a critical topic in the field of technology project management. Due to the nature of evolving topics, this course may not be eligible for repeat.

LTMS 500 - Macro Instructional Design

(3 semester hours)
Prerequisites: None
Description: This course focuses on the use of an instructional design process to improve learning outcomes, with an emphasis on the analysis components of instructional design that create a foundation for successful learning solutions. The course explores tools and techniques for analysis, design, development, delivery and evaluation and addresses

strategies that can be enhanced by technology integration. The goal of the course is to establish a systematic process for designing instruction and explores trends and technology integration opportunities throughout the process.

LTMS 501 - Active Learning Planning

(1 semester hour)
Prerequisites: None
Description: This course focuses on the research and evidence that supports the role of movement in learning, memory, attention and concentration. A course participant creates an active learning intervention plan for the school setting, which is reviewed by experts in the field. Upon completion, the student receives the Active Learning Specialist certificate. This course is delivered in an online, asynchronous format with new cohorts of students starting the online course each semester with a one-month rolling start date. Course completion takes approximately 30 hours over 5 to 10 weeks. Thirty (30) hours of asynchronous contact time equates to 15 hours of standard contact hours or 1 graduate semester hour. *This course is intended for current teachers, pre service teachers, administrators, athletic coaches, nutrition experts, and parents serving on a school board.*

LTMS 503 - Raspberry Pi in the STEM Classroom

(3 semester hours)
Prerequisites: None
Description: Uses of the Raspberry Pi in the STEM Classroom are explored. Topics include teaching the Linux operating system to students, uses of the various programming languages in the PI, including Scratch, Sonic Pi, and Python. An introduction to physical computing within several curricula in an integral part of the class. The student will be expected to purchase a Raspberry Pi 3B starter kit.

LTMS 504 - Robotics in the STEM Classroom

(3 semester hours)
Prerequisites: None
Description: This course will explore STEM and robotics through hands-on application, real world examples and classroom/industry based examples. The course will explore the two main theoretical approaches to STEM. Over the duration of the course, the student will be able to discuss the theory of STEM, experience hands-on applications of STEM using robotics and other tools, and create comprehensive unit plans and hands-on projects.

The student will need to purchase Microbit Robotics controller and peripherals (approx $45.00).

LTMS 505 - Digital Security for Instructional Technology Specialist

(3 semester hours)
Prerequisites: None
Description: If you are a certified Instructional Technology Specialist you need to be aware of a variety of cybersecurity issues that become more important day by day. This class will cover topics in the 5 areas of cybersecurity defined by NIST: Identify, Protect, Detect, Respond and Recover, as well as school specific security concerns.

LTMS 507 - Implementing Google Tools in the Classroom

(3 semester hours)
Prerequisites: None
Description: This class explores the use of applications within the Google G Suite for education and Google Chromebooks in a school environment. Course topics include the use of the tools to foster individual creativity, collaboration, and presentation skills within a constructivist educational paradigm. This course is taught by Google certified educators and requirements for Google certification are presented.

LTMS 509 - Implementing Microsoft Tools for Education

(3 semester hours)
Prerequisites: None
Description: This class explores the use of applications within the Microsoft Tools for Educator in a school environment. Course topics include the use of the tools within Office 365 to foster individual creativity, collaboration, and presentation skills within a constructivist educational paradigm, including the use of Skype as a collaboration tool in the classroom. This course is taught by Microsoft certified educators and requirements for Microsoft certification are presented.

LTMS 510 - Learning Technologies and Solutions

(3 semester hours)
Prerequisites: None
Description: This course presents an overview of multiple technology-based solutions to realize learning outcomes. Beyond a survey of learning software, the course challenges the student to think broadly about emerging technology trends that present opportunities. By establishing a systematic decision analysis process, the student is able to assess suitable technology tools for specific environments and learning needs. A broad survey of open source and proprietary solutions are explored, as well as emerging trends in learning technologies. Course topics are examined within a framework of a learning strategy and a learning architecture.

LTMS 514 - Media Selection, Design and Production

(3 semester hours)
Prerequisites: None
Description: This course focuses on creating media for learning solutions. Selecting appropriate media to meet learning objectives are explored as the student creates graphics, illustrations, audio, video, and animations to support learning. Graphic design fundamentals are addressed, in addition to production skills like media compression and conversion. Industry leading media software and open source options are considered.

LTMS 515 - History of Instructional Technology

(3 semester hours)
Prerequisites: None
Description: This course explores the history of instructional technology, and the instruction design practices reflected in that history. Topics include the origins of programmed instruction as practiced by BF Skinner and Norman Crowder, the PLATO system as the first large scale educational technology platform, the Apple II and other early microcomputers, Seymour Papert and the move to cognitivist instruction, Window systems and finally, the Raspberry Pi as an example of the latest STEM based instructional platform.

LTMS 518 - eLearning Development

(3 semester hours)
Prerequisites: None
Description: This course presents content creation software that can be used for eLearning. The student creates eLearning modules that focus on navigation, usability and compliance to content standards. Planning and asset management are also explored as elements of efficient eLearning development. Industry leading software and open source options are considered.

LTMS 520 - Learning Evaluation and Assessment

(3 semester hours)
Prerequisites: LTMS 500
Description: This course focuses on measuring multi-modal learning and performance with an emphasis on the use of technology as an evaluation and assessment tool. Course evaluation and learner performance are both explored as formative and summative assessment, authentic assessment, subjective and objective assessment, criterion-referenced and norm-referenced assessment, formal and informal assessment, testing and evaluation standards, analytics and metrics, the importance of validity and reliability, and the use of technology in the evaluation and assessment process.

LTMS 525 - Learning Theories and Instructional Strategies

(3 semester hours)
Prerequisites: None
Description: This course is an in-depth exploration of learning theories including, but not limited to, behavioral modeling, cognitive processing, metacognition, motivation, social learning, constructivism and connectivism. Culture and learning, brain research and the integration of technology to support learning theories are also explored. Theories and practices are examined within the context of creating instructional strategies as part of learning design with a focus on technology-supported learning solutions.

LTMS 530 - Managing Technology Resources

(3 semester hours)
Prerequisites: LTMS 510
Description: New technologies are changing instruction and placing new demands on technology professionals that support learning technologies. This course addresses the challenge of providing access to educational technologies while balancing security and resources in learning environments. The course establishes strategies for assessing, planning, implementing, supporting and governing learning technologies with a focus on maximizing the instructional value of technology investments.

LTMS 531 - Designing Serious Games and Simulations

(3 semester hours)
Prerequisites: LTMS 500
Description: This course focuses on applying game and simulation design strategies to increase context, motivation, engagement and learning outcomes. Character development, narrative, user interface, game play, game balancing, principles of level design and feedback in games and simulations are applied as the student designs a game or simulation to achieve a learning goal. The differences and similarities between game and simulation concepts, genres and worlds are examined, in addition to game and simulation intricacies for specific groups and game production and management.

LTMS 532 - Developing Serious Games and Simulations

(3 semester hours)
Prerequisites: LTMS 514 and LTMS 531
Description: This course presents tools and techniques for developing serious games and simulations. Programming and scripting languages, simulation systems, programming fundamentals, game architecture, navigation, usability, feedback, data management, artificial intelligence, media programming and developing for multiplayer environments are explored as the student develops the design from the "Designing Serious Games & Simulations" course. Game production and management with a focus on the game development phase are also discussed.

LTMS 533 - 3-D Modeling and Design

(3 semester hours)
Prerequisites: LTMS 514
Description: This course develops skills in computer-generated 3D modeling and design with a focus on basic 3D concepts, animation concepts and physics, scene management, modeling, mesh, materials and mapping. A focus is given to lighting, physics, and particle emitters as part of object development and animation. 3D rendering options and preferences are also examined. A discussion of 3D production and management requirements is also explored.

LTMS 535 - Critical Issues in Biology Education

(3 semester hours)
Prerequisites: LTMS 500 and LTMS 510
Description: This course addresses topics in biology education that combine current priorities in science and the need of the society. Topics such as biological knowledge, scientific methods, and career awareness are covered. This course also surveys the biology education landscape to identify topics in K-12, postsecondary and professional biology education that are impacting interest and achievement in STEM education and how interactive learning experiences such as games and simulations can address the student motivation and cognition challenges for improved learning outcomes.

LTMS 536 - Applied eHealth Communication

(3 semester hours)
Prerequisites: LTMS 500 and LTMS 525
Description: This course focuses on developing a foundational knowledge of theory-based methods in health communication and the application of those methods to creating health communication products that influence awareness, knowledge, attitude, and behavior within a target audience. The course examines successful case studies in health communication and the stages of health communication product development (audience assessment, product planning, development, testing, revision, and implementation) as they apply to eHealth Communication.

LTMS 540 - The Instructional Designer as Entrepreneur

(3 semester hours)
Prerequisites: completion of 15 graduate-level credits and Learning Technologies Major
Description: This course focuses on the evolution of the profession of instructional designer from one customarily employed by a corporation to one where the instructional designer is most frequently an independent contractor. The focus is on the effect this has on the required skillset and mindset of the designer. The course explores tools and techniques for finding work, evaluating requests for proposals, writing proposals, meeting with selection teams, and building strategies that can be enhanced by technology integration. The goal of the course is to establish a systematic process for designing the workflows, processes, and skillsets needed to build an instructional design consultancy.

LTMS 544 - Critical Issues in Teaching Mathematics

(3 semester hours)
Prerequisites: LTMS 500 and LTMS 510
Description: This course explores the integration of learning technologies into a math curriculum. Emerging opportunities in learning technologies for active learning, applied math, data visualization, media solutions and assessment are investigated. Promoting math careers and supporting professional development through the use of learning technologies are also explored.

LTMS 580 - Special Topics in LTMS

(3 semester hours)
Prerequisites: None

Description: This course explores a topic of current interest in the field of learning technology. Due to the nature of evolving topics, this course may not be eligible for repeat.

LTMS 598 - Critical Issues in Teaching Science

(3 semester hours)
Prerequisites: LTMS 500 and LTMS 510
Description: This course explores the integration of learning technologies into a science curriculum. Emerging opportunities in learning technologies for active learning, virtual labs, data visualization, media solutions and assessment are investigated. Promoting science careers and supporting professional development through the use of learning technologies are also explored.

LTMS 599 - Critical Issues in Teaching Technology

(3 semester hours)
Prerequisites: LTMS 500 and LTMS 510
Description: This course explores the integration of learning technologies into a technology curriculum. Emerging opportunities in learning technologies for active learning, virtual computer labs, media solutions and assessment are investigated. Promoting technology careers and supporting professional development through the use of learning technologies are also explored.

LTMS 602 - Technology Evaluation and Selection

(3 semester hours)
Prerequisites: LTMS 510
Description: Effectively evaluating and selecting the right technology solution (software, hardware, and services) for myriad complex situations is a necessary skill in the development and management of learning technology projects and initiatives. This course explores the request for proposal (RFP) process for evaluation and selection including evaluating the needs and internal processes of the organization along with evaluating an RFP. Keys to the successful implementation of new technologies and solutions are also explored.
Each topic will be handled as a 2-week sprint and will be structured as an initial lecture that designates the parameters of a topic. This will then be followed with several possible case studies that explore those parameters in real situations, either from the point of view of schoolteachers or corporate instructional designers. The student will work in teams to develop the case studies and come to a consensus on how to proceed. For each sprint, the student will present a solution to the case.

LTMS 609 - Synchronous Facilitation

(3 semester hours)
Prerequisites: LTMS 500
Description: This course is an in-depth discovery of planning, producing and facilitating synchronous face-to-face and online communication and learning events. Classroom facilitation techniques are examined, in comparison and support of developing online facilitation skills. Creating audience engagement with effective content development, media and interactive elements in an online synchronous session are addressed. The producer's role in facilitator and participant preparation, technology validation, logistics, in-session troubleshooting and post-session follow-up is also examined. Industry leading web conferencing and virtual classroom software and open source options are both considered.

LTMS 610 - Learning Technologies Project

(3 to 6 semester hours)
Prerequisites: Learning Technologies Major
Description: The student creates and executes a detailed project plan to use as part of a real-world project that applies

concepts and skills previously explored throughout the program. The student's project is customized to a particular area of interest in learning technologies. This experiential course also provides an opportunity to reinforce and demonstrate the eight University competencies, i.e., critical thinking, communication, teamwork and collaboration, entrepreneurship, information literacy, ethical decision making, global awareness, and civic engagement.

LTMS 614 - Social Learning in the Organization

(3 semester hours)
Prerequisites: None
Description: This course explores the use of social learning and communication in organizations, the software tools used to enable online social interaction and the challenges of organizational implementation. Social learning technologies enable conversations, content creation, connections and collaboration in the organization. When socially-enabled, these activities can increase productivity, deliver knowledge at the time of need and address time and location challenges that exist in today's organizations. The student identifies a learning or communication opportunity to create a solution using social learning technologies. Open source and industry leading hardware and software options are both considered.

LTMS 615 - Coordinating the Learning Technology Infrastructure

(3 semester hours)
Prerequisites: LTMS 530
Description: This course focuses on identifying, selecting, installing and maintaining a technology infrastructure to support technology-enabled learning solutions. Administrative and educational technology needs along with the need for assistive technology resources to support learners with special needs are specifically addressed within the examination of the overall infrastructure.

LTMS 618 - Accessibility Software and Devices

(3 semester hours)
Prerequisites: LTMS 500
Description: This course is a study of software and hardware devices that are used to address accessibility requirements. Design fundamentals, built-in accessibility development functions, scripting solutions, accessibility devices and alternative delivery methods are explored in the context of achieving compliance with the 1998 amendment to Section 508 of the Rehabilitation Act of 1973 requiring electronic and information technology accessibility by government and government-subsidized organizations for persons with disabilities.

LTMS 628 - Advanced eLearning Development

(3 semester hours)
Prerequisites: LTMS 518
Description: This course continues the topics introduced in LTMS 518. In this course, the student will develop expertise in a variety of topics that will lead to their becoming a successful eLearning technologist on a professional development team. Topics for this course include the workflows of a professional team, areas of responsibility, publication and distribution of completed content and the role of the technologist in the eLearning life cycle, and a concentration on other practical topics that will permit the student to obtain a job working in the eLearning field.

LTMS 636 - Micro Instructional Design

(3 semester hours)
Prerequisites: LTMS 500, LTMS 510, and either LTMS 514 or LTMS 518
Description: An in-depth exploration of instructional design strategies and techniques are explored in a project-based

group environment. Selecting media, identifying learning objectives, writing assessment instruments and creating a detailed instructional plan are examined as part of the complete design and development of a learning solution.

LTMS 645 - Visual Representation for Learning and Communication

(3 semester hours)
Prerequisites: LTMS 514
Description: This course explores the benefits of visually representing ideas, concepts and processes to improve the results of learning and communication. The history of visualization for learning and communication, along with the current research and trends in using visuals to improve learning and communication, are explored. Techniques and technologies for brainstorming, mind mapping, creating instructional and curricular design, thinking creatively, planning, creating visuals and delivering visual learning and communication are applied in individual and group projects throughout the course.

LTMS 680 - Advanced eLearning Development

(3 semester hours)
Prerequisites: Permission of Instructor
Description: An in-depth exploration of advanced eLearning application development is explored in a project-based group environment. Interactivity, personalization, data flow and management and system integration are examined as part of developing an advanced eLearning application.

LTMS 697 - LTMS ePortfolio

(0 semester hour)
Prerequisites: None
Description: A graduate student pursuing the Pennsylvania Department of Education Instructional Technology Specialist (ITS) K-12 instructional certificate is required to create an ePortfolio. The ePortfolio presents the student's knowledge and performance in the competencies required by the ITS guidelines.

LTMS 698 - Learning Technologies Internship

(1 to 6 semester hours)
Prerequisites: GRAD 695 or permission of advisor
Description: The student conducts learning technology-related activities at an organization to apply concepts and skills previously explored throughout the program. This experiential course also provides an opportunity to demonstrate and further develop the eight University competencies, i.e., critical thinking, communication, teamwork and collaboration, entrepreneurship, information literacy, ethical decision making, global awareness, and civic engagement. This course is required for and limited to Pennsylvania School Teachers seeking the Instructional Technology Specialist Certification.

LTMS 699 - Applied Project in LTMS

(3 semester hours)
Prerequisites: GRAD 695 or permission of advisor
Description: This course allows the student to pursue an area of interest that is within the broad scope of learning technologies. A faculty member supervises this study.

MGMT 510 - Business Strategy and Management Principles

(3 semester hours)
Prerequisites: None
Description: This course introduces the basic concepts of business strategy and management principles of planning,

organizing, staffing, developing, and monitoring/control. The context is global markets and their impact on business strategies and managerial processes. The course explores the best practices in global strategic management, organizational design, human resource processes, and organizational behavior.

MGMT 511 - Digital and Global Enterprises

(3 semester hours)
Prerequisites: MGMT 510
Description: Modern enterprises are globally dispersed organizations where nearly all significant business processes and relationships with customers, suppliers, and employees are digitally-enabled and key corporate assets are managed through digital means. Such organizations merge the concepts traditionally discussed in ecommerce, ebusiness and egovernment. This course introduces the organizational and operational aspects of such organizations and highlights the role of managing such organizations. Topics include organizational structure and design, learning and agile organizations, and operational concerns such as management of supply chains and B2B trade at a global level.

MGMT 512 - Marketing Principles and Applications

(3 semester hours)
Prerequisites: MGMT 510
Description: This course introduces the student to the most recent and relevant thinking in marketing in the competitive global marketplace. The student is provided with analytical tools to understand and synthesize the most current applications of theories and concepts in marketing. The student is shown how to design strategic planning for competitive advantage in the marketplace and is encouraged to explore the essence of marketing environment and the global vision for business marketing.

MGMT 513 - Accounting Principles and Applications

(3 semester hours)
Prerequisites: MGMT 510
Description: This course explores the basic financial and managerial accounting competencies needed to manage a business or product line. The accounting concepts are introduced with a discussion of how general purpose financial statements reflect the business corporations' performance and position for readers external to management.

MGMT 520 - Professional Communication

(3 semester hours)
Prerequisites: None
Description: This course provides training in business writing, interpersonal communication and oral communication to prepare the student to be a more effective professional communicator. The student works on projects in the classroom that offer practical applications of concepts covered in the textbook, including case study examples of poorly executed business communication that the student revises and improves. The student also writes a proposal and a report and prepares a plan to manage a project team kickoff meeting.

MGMT 560 - Organizational Leadership

(3 semester hours)
Prerequisites: None
Description: Successful project managers are adept at leading. Leadership, however, is a complex undertaking that requires knowledge and understanding of a number of competencies. This course builds these competencies. Focusing on organizational leadership, the course explores and develops skills and knowledge needed to lead organizational transformation and change, negotiate conflict resolution, build relationships and human capital, and instill business ethics and professional codes of conduct.

MGMT 580 - Special Topics in Management

(3 semester hours)
Prerequisites: None
Description: This course explores a topic of current interest in the field of management. Due to the nature of evolving topics, this course may not be eligible for repeat.

MGMT 721 - Management Sciences I

(3 semester hours)
Prerequisites: Completion of all 500-level Breadth courses and ISEM 706, or permission of instructor
Description: This course is concerned with the use of quantitative approaches to formulate, analyze, and solve business, management, and social problems. Advanced management science combines operations research and management systems to model complex management problems to discover and apply optimal solutions. The student is expected to investigate complex managerial and societal problems using scientific methodologies. Topics include, but are not limited to, Management Science Research, Linear Programming, Modeling with Spreadsheets, Inventory Management, Network models and Forecasting techniques.

MGMT 722 - Management Sciences II

(3 semester hours)
Prerequisites: MGMT 721
Description: A continuation of Management Science I, combining operations research and management systems to model complex management problems to discover and apply optimal solutions. Basic deterministic models and methods are described in MGMT 721. The main focus of this course is on advanced deterministic and stochastic models in Operations Research. Topics include, but are not limited to, Stochastic processes, Markov chains, Queuing models, Non-linear optimization, Dynamic programming, and game theory.

MGMT 731 - Innovation and Entrepreneurship

(3 semester hours)
Prerequisites: Admission to ISEM Doctoral Program
Description: In this course, the models for successfully organizing technologically driven innovations, in entrepreneurial and established firms, are studied, and critiqued. The student learns to develop innovative-based strategies, which will cause entrepreneurial organizations to earn sustained competitive advantage. The student also discovers how to identify, build, and commercialize technological innovations. This course emphasizes the need for continuity in the building and commercialization of valuable innovations. It draws heavily from recent literature and models on entrepreneurial innovation and expects the student, not only to critique these existing literature and models, but to design original technology-driven innovations that could aid organizations gain and sustain competitive advantage. The course is divided into 4 Modules, which takes the student from the formulation of innovative ideas to the building of innovative entrepreneurial firms. These modules will systematically guide the student to conduct a focused literature review on some advanced aspect of the studied material and produce a research paper.

MATH 510 - Applied Statistical Methods

(3 semester hours)
Prerequisites: None
Description: This is an applied statistics course with probability theory being presented but applicable statistics is emphasized. The course covers the statistical methods and models that practitioners require for use in their professions and is an applied course in regression, analysis of variance, and linear models which includes experience with the SAS statistical software package. Topics include descriptive statistics/data summaries, inference in simple and multiple linear regression, residual analysis, estimation and testing of hypothesis, transformations, polynomial regressions,

model building with real data, nonlinear regression and linear models. This course is not mathematically advanced but covers a large volume of material.

NURS 510 - Foundational Concepts for Master Prepared Nurses

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program
Description: This course is the first course in the core curriculum for Master of Science in nursing. It provides an overview of the theory in advanced nursing to prepare the graduate with a broad knowledge and practice expertise that builds and expands upon their entry-level nursing practice. The student is expected to have a deeper understanding of the discipline of nursing to engage an advanced level of nursing practice and leadership in a variety of settings with the commitment to the lifelong learning philosophy.

NURS 515 - Quality and Safety

(3 semester hours)
Prerequisites: B or higher in NURS 510
Description: This course will introduce the student to the quality and process improvement methodologies within different healthcare settings. The student is expected to have a deeper understanding of nursing's role in quality and processes improvement. The student delves into the foundations of quality and process improvement practice through different standpoints, histories, frames of reference and interpretations of different views of the best practices.

NURS 520 - Healthcare Policy

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program
Description: This course will explore contemporary issues in healthcare and how they are/or may be addressed through development, implementation, and evaluation of policy. Issues of economics, access, demand, and services are explored. The political issues underpinning public policy, decisions related to specific health services issues, as well as social determinants are examined. The societal and organizational contexts of the delivery of nursing services across various settings are explored with organizational, local, state, national, and global perspective.

NURS 540 - Advanced Research Methods and Evidenced-Based Practices

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program
Description: This course builds upon the nurse's knowledge of research theories and methods and evidence-based practices. This course has some strong focus and data analytics and evaluation. Throughout readings, case studies and the application of data the student will have practical experience evaluating evidence-based solutions to improve the health outcomes of an individual or population.

NURS 550 - Advanced Pathophysiology/Pharmacology and Health Assessment

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program
Description: This course builds upon the nurse's knowledge of anatomy and physiology, pathology in the disease process, pharmacology, and health assessment associated with the human body systems. This course is an integrated approach to health assessment.

NURS 605 - Foundations for the Clinical Nurse Leader I

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program with the Clinical Nurse Leader Concentration
Description: This course provides a foundation for the implementation of the clinical nurse leader role. The student focuses on the role and its contribution to improve patient outcomes, ensure quality care and reduce health care cost. Concepts, theories, and issues related to nursing leadership and care environment management are investigated in depth. End of program competencies for the Clinical Nurse Leader role will be discussed.

NURS 610 - Foundations for Clinical Nurse Leader II

(3 semester hours)
Prerequisites: NURS 605
Description: The student applies elements of the CL curriculum with a select cohort of clients. This course facilitates the development of skills for advocacy and leadership in a microsystem to promote positive change in a healthcare delivery system while putting best practices into action. This course will include assignments that will fulfill 25 hours of non-preceptee hours that is a part of the total clinical hours needed to fulfill program requirements.

NURS 620 - Theoretical Foundation in Nursing Education

(3 semester hours)
Prerequisites: Completion of all MSN Core Courses and B or higher in NURS 510
Description: This course prepares the prospective nurse educator with the foundational principles necessary for teaching in various settings: classroom, clinical, and college laboratories, and health care agencies.

NURS 625 - Curriculum Development

(3 semester hours)
Prerequisites: Completion of all MSN Core Courses
Description: The purpose of this course is to offer the student applications in nursing curriculum design, including the development of a teaching/ learning philosophy, mission statement, programmatic goals, learning objectives, teaching plans, and individual courses.

NURS 630 - Epidemiology in Action: Tracking Health & Disease

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program with the Clinical Nurse Leader Concentration
Description: The student will apply principles of epidemiology using public health and population health theories using data and other variables to determine the best possible clinical or population outcomes. This course includes assignments that will fulfill 25 hours of non-preceptee hours that is a part of the total hours needed to fulfill program requirements.

NURS 635 - Clinical Nurse Leader Evaluation of Health Outcomes

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program with the Clinical Nurse Leader Concentration
Description: The student will use quality improvement and process evaluation techniques to track and evaluate health outcomes to ensure the best possible clinical or population outcomes. This course will include assignments that will fulfill 25 hours of non-preceptee hours that is a part of the total clinical hours needed to fulfill program requirements.

NURS 640 - Nursing Research and Evidence-Based Teaching Models

(3 semester hours)
Prerequisites: Admission to the Master of Science in Nursing Program

Description: This course provides an overview of teaching methods utilized in nursing education to support the student learning in clinical, didactic and online learning environments. The student examines various teaching/learning technologies, including simulation, and integrate these technologies with select teaching methods in the design of coursework to support learning.

NURS 645 - Assessment and Evaluation in Education

(3 semester hours)
Prerequisites: Completion of all MSN Core Courses
Description: This course explores the theories, principles, and practices that underpin the measurement and evaluation of educational settings and programs. This course includes content on approaches to giving feedback, test construction, and psychometric evaluation, development, and grading of written assignments, evaluation of clinical performance and self-evaluation for personal teaching effectiveness.

NURS 695 - Nursing Practicum I

(3 semester hours)
Prerequisites: Completion of all MSN Core Courses
Description: This experiential course synthesizes the key concepts of the program extending and applying these concepts to real-life practical problems or research investigation.

NURS 699 - Nursing Practicum II

(3 semester hours)
Prerequisites: NURS 695
Description: This course is a continuation of the experiential component. The course synthesizes the key concepts of the program extending and applying these concepts to real-life practical problems or research investigation.

QISC 555 - Implementation Technologies in Quantum Devices

(3 semester hours)
Prerequisites: QISC 530
Description: This course introduces a wide range of scientific ideas, engineering techniques, and manufacturing technologies employed in harnessing quantum physics to create quantum devices; such as quantum clocks, computers, sensors, and the quantum internet. This is a topical-survey course that presents the terminology and basic principles underlying the theoretical and practical aspects of these devices. The student will be presented with the historical context and trajectory of important innovations and be brought up to date with the present state of these underlying technologies. At the conclusion of this course the student will be wholly conversant in the present challenges in the development of these devices, supported by a student-produced whitepaper, accompanied by the production of a video presentation.

QISC 565 - The Business of Quantum Technologies, Research and Policies

(3 semester hours)
Prerequisites: QISC 530
Description: This course surveys the historic and present-day business, governmental and academic landscape of quantum technologies and the associated ecosystem of the industry. An in-depth analysis of the quantum ecosystem (industrial, governmental, and academic) will be conducted leading to formation of individualistic projections of the industry, including a survey of opportunities and pitfalls for players in the ecosystem. Moreover, the student will be guided in developing a personalized document consisting of a meaningful business plan or research proposal that describes their projected entry into the quantum technology ecosystem; this proposal will be enhanced by the student creating a video presentation to accompany their document.

QISC 715 - Topics in Quantum Information Science

(3 semester hours)
Prerequisites: QISC 530 and ISEM 706, or permission of instructor
Description: This course focuses on four important applications of quantum computing and provides a foundation for the student to develop applied research in an area of their choosing. Students will be guided on practical and theoretical aspects of using a quantum computer for simulation, optimization, machine learning, and communications. The student will design, develop, and carry out original research in one of these areas.

PHAR 520 - Pharmacokinetics and Pharmacodynamics

(3 semester hours)
Prerequisites: None
Description: This course introduces the student to the principal factors that can impact absorption, distribution, and elimination of drugs in the body. Specifically, mathematical approaches to characterizing pharmacokinetics (PK), the study of factors influencing drug concentrations in the body, and pharmacodynamics (PD), the study of the physiologic action of drugs in the body, are discussed with an emphasis on small molecule and protein therapeutics. The clinical and non-clinical applications of PK and PD will be discussed. The student will participate in simulations of real-world pharmacokinetic monitoring of various drugs used clinically to treat infections, control seizures, and suppress arrythmias.

PHAR 525 - Drug Transport

(3 semester hours)
Prerequisites: None
Description: This course covers multiple aspects of drug transport, from simple diffusion to protein-mediated active transport of drugs and other xenobiotics. Specific transporters will be discussed in the context of clinical and pre-clinical effects on drug disposition. Distribution, substrates, and mechanisms of relevant drug transporters will be discussed, as well as how they can mediate potentially toxic effects of drugs.

PHAR 540 - Drug Metabolism

(3 semester hours)
Prerequisites: None
Description: This course focuses on multiple aspects of drug metabolism. Specific content includes instruction on Phase 1 and Phase 2 drug metabolism. While the majority of the course will involve examining hepatic drug metabolism and extrahepatic metabolic pathways, drug metabolism in preclinical drug development will also be covered. This course will also expose the student to the role drug metabolism plays in potentially toxic drug effects and interactions.

PHAR 630 - Pharmaceutical Drug Development

(3 semester hours)
Prerequisites: None
Description: This course focuses on a generalized overview of pharmaceutical industry drug development. The course will follow a new therapeutic entity from discovery through clinical development, up to filing and post-marketing commitments from regulatory agencies. An introduction will be given to the drug development process, explaining the multi-faceted responsibilities in bringing a new compound to clinic. The structure of project teams, roles and responsibilities, and the regulatory landscape for filing a drug will be discussed. Specific case-studies will be shared throughout the course to give examples of the varied role an individual may play on a drug development team. Offered as needed.

PHAR 690 - Ethics and Trends in Pharmaceutical Science

(3 semester hours)
Prerequisites: None
Description: Ethics and Trends in Pharmaceutical Science presents current challenges, trends, and controversies concerning pharmaceutical science. Lectures are generally composed of presenting current (within the calendar year) articles from around the world that introduce a topic of interest. Such topics may include industry news, education trends, and regulatory controversies.

PHAR 699 - Applied Project in Pharmaceutical Sciences

(3 semester hours)
Prerequisites: GRAD 695 and permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of Pharmaceutical Science. A faculty member will supervise this study.

DPTH 600 - Culturally Responsive Professionalism in Physical Therapy I

(2 semester hours)
Prerequisites: None
Corequisites: DPTH 602, DPTH 604, and DPTH 606
Description: This course is the first of a multi-course series. The course introduces learners to professional development as a physical therapist with emphasis on professional behaviors and actions in accordance with professional core values and the patient/client management model. The focus of this course is to provide the learner with the foundational professional knowledge necessary to engage in the interprofessional healthcare environment and to meet the needs of a diverse human population through their lifespan.

DPTH 602 - Clinical Medicine in Physical Therapy Practice I

(4 semester hours)
Prerequisites: None
Corequisites: DPTH 600, DPTH 604, and DPTH 606
Description: This is the first course in a three-course series. This course provides learners with an overview of the clinically relevant anatomy, physiology, and pathophysiology of the musculoskeletal, cardiovascular, respiratory and nervous systems and the common imaging, lab values and pharmacology associated with medical management of disease processes that affect these body systems. This course facilitates the learner's knowledge and understanding of varied diseases and their medical management that is needed to effectively evaluate and safely treat persons with varied medical conditions. Learners will consider the psychological, social, emotional, cultural, and spiritual impact of disease and disability on the client, caregivers and physical therapy management.

DPTH 604 - Movement Science I

(4 semester hours)
Prerequisites: None
Corequisites: DPTH 600, DPTH 602, and DPTH 606
Description: This course is the first course in a 2-course series. This course introduces current concepts in human movement and functional anatomy from a variety of perspectives including biomechanics, kinematics and kinetics to explore normal mechanics of functional movement.

DPTH 606 - Evidence Informed Physical Therapy Practice I

(2 semester hours)
Prerequisites: None
Corequisites: DPTH 600, DPTH 602, and DPTH 604
Description: This course introduces evidence-informed practice in physical therapy. The focus of the course is the exploration of scientific research as a basis for clinical practices, including critical appraisal of quantitative and qualitative studies. The course explores medical ethics, the role of institutional review boards, and the NIH guidelines for the protection of human subjects. Learners gain insight into the intersection of evidence-informed clinical application with professionalism, ethical and legal parameters of healthcare.

DPTH 610 - Physical Therapy Exam and Rehabilitation Principles

(4 semester hours)
Prerequisites: DPTH 600, DPTH 602, DPTH 604, and DPTH 606
Corequisites: DPTH 612 and DPTH 614
Description: This course introduces rehabilitation principles using the patient/client management model and the International Classification of Function (ICF) to guide physical therapy examination and intervention procedures. This course promotes clinical decision-making during systems review, examination and the implementation of rehabilitation tests/measures and interventions for persons across the continuum of care and the lifespan of a diverse human population.

DPTH 612 - Clinical Medicine in Physical Therapy Practice II

(4 semester hours)
Prerequisites: DPTH 600, DPTH 602, DPTH 604, and DPTH 606
Corequisites: DPTH 610 and DPTH 614
Description: This is the second course in a three-course series. This course provides learners with an overview of the clinically relevant anatomy, physiology, and pathophysiology of the immune, endocrine, metabolic, integumentary, lymphatic, hematologic, gastrointestinal, hepatic, biliary, pancreatic, and urogenital systems, as well as infectious and oncologic disorders and pregnancy and the common imaging, lab values and pharmacology associated with medical management of these conditions. This course facilitates the learner's knowledge and understanding of varied diseases and their medical management that is needed to effectively evaluate and safely treat persons with varied medical conditions. Learners will consider the psychological, social, emotional, cultural, and spiritual impact of disease and disability on the client, caregivers, and physical therapy management.

DPTH 614 - Movement Science II

(4 semester hours)
Prerequisites: DPTH 600, DPTH 602, DPTH 604, and DPTH 606
Corequisites: DPTH 610 and DPTH 612
Description: This course is the second in a 2-course series. This course builds on the foundational knowledge that was introduced in DPTH 604 - Movement Science I. The course explores the physics of human movement and the role of the neurological system. Theories of motor control and motor learning are discussed in the context of typical motor development from birth through maturity with considerations for socioeconomic and cultural factors that impact development.

DPTH 622 - Neuroscience Fundamentals in Physical Therapy

(3 semester hours)
Prerequisites: DPTH 610, DPTH 612, and DPTH 614
Corequisites: DPTH 624. DPTH 626, and DPTH 628
Description: This course introduces the learner to the foundations of neuroscience and pathology of the neurological system as it pertains to physical therapy practice. Learners will explore concepts of neuroanatomy and neurophysiology and will apply concepts using case studies to facilitate the integration of foundational science with clinical information.

DPTH 624 - Foundational Cardiovascular and Pulmonary Practice

(4 semester hours)
Prerequisites: DPTH 610, DPTH 612, and DPTH 614
Corequisites: DPTH 622, DPTH 626, and DPTH 628
Description: This course provides the learner with opportunities to explore evidence-based examination, evaluation and skilled intervention delivery for persons with cardiopulmonary disease and dysfunction, with emphasis on the response of the cardiac, circulatory and pulmonary systems to human movement. The learner will explore how physical therapy can maximize function, promote health and wellness, minimize impairments/disease progression, and mitigate the progression of disability related to cardiovascular and respiratory pathology.

DPTH 626 - Musculoskeletal Physical Therapy I

(4 semester hours)
Prerequisites: DPTH 610, DPTH 612, and DPTH 614
Corequisites: DPTH 622, DPTH 624, and DPTH 628
Description: This course reinforces examination and rehabilitation management principles specific to the musculoskeletal system for the lumbar spine and lower body region from an orthopedic physical therapy perspective. Learners are introduced to differential diagnosis for medical referral and methods to coordinate care with other healthcare professionals within a collaborative healthcare environment. This course builds on foundational knowledge of clinical decision-making within the framework of the patient/client management model, promoting the learner's ability to competently gather data and make decisions to guide a plan of care in a culturally responsive manner. Laboratory sessions explore the examination, evaluation, and evidence-informed interventions needed to competently treat patients across the lifespan of a diverse human population.

DPTH 628 - Integrated Clinical Experience I

(1 semester hour)
Prerequisites: DPTH 610, DPTH 612, and DPTH 614
Corequisites: DPTH 622, DPTH 624, and DPTH 626
Description: This course blends clinical interactions with reflective learning activities to introduce foundational patient care activities in the clinical setting with a focus on patient/ client interaction, interdisciplinary communication, and professional behaviors. Observations will occur under the supervision of a Clinical Instructor.

DPTH 700 - Culturally Responsive Professionalism in Physical Therapy II

(1 semester hour)
Prerequisites: DPTH 622, DPTH 624, DPTH 626, and DPTH 628
Corequisites: DPTH 702, DPTH 704, and DPTH 706
Description: This is the second course in the Culturally Responsive Professionalism series. This course builds upon professional behaviors for the delivery of just, equitable, and inclusive healthcare to a diverse human population including professional communication through the ICF model and clinical documentation. This course provides the foundation for legal and ethical documentation and billing practices for a variety of healthcare settings.

DPTH 702 - Neuromuscular Rehabilitation

(4 semester hours)
Prerequisites: DPTH 622, DPTH 624, DPTH 626, and DPTH 628
Corequisites: DPTH 700, DPTH 704, and DPTH 706
Description: This course focuses on neuromuscular evaluation elements, examination procedures and interpretation of evidenced-based measurement tools and test batteries commonly used by the physical therapist for assessment and intervention for adults with neurological dysfunction. The patient/client management and International Classification of

Functioning, Disability and Health (ICF) models provide the framework for this course. Learners apply assessment skills and evidence-based interventional strategies within the context of specific neurologic impairments and diagnoses to develop, implement and assess a holistic plan of care. Laboratory activities emphasize a patient-oriented approach and provide meaningful exposure and continued mastery of selected interventions that are indicated when treating persons with neurological conditions.

DPTH 704 - Clinical Integration of Physical Therapy Principles I

(3 semester hours)
Prerequisites: DPTH 622, DPTH 624, DPTH 626, and DPTH 628
Corequisites: DPTH 700, DPTH 702, and DPTH 706
Description: The Clinical Integration Course Series provides a systematic progression of the requisite physical therapy evaluative, assessment, intervention and monitoring skills needed to become a practicing clinician capable of effectively evaluating and treating persons across the lifespan and throughout the continuum of care. The courses utilize a case-based approach and require the learner to integrate prior coursework to demonstrate effective examination, evaluation and intervention skills for patients with varying degrees of complexity. The courses progress by assessment-based milestones to ensure learners are deemed competent with fundamental physical therapy skills prior to final year clinical experiences.

DPTH 706 - Musculoskeletal Physical Therapy II

(4 semester hours)
Prerequisites: DPTH 622, DPTH 624, DPTH 626, and DPTH 628
Corequisites: DPTH 700, DPTH 702, and DPTH 704
Description: This course reinforces examination and rehabilitation management principles specific to the musculoskeletal system for the cervical and thoracic spine and upper body region from an orthopedic physical therapy perspective. Learners are introduced to differential diagnosis for medical referral and methods to coordinate care with other healthcare professionals within a collaborative healthcare environment. This course builds on foundational knowledge of clinical decision-making within the framework of the patient/client management model, promoting the learner's ability to competently gather data and make decisions to guide a plan of care in a culturally responsive manner. Laboratory sessions explore the examination, evaluation, and evidence-informed interventions needed to competently treat patients across the lifespan of a diverse human population.

DPTH 710 - Physical Therapy within the Inpatient Continuum of Care

(3 semester hours)
Prerequisites: DPTH 700, DPTH 702, DPTH 704, and DPTH 706
Corequisites: DPTH 712, DPTH 714, DPTH 716, and DPTH 718
Description: The learner will experience an in-depth study of the role of the physical therapist within the inpatient continuum of care, with an emphasis on person centered care, clinical decision-making, development of an appropriate plan of care, goal setting and treatment design, interdisciplinary communication and collaboration, and discharge planning with a focus on maximizing patient outcomes (leveraging resources and in consideration of all ICF factors).

DPTH 712 - Orthotics, Prosthetics, and Assistive Technology in Healthcare

(2 semester hours)
Prerequisites: DPTH 700, DPTH 702, DPTH 704, and DPTH 706
Corequisites: DPTH 710, DPTH 714, DPTH 716, and DPTH 718
Description: This is a course designed to instruct learners in the physical therapy examination, evaluation, and interventions for individuals with orthotic, prosthetic or assistive technology (AT) needs. Learners will apply biomechanical principles and neurologic considerations into the orthotic/prosthetic/AT selection and management process for patients in a variety of healthcare settings. Emphasis will be placed on lower extremity orthoses/prosthesis/assistive technologies in consideration of environmental and social factors that can impact decision-

making across the lifespan of a diverse human population. Lab experiences will provide experiential learning with fit and function of orthoses, prosthetics, assistive technologies and orthotic fabrication techniques.

DPTH 714 - Clinical Integration of Physical Therapy Principles II

(3 semester hours)
Prerequisites: DPTH 700, DPTH 702, DPTH 704, and DPTH 706
Corequisites: DPTH 710, DPTH 712, DPTH 716, and DPTH 718
Description: The Clinical Integration Course Series provides a systematic progression of the requisite physical therapy evaluative, assessment, intervention and monitoring skills needed to become a practicing clinician capable of effectively evaluating and treating persons across the lifespan and throughout the continuum of care. The courses utilize a case-based approach and require the learner to integrate prior coursework to demonstrate effective examination, evaluation and intervention skills for patients with varying degrees of complexity. The courses progress by assessment-based milestones to ensure learners are deemed competent with fundamental physical therapy skills prior to final year clinical experiences.

DPTH 716 - Evidence Informed Physical Therapy Practice II

(2 semester hours)
Prerequisites: DPTH 700, DPTH 702, DPTH 704, and DPTH 706
Corequisites: DPTH 710, DPTH 712, DPTH 714, and DPTH 718
Description: This course is the second course in the series. The learner expands their ability for critical appraisal of research and application to clinical practice. In this course, the learner further integrates their knowledge of ethical decision-making, professionalism, and legal clinical practice in the healthcare setting with evidence-informed patient/client management. Upon completion of this course, the learner demonstrates an understanding of the skills, methods, and knowledge of a physical therapist to solve a problem or answer a question representative of the role of physical therapy in creating a just, equitable, and inclusive society.

DPTH 718 - Integrated Clinical Experience II

(1 semester hour)
Prerequisites: DPTH 700, DPTH 702, DPTH 704, and DPTH 706
Corequisites: DPTH 710, DPTH 712, DPTH 714, and DPTH 716
Description: This course blends clinical interactions with reflective learning activities to reinforce foundational patient care activities in the clinical setting with a focus on patient/ client interaction, interdisciplinary communication, and professional behaviors. Learners will critically appraise literature related to an observed clinical intervention or examination technique. Observations will occur under the supervision of a Clinical Instructor.

DPTH 720 - Culturally Responsive Professionalism in Physical Therapy III

(2 semester hours)
Prerequisites: DPTH 710, DPTH 712, DPTH 714, DPTH 716, and DPTH 718
Corequisites: DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Description: This is the third course in the Culturally Responsive Professionalism series. This course connects involvement in the APTA and advocacy to professional development. The course expands the concepts of professional behaviors and includes discussion of ethics in practice and laws that promote justice, equity and inclusion in health for a diverse human population across their lifespan.

DPTH 722 - Clinical Medicine in Physical Therapy Practice III

(2 semester hours)
Prerequisites: DPTH 710, DPTH 712, DPTH 714, DPTH 716, and DPTH 718

Corequisites: DPTH 720, DPTH 724, DPTH 726, and DPTH 728
Description: This is the third course in a three-course series. This course uses a case-based approach to facilitate the learner's clinical decision-making as it relates to the physical therapy examination, evaluation and treatment of persons with varied medical conditions and co-morbidities. Learners will consider the psychological, social, emotional, cultural, and spiritual impact of disease and disability on the client, caregivers and physical therapy management.

DPTH 724 - Clinical Integration of Physical Therapy Principles III

(3 semester hours)
Prerequisites: DPTH 710, DPTH 712, DPTH 714, DPTH 716, and DPTH 718
Corequisites: DPTH 720, DPTH 722, DPTH 726, and DPTH 728
Description: The Clinical Integration Course Series provides a systematic progression of the requisite physical therapy evaluative, assessment, intervention and monitoring skills needed to become a practicing clinician capable of effectively evaluating and treating persons across the lifespan and throughout the continuum of care. The courses utilize a case-based approach and require the learner to integrate prior coursework to demonstrate effective examination, evaluation and intervention skills for patients with varying degrees of complexity. The courses progress by assessment-based milestones to ensure learners are deemed competent with fundamental physical therapy skills prior to final year clinical experiences.

DPTH 726 - Pediatric Physical Therapy Practice

(3 semester hours)
Prerequisites: DPTH 710, DPTH 712, DPTH 714, DPTH 716, and DPTH 718
Corequisites: DPTH 720, DPTH 722, DPTH 724, and DPTH 728
Description: This course presents an introduction to the physical therapy management of children from birth to 21 years of age to effectively provide physical therapy care to pediatric patients across the continuum of care, while considering the biopsychosocial, environmental, and economic factors that may impact the effectiveness of care delivery. Learners will apply the components of physical therapy screening, examination, evaluation, diagnosis, prognosis, plan of care, intervention, outcomes assessment and evaluation to selected case studies representing the broad variation in medical complexity associated with treatment of pediatric patients. The learners will explore the effect of public policy and varied healthcare models on access to care and functional outcomes for pediatric patients. This course emphasizes evidence-based interventions that encourage application of prevention, wellness, and health promotion education, regardless of level of ability.

DPTH 728 - Physical Therapy for the Aging Adult

(2 semester hours)
Prerequisites: DPTH 710, DPTH 712, DPTH 714, DPTH 716, and DPTH 718
Corequisites: DPTH 720, DPTH 722, DPTH 724, and DPTH 726
Description: This course provides learners opportunities to explore evidence-based examination, evaluation, and skilled intervention delivery for the aging adult across the continuum of care, while considering the biopsychosocial, environmental and economic factors that may impact the effectiveness of care delivery. This course emphasizes prevention, wellness, health promotion interventions/education, and inclusion of treatment interventions of adequate intensity to maximize functional performance for the aging adult population. The learners will explore the effect of public policy and varied healthcare models on access to care and functional outcomes for the aging adult, and they will construct and participate in a healthcare related advocacy activity to enhance an aging-related experience for this population.

DPTH 800 - Leadership and Health Informatics in Physical Therapy Practice

(3 semester hours)
Prerequisites: DPTH 720, DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Corequisites: DPTH 802, DPTH 804, DPTH 806, and DPTH 808

Description: This course expands upon concepts in the Culturally Responsive Professionalism series. The course connects the role of the physical therapist to the organization, management, and leadership activities in the healthcare system and explores the use of data to meet quality, regulatory, and key performance indicators of healthcare management. The learner connects human resource activities, customer service, and other business practices to positive outcomes for diverse employees, individuals, and communities.

DPTH 802 - Physical Therapy in Primary Care and Prevention

(2 semester hours)
Prerequisites: DPTH 720, DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Corequisites: DPTH 800, DPTH 804, DPTH 806, and DPTH 808
Description: This course examines the role of the physical therapist as a primary care provider within the healthcare team. This course explores various domains and influences of health and identifies appropriate screening and testing procedures, culminating in individual patient and community interventions. This course explores the relationship between social determinants of health and culturally competent healthcare, wellness, and education. Learners will advocate for just, equitable, and inclusive health through preventative care, medical screening, and interprofessional collaboration, while practicing the psychosocial skills necessary for an autonomous doctoring profession.

DPTH 804 - Clinical Integration of Physical Therapy Principles IV

(2 semester hours)
Prerequisites: DPTH 720, DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Corequisites: DPTH 800, DPTH 802, DPTH 806, and DPTH 808
Description: The Clinical Integration Course Series provides a systematic progression of the requisite physical therapy evaluative, assessment, intervention and monitoring skills needed to become a practicing clinician capable of effectively evaluating and treating persons across the lifespan and throughout the continuum of care. The courses utilize a case-based approach and require the learner to integrate prior coursework to demonstrate effective examination, evaluation and intervention skills for patients with varying degrees of complexity. The courses progress by assessment-based milestones to ensure learners are deemed competent with fundamental physical therapy skills prior to final year clinical experiences. The final course in the series is a comprehensive review and comprehensive practical exam designed to measure competency and enhance experiential learning to prepare learners for clinical experiences.

DPTH 806 - Service Learning in Physical Therapy

(1 semester hour)
Prerequisites: DPTH 720, DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Corequisites: DPTH 800, DPTH 802, DPTH 804, and DPTH 808
Description: This course focuses on applying just, equitable, and inclusive community engagement to promote health and wellness for a diverse human population across their lifespan.

DPTH 808 - Advanced Practice Elective

(2 semester hours)
Prerequisites: DPTH 720, DPTH 722, DPTH 724, DPTH 726, and DPTH 728
Corequisites: DPTH 800, DPTH 802, DPTH 804, and DPTH 806
Description: This course provides the opportunity for learners to explore advanced practice areas in physical therapy. Specific descriptions will be provided for each topic area.

DPTH 810 - National Physical Therapy Exam Review

(1 semester hours)
Prerequisites: DPTH 800, DPTH 802, DPTH 804, DPTH 806, and DPTH 808
Corequisites: DPTH 816 and DPTH 818
Description: This course prepares learners for all aspects of taking the National Physical Therapy Examination upon completion of all coursework. This course leverages a variety of modalities, including practice examinations, coaching, and reflection activities to improve the learner's knowledge base and test taking skills.

DPTH 816 - Clinical Experience in Physical Therapy I

(4 semester hours)
Prerequisites: DPTH 800, DPTH 802, DPTH 804, DPTH 806, and DPTH 808
Corequisites: DPTH 810 and DPTH 818
Description: This course provides the first full-time, clinical education experience with a supervising Clinical Instructor. Learners will build upon the elements of patient/client management in the clinical setting. The learner's professionalism and progress towards competency as an entry-level clinician will be evaluated through a standardized tool. Learners will reflect and explore components of clinical practice through structured learning activities. The learner will apply evidence informed practice to generate a case-based presentation as culmination of this learning experience.

DPTH 818 - Clinical Experience in Physical Therapy II

(4 semester hours)
Prerequisites: DPTH 800, DPTH 802, DPTH 804, DPTH 806, and DPTH 808
Corequisites: DPTH 810 and DPTH 816
Description: This course provides the second full-time, clinical education experience with a supervising Clinical Instructor. Learners will build upon the elements of patient/client management in the clinical setting. The learner's professionalism and progress towards competency as an entry-level clinician will be evaluated through a standardized tool. Learners will reflect and explore components of clinical practice through structured learning activities. The learner will apply evidence informed practice to generate a case-based presentation as culmination of this learning experience.

DPTH 820 - Physical Therapy Capstone

(1 semester hour)
Prerequisites: DPTH 810, DPTH 816, and DPTH 818
Corequisites: DPTH 826 and DPTH 828
Description: Course activities facilitate the learner's application of evidence-informed practice, legal and ethical decision-making, and professionalism in clinical practice. The course emphasizes the role of the physical therapist in creating a just, equitable, and inclusive society. The learner will develop and complete an individualized project that will culminate in a final Capstone Project.

DPTH 826 - Clinical Experience in Physical Therapy III

(4 semester hours)
Prerequisites: DPTH 810, DPTH 816, and DPTH 818
Corequisites: DPTH 820 and DPTH 828
Description: This course provides a terminal full-time, clinical education experience with a supervising Clinical Instructor. Learners will work to demonstrate mastery of the elements of patient/client management in the clinical setting through evaluation using a standardized tool. Learners will reflect and explore components of clinical practice through structured learning activities. The learner will apply evidence informed practice to generate a case-based presentation as culmination of this learning experience.

DPTH 828 - Clinical Experience in Physical Therapy IV

(4 semester hours)
Prerequisites: DPTH 810, DPTH 816, and DPTH 818
Corequisites: DPTH 820 and DPTH 826
Description: This course provides a terminal full-time, clinical education experience with a supervising Clinical Instructor. Learners will work to demonstrate mastery of the elements of professional behaviors and patient/client management in the clinical setting through evaluation using a standardized tool. Learners will reflect and explore components of clinical practice through structured learning activities. The learner will apply evidence informed practice to generate a case-based presentation as culmination of this learning experience.

PMGT 510 - Principles of Project Management

(3 semester hours)
Prerequisites: None
Description: This course introduces the student to project management knowledge areas and processes used by project managers to successfully deliver their project on time, within budget and to the expectations of project stakeholders. The student works on real-world examples, problems and case studies as individuals and in groups. An emphasis is placed on hard and soft skills, and the tools and techniques used by project managers to initiate, plan, execute, monitor/control, and successfully close projects in typical project environments associated with waterfall and agile methodologies.

PMGT 511 - Introduction to Large Language Model in Project Management

(3 semester hours)
Prerequisites: None
Description: The world functions on projects. This course focuses on the ethical use of LLM and delivers ethical project evaluation, decision-making, and risk analysis. In this course, the graduate student will evaluate the foundational literacy and interactions with LLMs and ethical use of content in project management applications to align with allocating resources, risk management, stakeholder, and organizational objectives requirements. The student will analyze the ethical implications of LLM in one of three case studies and develop and defend the methods of applying LLM to enhance their academic and professional pursuits.

PMGT 515 - Business and Requirements Analysis Fundamentals

(3 semester hours)
Prerequisites: None
Description: This course is designed to help the student prepare for a career in management, building on their technical and professional background and education. The field of business analysis is a fast-growing profession that offers a global certification. Business analysis is a key function on a project team that promotes understanding of what the customers want the project team to build for them; it is essential to project success. Through the use of real life project examples, the student gains expertise in planning, eliciting, writing, and managing customer requirements for IT and other types of projects. Cross-listed with ITPM 515.

PMGT 530 - Risk, Procurement and Contracts

(3 semester hours)
Prerequisites: PMGT 510
Description: Using real-life project examples and scenarios, the student will learn how to reduce negative risks exposure and understand opportunities uncertainty can provide in projects by using effective risk management practices such as risk planning, identification and control. The student will design a risk management plan and learn how to prepare a Risk Register. The student will also learn how to plan a procurement, understand different procurement methods and types of contracts, find a vendor, write a Request for Proposal and apply these concepts, tools and techniques to actual projects.

PMGT 540 - Planning and Executing Projects

(3 semester hours)
Prerequisites: PMGT 510
Description: This course will focus on the production of core project management deliverables necessary to successfully navigate today's complex projects with an introduction to current project management best practices. In this learning forum, the student will develop a project from the ground up. This is a comprehensive, semester-long project scoping, budgeting, scheduling and control course where practiced theory is the platform for learning. The course objective is to provide a practical hands-on learning experience that builds on the fundamentals established in PMGT 510-Principles of Project Management. The focus of this course is to demonstrate the applied project management artifacts to meet stakeholder expectations within the triple constraints of scope, schedule and cost while also exploring impacts to other key factors such as quality and risk.

PMGT 550 - Quality Management and Continuous Improvement

(3 semester hours)
Prerequisites: None
Description: The student will be introduced to how quality improvement techniques and quality management can be used to support organizational initiatives such as projects and operations. This includes quality planning, quality assurance and quality control. Statistical topics will also be discussed and linked to the Lean Six Sigma methodology to improve quality, productivity, and the competitive position. This course will also cover the relationship and overlap of project management and quality management using standards from the Project Management Institute and the International Standards Organization.

PMGT 563 - Emotional Intelligence for Project Managers

(3 semester hours)
Prerequisites: PMGT 510 and MGMT 560, or permission of the instructor
Description: This course will provide the student with a solid understanding of emotional intelligence and its principles and how it can be developed in each project leader. The student will also learn and apply a variety of strategies to develop their own emotional intelligence and to enhance their own self-awareness and self-management, along with developing relationship management skills to create successful project outcomes. Throughout the course, the student will also gain an understanding of how to use emotional intelligence to create a positive team environment and learn techniques to develop an emotionally intelligent organization. Through this course, the student will learn best practices in developing their self-motivation and gain an understanding of how change can be created using emotional intelligence. The EQ I 2.0 Emotional Intelligence Assessment is offered as a component of this course providing the student with a unique insight into their current level of emotional intelligence skills.

PMGT 570 - Agile Project Management with Scrum Methodology

(3 semester hours)
Prerequisites: None
Description: This course provides to the student the features, benefits, and practices of using Agile Project Management with Scrum Methodology and that this approach differs from traditional project management at the project level and enterprise level.

PMGT 572 - Agile Scrum Applied Projects

(3 semester hours)
Prerequisites: PMGT 570
Description: This course provides the student with hands on experiential learning using Agile Scrum as a member of a team. The team develops a vision statement and user stories for a real application. The team then implements the

product that is specified using Agile Scrum Framework and all the standard Agile Scrum ceremonies such as Product Backlog, Sprints, Sprint Planning, Release Planning, Daily Standups, Sprint Review, and Sprint Retrospectives. Team members play the actual roles of Product Owner, ScrumMaster, Developers, Testers, etc. The course produces an actual working viable product that can be demonstrated to stakeholders. The team consists of a mix of graduate students from Project Management, ISEM, Computer Science, Analytics, and Learning Technologies.

PMGT 573 - Scaling Agile for the Enterprise

(3 semester hours)
Prerequisites: PMGT 570
Description: This course provides the student with a solid foundation of agile frameworks that have been scaled to the enterprise synchronizing alignment, collaboration, and delivery for large numbers of teams. One of the more popular enterprise agile frameworks called the Scaled Agile Framework (SAFe) will be studied and analyzed. This framework has been a proven framework for enterprises applying integrated principles and practices for Lean, Agile, Systems Thinking, and DevOps. In addition to SAFe, the course provides the student with an overview of other popular frameworks for scaling the enterprise, such as: The Disciplined Agile (DA), the Large-Scaled Scrum (LeSS), Nexus, Scrum@Scale, and Scrum of Scrum (SoS).

PMGT 574 - Lean Thinking

(3 semester hours)
Prerequisites: None
Description: This level course provides the student with key strategies in agile lean product development that will help the student streamline new product development processes that will decrease time-to-market, reduce waste, enhance product quality, and fully integrate new product designs into a lean production environment. This course uses principles rooted in the iconic Toyota Production system.

PMGT 576 - Agile Lean Transformational Leadership

(3 semester hours)
Prerequisites: PMGT 570 and PMGT 574
Description: This course provides the student with innovative practices that need to be followed in order to transform a company or organization from a traditional waterfall mindset to more of an Agile Lean mindset and culture. Agile Lean Change management (not the typical change management talked about in project management relative to scope, budget, etc.) is one method that is being used successfully in the industry to move organizations from a more traditional mindset to Agile Lean. A transformation to Agile Lean relies significantly on the leaders in the organizations to facilitate the change. In conjunction with this course, the student learns the responsibilities and techniques of the Agile Coach role, which has become a key role in the industry to facilitate change. The student will study the importance of leader standard work, visual management techniques, and methods for leading change. This course will also offer the student an opportunity to learn about and use various Lean tools and how to lead using these tools. The student will also gain insights into strategy deployment, leading Lean teams and sustaining a Lean transformation.

PMGT 580 - Project Management Offices

(3 semester hours)
Prerequisites: PMGT 540, PMGT 530
Description: This course provides the student an overview of the types of Project Management Office (PMO) structures, the key elements of each, and the key aspects of how to initiate and sustain a business-centered and value-driven PMO.

PMGT 610 - Project Management Practicum

(3 semester hours)
Prerequisites: PMGT 530, PMGT 540, and Permission of Program Lead
Description: Project Management Practicum is a second-year graduate course in applied learning with real-world community visibility and impact and is an exemplar of experiential learning at the graduate level. Students will work with local industry partners to assist in solving identified business problems using skills, techniques, and tools of the PM discipline. Opportunities may exist for follow-on internships and employment with industry partners. Students will have the opportunity to team with students from other HU graduate programs depending on the requirements of the identified business problem. This course is not eligible for repeat.

PMGT 615 - Enterprise Leadership Strategies

(3 semester hours)
Prerequisites: PMGT 510
Description: This course provides the student with a comprehensive understanding of the strategic application of design thinking, creativity, and decision-making processes and techniques necessary to create empowered individuals and teams. The student will master problem identification and techniques for generating solutions. The student will examine real-world case studies and examples that show the successful integration of these approaches.

PMGT 620 - Organizational Behavior through Transformational Leadership

(3 semester hours)
Prerequisites: PMGT 515 and PMGT 563
Description: This course examines the intricacies of leadership, strategic thinking, and organizational behavior within complex and dynamic environments, specifically organizational culture and climate. The course will equip the student with the theoretical foundations and practical skills necessary to cultivate strategic thinking capabilities and drive organizational success.

PMGT 695 - Applied Project Management I

(3 semester hours)
Prerequisites: MGMT 560, PMGT 510, PMGT 511, PMGT 530, PMGT 540, and PMGT 570
Description: The capstone course provides the student the experience to apply research methodologies and tools towards completion of a project management plan.

PMGT 697 - PMP/CAPM Exam Preparation

(0 semester hour)
Prerequisites: PMGT 510 and PMI membership
Description: This course exposes the student and the practicing project manager to the Project Management Body of Knowledge processes and standards, which prepares the student to take the PMP or CAPM certification exam. The student must take the PMP or CAPM exam and submit proof of a successful exam score. Upon completion of the six project management courses, the student has one year to take the PMP exam or take PMGT 697 and take the PMP exam.

PMGT 699 - Applied Project Management II

(3 semester hours)
Prerequisites: PMGT 695 or permission of instructor
Description: This course allows the student to pursue an area of interest that is within the broad scope of project management. A faculty member supervises this study.

Professional Development

Professional Development is responsible for all contracted training, non-credit certificates, and professional development offerings for employers and working professionals. The professional development programs offered through Harrisburg University provides 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;
- customized trainings, on-site and off-site offerings such as workshops, institutes, clinics, and specializations;
- on-site and off-site credit-based offerings and degree programs; and
- 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://www.harrisburgu.edu/professional-dev/.

For more information on customized training or the calendar of upcoming professional development, contact 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/.

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Administration

David Schankweiler, HU Interim President
Kevin Purcell, Ph.D, Provost and Chief Academic Officer
Duane F. Maun, CPA, Chief Operating Officer and Chief Financial Officer

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)

Introduction

The Family Educational Rights and Privacy Act, (FERPA), is a Federal law that ensures the privacy of a student's education records. It applies to all educational institutions, including colleges and universities, that receive federal funds under any program administered by the US Department of Education.

FERPA provides college students the general rights to:

- Control the disclosure of their education records to others except to the extent that FERPA authorizes disclosure without consent;
- Inspect and review their own education records; and
- The ability to review and amend errors in their education records.

Definitions

Eligible Student. An "eligible student" whose records are protected under FERPA is an individual 18 years of age or older or who is currently enrolled, or was enrolled, in a HU credit-bearing course at any age.

Education Records. Those records that are: (1) directly related to a student; and (2) maintained by HU. A record is directly related to a student if it contains personally identifiable information (PII) or enough tangential information that would allow a reasonable person within the HU community to identify the student. Examples of education records include but are not limited to:

- Financial aid and account information
- Transcripts and class schedules
- Housing agreements
- Disability accommodation records
- Disciplinary records/grade appeals
- Athletic records (if not deemed directory information).

Education records do not normally include (but can become FERPA protected if shared):

- Sole Possession Records. Records kept in the sole possession of the maker, are used only as a personal memory aid, and are not accessible to any other person except a temporary substitute for the maker of the record.
- Law Enforcement Records (including non-commissioned security officers).
- Employment Records. However, records of an employee who is employed by HU and is also a student ARE education records such as work-study students, graduate teaching assistants, and Resident Advisors (RAs).
- Alumni Records. Alumni records must be created or received by HU after an individual is no longer a student and are not directly related to the individual's attendance as a student unless the record falls within directory information. A student that opted out of sharing director information as of graduation remains in an opt out status unless it is updated.
- Treatment/Medical Records. Treatment/Medical records are specifically excluded as protected FERPA records under HIPAA. However, state confidentiality rules still apply to treatment professionals. Treatment

records may become subject to FERPA if forwarded and used by others for the student's benefit such as documenting a disability for purposes of an academic accommodation. Treatment records are:

- Made or maintained by a physician, psychiatrist, psychologist, or other recognized professional or paraprofessional acting in a professional capacity or assisting in a paraprofessional capacity;
- Made, maintained, or used only in connection with treatment of the student; AND
- Disclosed only to individuals providing the treatment.

School Official: Any person employed by HU in any administrative, supervisory, academic, research, or support Staff position (including security and health services Staff); any person or company with whom HU has contracted to provide a service to or on behalf of HU (such as an attorney, auditor, or collection agent); or any student serving on an official committee or assisting another school official in performing his or her tasks.

Legitimate Educational Interest. A School Official has a "legitimate educational interest" if the official needs to review an education record in order to fulfill the official's professional responsibilities as specified in their position description or as stated in a contractual agreement with a third party acting as an agent for HU.

Written consent: The election by a student of individuals, such as a parent or guardian, for the granting of access to the student's educational records. When granting consent, a student should specify the records that may be disclosed (or generically all of HU education records); the purpose for which they may be disclosed (for general information to assist me with their college experience) and the persons to whom they may be disclosed (parents, guardians, employer, etc.).

Student's Right to Review and Request Amendment of FERPA Records.

All students have the right to view their education records. Students should submit in writing any request to review their education records to the Records and Registration office and identify which records are to be inspected. Within 45 days of receiving a request, Records and Registration will make arrangements for access and notify the student of the time and place where the records may be inspected. Records that are customarily open for student inspection will be accessible without written request. Records will not be copied or mailed.

If a student believes their records are inaccurate, the student can submit a written request to HU's Records and Registration office to amend his or her education records that identifies the records to be amended and the basis for the alleged inaccuracies. Records and Registration will notify a student of its decision and, if the decision is negative, provide additional information regarding a student's right to appeal the decision. The FERPA process is not a substitute for a grade appeal only the recorded inaccuracy of a grade issued.

Disclosure without a Student's Consent

FERPA permits HU 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 HU policy concerning the use or possession of alcohol or a controlled substance.

Directory Information

Directory information is contained in the educational records of a student that is not generally considered to be harmful or an invasion of privacy if disclosed. Consequently, it can normally be released without the need to obtain a student's consent.

HU defines directory information as:

- 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

Students wishing to have their directory information withheld can do so but must notify Records and Registration in writing or by the completion of a FERPA Disclosure of Directory Information form located on MyHU. A request to withhold directory information will preclude HU from providing a student's directory information to prospective employers, professional organizations, the media, and others with whom you may wish HU to share such information. However, this information will still be available to school officials with a legitimate education interest.

A student may opt out from sharing directory information at any time, but it will be effective prospectively only.

HU Privacy Notice

HU is committed to safeguarding the privacy of individuals who share personal data with it and in addition to the protections afforded under FERPA, HU has adopted a Privacy Notice that outlines HU's collection, use, and disclosure of information provided by prospective students, students, or third parties. A copy of HU's Privacy Notice is available on its webpage at: https://www.harrisburgu.edu/privacy/.

The Right to File a FERPA Complaint

Students have the right to file a complaint with the U.S. Department of Education concerning alleged failures by HU to comply with the requirements of FERPA. The name and address of the office that administers FERPA is:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202-4605

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 and an annual fire safety 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 https://harrisburgu.edu/disclosures/.

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 five years worth of hazing offenses on a bi-annual basis. The University's current antihazing report is available on its website at https://harrisburgu.edu/disclosures/.

Equity in Athletics Disclosure Act (EADA)

The Equity in Athletics Disclosure Act Survey (EADA) was designed to make current and prospective students and current and prospective student athletes aware of an institution of higher education's commitment to providing equitable athletic opportunities for its men and women students. The EADA requires the disclosure of information about varsity teams and the financial resources and personnel that the school dedicates to those teams. The EADA requires any coeducational institution of higher education that participates in Title IV, the federal student aid program, and has an intercollegiate athletics program, to comply with the EADA by preparing an annual report, officially called The Report on Athletic Program Participation Rates and Financial Support Data; more commonly known as the EADA Report. The report is published annually for public inspection, no later than October 15th. As required by law, this report was electronically circulated to each HU student and is maintained at HU's publicly accessible webpage for current and prospective students at https://harrisburgu.edu/disclosures/.

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 Information 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 bring 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 *OneDrive* 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 Success.

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/Sex Discrimination Policy and Grievance Resolution Process

To ensure compliance with Title IX and other federal and state civil rights laws, HU has developed a Title IX/Sexual Misconduct Policy (harrisburgu.edu/wp-content/uploads/Sexual-Misconduct-Policy-August-2020.pdf) that prohibits discrimination and sexual misconduct on the basis of sex, or gender expression. Title IX requires HU to respond and take action to address sex-based discrimination and harassment complaints. This includes sexual misconduct complaints related to sexual harassment, sexual assault, domestic violence, dating violence and stalking. Therefore, upon receiving a complaint, HU will, without bias or conflict:

- Investigate what happened;
- Implement interim measures when appropriate during the investigation to prevent the potential of any further discrimination or harassment; and
- Take appropriate steps to resolve the matter in an effort to eliminate the discrimination/harassment, prevent its recurrence, and remedy its effects.

The procedures in HU's Title IX Sex Discrimination Policy and Grievance Resolution Process outline HU's ability to receive, investigate, and resolve complaints of discrimination on the basis of sex, sexual orientation, gender identity, or sex characteristics. These procedures are designed to provide a supportive process for individuals who report discrimination and to ensure a fair process for individuals who are accused of discriminatory conduct. Internal investigation of allegations of discriminatory treatment or systemic discriminatory practices is intended to ensure that HU meets its commitment to an open and inclusive educational and employment environment. These procedures also describe HU efforts to conduct a timely, thorough, and fair investigation, as required by law.

HU's staff who participates in this process are trained (Student Conduct and Policies at Harrisburg University) concerning the obligations of their roles as outlined within Title IX.

HU's policy also complies with the federal Violence Against Women Act Amendments to the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act (www.law.cornell.edu/uscode/text/20/1092), and the accompanying regulations (collectively referred to as VAWA).

Lastly, Tile IX prohibits retaliation for asserting or otherwise participating in claims of sex discrimination. VAWA imposes additional duties on universities and colleges to investigate and respond to reports of sexual assault, stalking, dating or domestic violence, and to publish policies and procedures related to the way these reports are handled. HU has designated the Title IX Coordinator to coordinate HU's compliance with Title IX and VAWA, and to respond to reports of violations.

For information on the University's Title IX/Sexual Misconduct policy, or to file a report, please see the Title IX/Sexual Misconduct website at https://harrisburgu.edu/title-ix-sexual-misconduct-policy-reporting/.

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 17110-2123 or by calling (717) 787-4410.

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/Pages/default.aspx.

Emergency Notification System

When HU becomes aware of incidents that, in the judgment of HU's senior leadership, constitute an ongoing threat to the campus community, an Emergency Alert or a Timely Warning will be issued to notify the HU community. Depending on the circumstances, a timely warning or emergency alert 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," through the MyHU portal of HU's webpage. Enrollees will need to reregister on an annual basis. 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, especially the Frequently Asked Questions at www.copyright.gov/help/faq.

Infringement of Digitally Copyrighted Material

The Digital Millennium Copyright Act of 1998 (DMCA) is 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:

Matthew Point
Director of Compliance
326 Market Street
Harrisburg, PA 17101
Compliance@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 serves as the University's student/faculty/staff ID, provides access to campus buildings and events, and serves as the library credential.

While on campus, the Campus ID must be accessible at all times and presented upon request to any faculty member, staff, security personnel, or contracted security personnel.

The Campus ID 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 Campus ID is not transferable and is only to be used by faculty, staff, a currently registered student, and other authorized persons.

The Campus ID must be surrendered to the University upon deactivation. A fee may be assessed for any Campus ID that is not returned at the end of the expected period of use.

Campus Card Types

There are three versions of the Campus ID card:

- Campus ID Card: an ID card containing photo identification and student/employee ID number.
- Access-Only Campus ID Card: an ID card without photo identification (typically for visitors).
- HID Mobile Credential: A digital, access-only credential, utilizing the student/employee's personal mobile device.

Campus Card Usage

The primary purpose of the Campus ID is to provide easy identification of the ID holder and to permit access to permitted areas of the University campus. The Campus ID also serves as a library credential. It is the responsibility of the ID holder to immediately report suspected lost or stolen IDs to HU Security at HUSecurity@HarrisburgU.edu or by phone at 717-901-5180.

Campus Card Activation

The Campus ID is activated for faculty and staff following formal contractual employment or position appointment.

The Campus ID 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 is deactivated for faculty and staff following formal cancellation of contractual employment or resignation or termination from the position appointment.

The Campus ID 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; or, inappropriate relationships with the student which cause 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 Provost Designee.

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 Provost Designee 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 review by a Grievance Committee which consists of: the Provost Designee, 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 Success, 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 Provost Designee. 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 the student may participate. The Committee shall deliberate and reach a decision on the grievance in closed session and render its resolution regarding the grievance within ten (10) days of its meeting. The student will be notified promptly of the Committee's resolution in writing.

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[1].

Purpose

This policy:

1. 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).
2. 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.
3. 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.

[1]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

4. 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.
5. The Harrisburg University OIS is responsible for the following:
    1. Maintaining user accountability requirements including user identification and authentication, account administration, and password integrity.
    2. Making every effort to protect the privacy of users and confidentiality of data[2].
    3. Ensuring fair access to IT.

4. Developing and implementing security policies and standards.

6. All Harrisburg University IT users are responsible for the following:
    1. 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.
    2. Using IT for authorized university business only. Excessive use of any IT resource for personal use is prohibited.
    3. Safeguarding data including personal information and passwords.
    4. Recognizing the limitations to privacy afforded by electronic services.
    5. Respecting other users and their expectation of privacy, confidentiality, and freedom of expression.
    6. Taking precautions to prevent the initial occurrence and/or spread of computer viruses. Therefore, network connected resources must utilize university-approved anti-virus software.
    7. 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.
    8. 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 the person uses.

Compliance

7. 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:
    1. There is reasonable cause a user has violated this policy.
    2. A user or an account appears to be engaged in unusual activity.
    3. It is necessary to protect the integrity, security, or functionality of IT resources.
    4. It is necessary to protect the University from liability.
    5. It is permitted or required by law.

[2] 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.

Enforcement and Disciplinary Procedures

8. Any user who violates any part of this policy may be subject to the following:
    1. Suspension or revocation of the user's computer account and/or suspension or revocation of access to the University's IT resources.
    2. Disciplinary action as described in Harrisburg University's Student Handbook which may include suspension, dismissal, or expulsion from the University.
    3. 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.
    4. 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.
    5. Re-instatement of computer privileges shall be examined on a case-by-case basis.

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 which provides civil rights protection 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 mailing 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 ada@HarrisburgU.edu.

Addendum Updates

Academic Policies:

- Class Attendance: The F-1 Student Attendance Policy has been updated.

Student Success:

- Student Services has been updated to Student Success.
- Health and Mental Health Services: The Mental Health and Crisis Support information has been updated.

Philadelphia Location:

- Due to the cessation of all undergraduate and graduate degree program operations at the Philadelphia location effective August 31, 2025, instances of the Philadelphia location have been removed from the catalog.

Tuition Charges, Refund Policies and Business Office Policies:

- Undergraduate Tuition Rate:
    - The Harrisburg University of Science and Technology Board of Trustees has approved updated undergraduate tuition rates, effective for the 2025-2026 academic year. Full-Time Undergraduate tuition (12-17 credits) is now $12,300 per semester. Part-Time Undergraduate tuition (1-11 credits) is now $1,030 per credit hour. A $250 University Services fee will apply each fall and spring (*this replaced the previously titled Student Activity Fee*).
- A Delinquent Account Fee and Collections Policy has been added.