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General Information

Directory

Capitol Technology University
11301 Springfield Road
Laurel, MD 20708-9758

Main Telephone Numbers
301-369-2800
888-522-7486

Admissions
Washington, DC 301-953-3200
Toll Free 800-950-1992
Fax 301-369-2326
Distance Learning 866-960-9620
Undergraduate Admissions Email admissions@CapTechU.edu
Graduate Admissions Email gradadmit@CapTechU.edu

Website
www.CapTechU.edu

Office Hours
The following offices are open as indicated (EST).

Admissions
M, F 9 a.m.- 5 p.m.
T-Th 9 a.m.- 7 p.m.
Saturday appointments are available.

Business Office
M, F 9 a.m.- 5 p.m.
T-Th 9 a.m.- 7 p.m.

Financial Aid
M,F 9 a.m.-5 p.m.
T-Th 9 a.m.- 7 p.m.

Registration and Records
M, F 9 a.m.- 5 p.m.
T-Th 9 a.m.- 7 p.m.

Student Life
M-F 9 a.m.-5 p.m.
Evenings by appointment.

Emergency Closing
In the event of severe weather or other emergencies, any possible cancellations or late openings will be announced to area radio and television broadcasts and posted on the university website.

The university maintains a recorded message at 301-369-2800, 888-522-7486, 800-950-1992 and 301-953-3200 and posts a weather advisory on the website when possible. Due to power outages and other circumstances that occur during adverse weather, it is not always possible to update this information. It is the responsibility of students to tune in to the radio or television for announcements.

The television channels and radio stations notified by the university are listed in the student handbook and on the university website.

*Evening appointments are available.
Accreditation
Capitol Technology University is authorized by the state of Maryland (Maryland Higher Education Commission, 6 N. Liberty St., Baltimore, MD 21201, 410-767-3301) to confer bachelor of science (BS) degrees in astronautical engineering, business administration, computer science, cybersecurity, electrical engineering, management of cyber and information technology, mobile computing and game programming, software engineering and web development. The university is authorized to confer BS and associate in applied science (AAS) degrees in computer engineering technology, electronics engineering technology, and telecommunications engineering technology. The BS programs in business administration and management of cyber and information technology are fully accredited by the International Assembly for Collegiate Business Education (IACBE, PO Box 25217, Overland Park, KS 66225).

The university is authorized by the state of Maryland to confer master of science (MS) degrees in astronautical engineering, computer science, cyber and information security, electrical engineering, information systems management, and internet engineering. The university is authorized by the state of Maryland to confer a master of business administration (MBA) degree. The MBA and information systems management programs are fully accredited by the International Assembly for Collegiate Business Education (IACBE, PO Box 25217, Overland Park, KS 66225).

The university is authorized by the state of Maryland to confer a doctorate of science (DSc) in cybersecurity and a doctorate of philosophy (PhD) in management and decision sciences.

The university is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools (Commission on Higher Education, Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, 215-662-5606). The BS degree programs in electrical engineering, astronautical engineering and computer engineering are also accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The baccalaureate degree programs in computer engineering technology, electronics engineering technology and telecommunications engineering technology are also accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (111 Market Place, Suite 1050, Baltimore, MD 21202, 410-347-7700). Capitol Technology University is approved by the Maryland Higher Education Commission.

Equal Opportunities
Capitol Technology University actively subscribes to a policy of equal educational and employment opportunity and, in accordance with Title IX of the education amendments of 1972, does not discriminate on the basis of race, color, religion, gender, gender identity or expression, gender orientation, sexual orientation, national or ethnic origin, genetics, disability, age, or veteran status in admission, treatment of students or employment.

The following members of the Capitol Technology University community are designated to receive inquiries concerning the university’s application of the equal opportunities statement. Inquiries related to the application of Title IX may be referred to the campus Title IX Coordinator, Melinda Bunnell-Rhyne; the Director of Administration; or any Vice President of the university or to the Department of Education’s Office of Civil Rights.

Melinda Bunnell-Rhyne
Dean of Student Life and Retention
Title IX Coordinator and Section 504 Coordinator
11301 Springfield Rd. Laurel, MD 20708
301-369-2491
deanofstudents@CapTechU.edu

Changes in Catalog Information
Capitol Technology University reserves the right to make changes in policies, procedures, degree requirements, schedules, course offerings and other university standards or announcements to meet circumstances that may arise after publication.

The provisions of this publication are not to be regarded as an irrevocable engagement between the student and Capitol Technology University. The university reserves the right to change any provision or requirement in any university publication without notice at any time during the student’s term of attendance.

Capitol Technology University reserves the right to require a student to withdraw, or to refuse to grant a degree or certificate if, in the judgment of the administration of the university, the student fails to meet the university’s requirements satisfactorily. The university reserves the right to change tuition and fees at any time at the discretion of the Board of Trustees.

Student Records
The procedures and guidelines adopted by Capitol Technology University (hereinafter occasionally referred to as the “university”) regarding student records comply fully with the Family Educational Rights and Privacy Act of 1974 (FERPA). This federal law establishes the rights of students to inspect and review their records, and provides students with a mechanism for correcting inaccurate or misleading data found within a student’s education records. Moreover, FERPA guarantees the privacy of students’ education records. Specifically, FERPA limits the disclosure of personally identifiable, non-directory, information contained in education records, without the consent of the student. Consistent with its obligations, Capitol Technology University will not release personally identifiable information from a student’s education records without the student’s consent, except in circumstances permitted by FERPA (e.g., in connection with a health or safety emergency).

Education records are records, files, documents and other materials containing information directly related to a student that are maintained by Capitol Technology University. For example, records maintained by faculty advisors, the Office of Admissions, Office of Financial Aid, the Business Office, the Office of Career Services, Dean of Students’ Office, and Office of Registration and Records, are generally education records.

Student Review of Education Records
Students are entitled to inspect and review education records maintained by Capitol Technology University. Students who wish to access a particular record should contact the office responsible for maintaining that record. The university will produce the record within a reasonable period of time, although in most instances the university will allow the student to review the record immediately upon the submission of a written request. The university does not release personally identifiable information that is inaccurate, misleading, or in violation of the student’s rights of privacy, may request that Capitol Technology University amend the record. Students should submit such requests, in writing, to the official from whom the record was obtained. Alternatively, students may submit written requests to Melinda Bunnell-Rhyne, Dean of Student Life and Retention.

Capitol Technology University will decide whether to amend the record, as requested by the student, within a reasonable time after receiving the request. If Capitol Technology University declines to amend the record as requested, it will inform the student of its decision. In this instance, the student is entitled to request a hearing to determine the merits of his or her request.

Students may request copies of their Capitol Technology University education records for a fee of $10 per copy. However, Capitol Technology University will not copy records for students with unpaid financial obligations. Reproduction of academic transcripts costs $10 per copy. However, Capitol Technology University will not copy records for students with unpaid financial obligations.

Disclosure of Information Contained in Education Records
Capitol Technology University generally does not disclose personally identifiable information contained in a student’s education records without the student’s prior consent. However, FERPA does allow Capitol Technology University to disclose such information in certain, limited circumstances. For example, Capitol Technology University may disclose information in a student’s education records to school officials within Capitol Technology University whom the university has determined to have a legitimate educational interest in the information. A school official generally has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility. School officials include: professors; instructors; administrators; housing staff; counselors; attorneys; clerical staff; trustees; members of committees and disciplinary...
Allegations that Capitol Technology University is not in compliance with FERPA may be directed, in writing, to the Family Policy Compliance Office at the Department of Education.

Locations
Laurel Campus
Capitol Technology University occupies the grounds of the former Beltsville Speedway. Located just off the Baltimore-Washington Parkway, the campus is minutes away from NASA Goddard Space Flight Center, the Beltsville Agricultural Research Center, the laboratory headquarters of the U.S. Food and Drug Administration, and the Patuxent Wildlife Research Center.

The tree ringed suburban campus features gentle slopes and a small pond. The sleek white forms of M/COM Hall, MCI Hall and Telecommunications Hall are connected by glass-enclosed pedestrian walkways. The William G. McGowan Academic Center houses state-of-the-art classrooms, the Critical Infrastructures and Cyber Protection Center, the Space Operations Institute, the Cyber Lab, the Fusion Lab, and the Identity Credentialing and Access Management (ICAM) Lab. The buildings have high ceilings, skylights and exterior reflective glass walls overlooking the woods. Apartment-style student housing is available for 90 to 120 students.

Southern Maryland
Selected courses leading to degrees in electrical engineering and computer science are offered in classrooms at the Southern Maryland Higher Education Center in California, Maryland, near the Patuxent River Naval Air Station.

Mission, Vision and Learning Goals
Motto from the University Seal
Aut viam inveniam aut faciam (Latin). Either find a way or make one.

Mission
The mission of Capitol Technology University is to educate individuals for professional opportunities in engineering, computer and information sciences, and business. We provide relevant learning experiences that lead to success in the evolving global community.

Vision
In 2020, in accordance with the Mission Statement, Capitol Technology University will be seen by its constituents and by the public as:

- A STEM-focused institution educating in engineering, information sciences and business, that has flexibility and opportunities to grow, and that adapts offerings to emerging workforce and societal needs.

- A provider of hands-on, career relevant learning that is conducted in an interdisciplinary and interactive environment, where faculty and staff support student achievement and success.

- A university that delivers programs of similarly outstanding quality through face-to-face and virtual classrooms, and other forms and mixtures of teaching methods that align with the learning needs of our students.

- An organization with faculty and leadership who stimulate and implement new curricula for the professions we serve, and that benefit a diverse community of learners.

- An organization that is closely linked to its constituency of local, national, and international partners in business and government, and that provides influence for future technology development and policies.

- A university that develops graduates with communications, analysis and critical thinking skills that allow them to be successful in a global environment and pursue lifelong learning as technical professionals, leaders and innovators.

Values
The core values are the characteristics we embrace in working together to fulfill the mission and achieve the vision of the institution.

- Quality – always striving for continuous improvement
- Growth – expanding and changing to meet new needs of society
- Leadership – offering creative, supportive and shared leadership
- Balance – maintaining a balance between competing needs
- Integrity – being honest, ethical and open
- Teamwork – exercising collective effort to support students and staff
- Communications – providing timely and useful information
- Flexibility – discovering and seizing opportunities
- Safety – maintaining awareness and prevention of accidents and threats

Students
Capitol Technology University’s student body mirrors the 21st century diversity of American higher education. Academically prepared and motivated high school graduates come to Capitol Technology University to complete educational experiences that will open career opportunities for them. Working adults, veterans and transfer students come to Capitol Technology University to complete undergraduate programs of study that will open or enhance career opportunities. Established professionals come to Capitol Technology University to expand their skills by earning graduate degrees or completing short-term learning experiences. The diversity of students enriches the learning environment of the university.

Learning Goals
Capitol Technology University seeks to prepare graduates who demonstrate four characteristics:

- Employability: The ability to enter and advance in technical and managerial careers, appropriate to their level and area of study, immediately upon graduation.

- Communications: Mastery of traditional and technological techniques of communicat­ing ideas effectively & persuasively.

- Preparation of the Mind: The broad intellectual grounding in technical and general subjects required to embrace future technical and managerial opportunities with success.
Professionalism: Commitment to lifelong learning, ethical practice and participation in professions and communities.

The Educational Philosophy of the Academic Programs
Four principles define the educational philosophy of Capitol Technology University. Academic programs must be:
- Grounded in both theory and practice in order to prepare graduates for immediate employment and long-term professional careers,
- Fundamentally hands-on and practice oriented to provide the technical skills for students to be immediately employable upon graduation,
- Tied to the contemporary needs of industry so that curriculum reform and development are pragmatic, and
- Enriched by courses in the liberal arts to provide every graduate with an enhanced sense of self, society, history and aesthetics.

Strategic Goals
Elevating Education and Expanding Enrollment
Capitol Technology University is an institution that offers career-relevant curriculum with quality learning outcomes. The strategy includes continuing to expand educational offerings at higher levels of degree attainment, program completion, and learner qualifications and outcomes. The university will accelerate the strategy to become more globally known and active in serving international countries, companies and learners. The 52-acre campus will be built out to accommodate current and future growth in volume and diversity of educational programs and student services. Capitol will increase student enrollment to 1,500 by Fall 2014.

Diversifying Institutional Resources
The university will enhance its financial resources by expanding the range and amount of funding available to the institution, aligning costs with strategic initiatives, and expanding corporate relationships. Capitol will increase annual revenue from philanthropy to $1.34 million by 2018 through a coordinated advancement plan.

Extending Family of Organizational Partners
The mission of Capitol Technology University is to provide relevant learning experiences that lead to success in the evolving global community. In order to achieve the mission the university will enhance and expand corporate relationships. Capitol will increase and diversify revenue from services to corporations and government agencies to $500,000 by 2018.

Maintaining Institutional Viability
Capitol Technology University is committed to providing relevant learning in a quality learning environment. The university continuously reviews the higher education landscape to identify opportunities to revise and enhance the learning environment, either online or on campus. Capitol will develop plans to ensure the sustainability of the organization.

History
Since its start more than 80 years ago, Capitol Technology University has remained true to its mission – preparing students for careers in a quickly changing world. With a tradition of academic excellence and practical learning, Capitol Technology University has equipped its alumni with the knowledge and skills to evolve with the advanced sophistication of technology.

Capitol Technology University was founded in Washington, DC, as the Capitol Radio Engineering Institute in 1927 by Eugene H. Rietzke. A Navy veteran and radio operator, Rietzke foresaw the need for an advanced school that could produce talented radio and electronics technicians. CREI began as a correspondence school, but its popularity led to the 1932 opening of a residence division allowing students to work hands on in laboratories. As radio technology improved, new training programs and courses were quickly added. Following World War II, CREI became one of the first three technical institutes accredited by the Engineers’ Council for Professional Development.

The institute entered a new era in the mid-1950s when it began awarding three-year AA degrees. The school expanded its reach to new programs in applied engineering and electronics. To reflect this evolution, the institute changed its name to Capitol Institute of Technology in 1964. It awarded its first bachelor of science degrees in 1966 to four graduates of its electronics engineering technology program. Anticipating the need for more room, Capitol relocated in 1969 to a leased space in Kensington, Maryland. During the following decade, enrollment increased and so did the program offerings. In 1976 the Middle States Association of Colleges and Secondary Schools granted accreditation to Capitol, and the National Science Foundation provided funding for new instructional scientific equipment. Quickly outgrowing its space, Capitol’s leaders recognized a need for a permanent home and began searching for a new campus.

The result of that search was a relocation to Laurel, Maryland. Capitol purchased the 52-acre former site of the Bethesda Speedway, built new academic facilities and opened the doors to students in 1983. Enrollment swelled and two more engineering technology degrees were added. Within the next decade a capital campaign and funding from the state of Maryland raised millions for buildings, equipment and a scholarship endowment. The campus expanded with Telecommunications Hall and the 340-seat Avrum Gudelsky Memorial Auditorium. In 1987, the school became Capitol College, a name it would retain until September 2014.

In the late 1980s, Capitol’s leadership again recognized the transformation in the increasing demand for academic programs had become broader, with an increasing incorporation of humanities and social science courses. With a spacious campus and four-year degrees, the school had shed its skin as a technical institute. Preferring a title and an environment that would better suit its presence, the Board of Trustees changed the school’s name to Capitol College. Along with the name change came a plan to offer more degrees in engineering and management, build on-campus housing and convert from a quarterly academic calendar to a semester system.

Master’s degrees were introduced in the 1990s. Capitol began several outreach efforts and business partnerships, such as the NASA PREP summer program for minority students and the Maryland Distance Learning Network. Meanwhile, Capitol expanded the John G. and Beverly A. Puente Library, creating a spacious state-of-the-art facility with a multimedia teaching center. The opening of the William G. McGowan Academic Center in 2005 marked the next era for Capitol. The academic center hosts an expanded computer science department, the Space Operations Institute, and the BRAC-funded Cyber Battle Lab.

With a new century and millennium now under way, the time came again to take stock of Capitol’s achievements and set a course for its future growth. The radio institute founded in 1927 had burgeoned over the decades in ways that few could have predicted. It had become a full-fledged higher education institution, offering a wide palette of academic disciplines and degrees. Reflecting these changes, the school was renamed Capitol Technology University in 2014.

Today, Capitol is the only independent institution of higher education in Maryland that specializes in providing a relevant education in engineering, business and related fields. It takes pride in its proven record of placing graduates in competitive careers with salaries that are higher than the industry average. As a respected regional leader, Capitol continues attracting the attention of government agencies and corporate partners. Through a partnership with NASA, Capitol offers academic programs in astronautical engineering and practical training at its Space Operations Institute. The National Security Agency and Department of Homeland Security have designated Capitol a National Center of Academic Excellence in Information Assurance Education, and the Institute of Electrical and Electronics Engineers has named the university one of its twelve educational partners. In 2010, Capitol introduced a doctor of science in information assurance to its academic repertoire, allowing students to pursue their education to the highest level in the discipline. In 2015 the university launched a PhD program in management and decision sciences.

While new innovations spur new developments and industries, the foundations that are taught at Capitol Technology University – thinking critically, actively and creatively – will remain. As it looks to the future, Capitol Technology University remains committed to providing students with a quality education and the relevant experience to excel in a changing world.
The Centers of Excellence

Capitol Technology University has a vision, mandated by industry leaders, government officials, and education policy makers, to answer the call to provide a new generation of engineers and technology professionals who have higher levels of innovation and leadership in order to ensure the national workforce is competitive in science, technology, engineering, mathematics, and business.

Critical Infrastructures and Cyber Protection Center

Capitol established the Critical Infrastructures and Cyber Protection Center (CICPC) to address the technical and managerial needs of the nation’s professional workforce in the areas of critical infrastructure protection and homeland security. The CICPC delivers professional training to the homeland security workforce, as well as facilitating employment connections between our talented students and the federal agencies and industry contractors that hire them. CICPC programs and services specifically target the needs of individuals employed in fields responsible for securing what many take for granted – the American way of life.

From technical training in areas such as computer forensics and SCADA protection to managerial areas such as project management and supply chain management, Capitol provides customized programs featuring dedicated faculty who bring years of experience with theory and concepts. Our programs can be delivered at the customer site, on campus, and/or via our synchronous distance-learning platform.

Innovation and Leadership Institute

The Innovation and Leadership Institute offers programs designed to build the technical and social skills of young people and working adults who want to succeed in technology entrepreneurship and leadership careers. ILI sponsors the Capitol President’s Forums and speaker series, which bring distinguished speakers and panelists together with students and community members to share insights on innovation, entrepreneurship, and leadership.

Future ILI endeavors will continue to deliver seminars, conferences and symposia on innovative topics, and non-credit professional development programs in information assurance, technology management and entrepreneurship.

Other ILI activities include:
• a program of applied innovation and leadership research, resulting in the publication of best practices, organizational trends and successful leadership stories;
• providing facilities and university faculty as neutral resources focused on bringing together people with common technology and leadership challenges to solve problems;
• programs for minorities and women, two groups that continue to be under-represented in both technology and business leadership;
• outreach programs to high school and community college audiences to increase interest in engineering, technology and business leadership careers.

Space Operations Institute

The Space Operations Institute (SOI) was established at Capitol in 2003 with a grant from the National Aeronautics and Space Administration (NASA).

The SOI builds on Capitol’s established engineering foundation and works closely with NASA and industry partners to understand the aerospace industry’s changing skills requirements. The SOI provides support for educational programs that prepare students for careers in the aerospace industry. The SOI provides the infrastructure to prepare hands-on experience in satellite mission operations and planning, and developing and operating a picosatellite ground system. Students enrolled at Capitol may apply for an industry sponsored or internal university SOI internships. Industry sponsored student interns work at NASA, the employers facility, or on campus. SOI interns work in the Fusion Lab or SOI Control Center on development and ground system operations projects. The SOI provides students with practical experience that supplements their academic learning. The SOI currently has interns working on the Tropical Rainforest Measurement Mission (TRMM) at NASA Goddard Spaceflight Center, the James Webb Telescope at the Hubble Space Science Institute in Baltimore, and the Jet Propulsion Laboratory in California.

SOI management is continually seeking new opportunities with NASA and private industry to expand training and learning opportunities for students.

Center for Space Science Education and Public Outreach

The Center for Space Science Education and Public Outreach provides hands-on education and workforce development experiences for students in K-12, community colleges, universities and those who support them in achieving leadership careers in the science, technology, engineering and math (STEM) fields.

The Center’s vision is to assist in educating and developing the future leaders of the STEM career fields through utilizing space science, astronomy and other related areas of study at Capitol Technology University to engage students of all ages.

Working at the local, regional, and national levels, the Center will:
• assist the Capitol Technology University Space Operations Institute in fulfilling their mission;
• provide hands-on educational experiences for middle school, high school, community college, and college students to both introduce them to STEM careers in their mission;
• provide leadership development opportunities, in conjunction with the Innovation and Leadership Institute, to enable students to be future leaders within the STEM fields;
• support the dissemination of information regarding STEM workforce and leadership opportunities.

Affiliations, Memberships and Partnerships

The university’s academic offerings are strengthened by relationships with government agencies, professional societies and private industry.

CyberWATCH

Capitol Technology University is a member of CyberWATCH, an Advanced Technological Education Center funded by a grant from the National Science Foundation. CyberWATCH, founded in 2005 as a consortium for ten institutions in the DC metro area, has grown to 95 member institutions across 29 states and the District of Columbia. The CyberWATCH mission is to increase the quantity and quality of the cybersecurity (information assurance) workforce through increased education, curriculum development, faculty development, student development, career pathway exploration and development and public awareness.

Institute of Electrical and Electronics Engineers

Capitol Technology University is a participating university partner with the Institute of Electrical and Electronics Engineers. Individuals who hold full membership in IEEE will receive a 10 percent discount on tuition charges upon verification.

National Defense University

Capitol Technology University is a partner with the National Defense University’s College (formerly Information Resource Management College) to advance the professional skills and knowledge of active-duty military, veterans and select Department of Defense employees. This arrangement provides an opportunity for military and DoD students who have completed selected NDU programs to transfer up to 15 credits in lieu of Capitol Technology University graduate coursework.

National Security Agency and Department of Homeland Security

The National Security Agency and the Department of Homeland Security initially designated Capitol Technology University as a National Center of Academic Excellence in Information Assurance Education (CAEIE) in 2003, after a thorough review of the master of science in information assurance (MSIA) curriculum. In 2007, Capitol became one of...
only three institutions nationwide to be certified as meeting all six standards (at the most advanced levels where applicable) as determined by the Committee on National Security Systems. Today, Capitol Technology University remains the only institution with this all-inclusive mapping that delivers its program fully online.

Students successfully completing the requirements for the degree are awarded, in addition to the graduate degree, a federally accepted certificate attesting that they studied the requirements of the six national training standards. In the process of earning the MSIA, students have the opportunity to earn three post-baccalaureate certificates: Network Protection, IA Administration, and Security Management. For more information on these certificates see the Post-baccalaureate Certificates section of the university catalog.

**Maryland Community College Partner Institutions**

Capital Technology University has collaborated with ten Maryland colleges to provide transfer/articulation agreements in certain degree fields. These colleges include Anne Arundel Community College, Baltimore City Community College, College of Southern Maryland, Community College of Baltimore County, Hagerstown Community College, Harford Community College, Howard Community College, Montgomery Community College, Prince George’s Community College and WorWic Community College. These agreements allow students from these participating institutions to easily transfer credits to Capital Technology University.

**Online Learning**

Capital Technology University offers all graduate degrees and certificates entirely online. In addition, undergraduate third and fourth year courses leading to a BS in Business Administration, Information Assurance, or Management of Information Technology are available online for degree completion at a distance. Students enrolled in Capitol’s online programs meet in virtual classrooms using a web-based application that delivers interactive live classes. In addition, a course management system provides course materials, homework, grades, and discussion threads. Online students participate in real-time class sessions once or twice a week. During the live lectures, students view slides or live programming and diagnostics while listening to professors and other students speaking in real-time. Student interactivity is encouraged and is made possible through chat and audio discussions. In a way similar to a traditional classroom, students can raise their hands using interface icons and ask questions using their microphones or by chatting. Outside of the live classroom, the knowledge exchange continues as students download and view course material, transmit homework assignments, post to discussion boards and collaborate with other classmates. A typical online course consists of 16 class sessions, alternating between synchronous (“live”) lectures and asynchronous sessions. Asynchronous sessions can be recorded lectures or assignments that supplement topics discussed during the live lecture.

Because software vendors constantly update the online platforms, Capitol Technology University posts the latest computer system requirements for online learning on our support site, ask.CapTechU.edu. Use the search input box there to look for “minimum system requirements” or just “minimum.” In general, most computers manufactured after 2008 meet the minimum requirements for online learning. The computers will also need audio capabilities for speakers and microphones. Lecture audio uses Voice over Internet Protocol (VoIP), so students will need an Internet connection with sufficient bandwidth (usually DSL or cable Internet but even wireless mobile devices with data plans should be sufficient for most classes). Remember that minimum requirements are bare minimums: more memory, faster processing speed, and faster Internet connections will always improve the online class experience. Even though it is possible and convenient to attend online classes with mobile devices, they limit capacities required in some classes. For example, a student might be required to upload and present a PowerPoint presentation or use another application.

To fully participate in a Capitol LIVE! virtual classroom, students must have access to a Windows or Linux PC or a Mac configured with a full-duplex sound card and a headset (microphone and speakers). Note that graduate students in Information Assurance labs and selected advanced undergraduate courses are expected to have more recent Windows systems with considerable RAM memory and hard drive space.

Students can get technical assistance by phone or e-mail (ask@CapTechU.edu) and around-the-clock support via our website at ask.CapTechU.edu. Phone support is available every hour classes are in session including 8:30 a.m. until 10 p.m. Monday-Thursday; 8:30 a.m. until 5 p.m. Friday; and 8:30 a.m. until 2 p.m. Saturday at 888-960-9620.
Academic Policies and Procedures

Program Advisors

Degree-seeking students are assigned academic advisors before registration. Students are encouraged to work closely with advisors in developing their programs of study. Academic advisors are available for guidance, but each student must assume final responsibility for conforming to university regulations and curriculum requirements.

Registration Procedures

Detailed registration information is provided before the beginning of each semester. Registration dates are listed in the university calendar beginning on page 126 and online. Students must be in good financial standing with the university to be eligible for registration services.

Registration forms can be obtained and submitted at the Laurel campus or online. Late registration occurs during the first two weeks of the semester for all semester-length courses, or between the first and second class meeting for all term-length courses (with undergraduate and graduate). No term-length course registrations will be accepted after the second class meeting. The last day to add or drop a class is listed in the university calendar beginning on page 126 and online.

Independent Study

Independent study in a course will be granted in only the most extraordinary circumstances. The professor who administers the independent study and the dean of academics must give permission for the course. When permission is given, the professor organizes the course requirements, including exams, homework, lab assignments, research and position papers, to compensate for the absence of classroom participation. Students must be in good academic standing to petition for independent study. Students interested in independent studies should consult with the dean of academics and submit all appropriate documentation to the Office of Registration and Records.

Change of Degree Program

Students who want to change degree programs must fill out a change of degree program form, which may be obtained in the Office of Registration and Records. The dean of academics must approve all changes of degree programs. Students who change their degree program are required to meet all requirements of the new program that are in effect at the time of the change. Transfer credits and courses that have already been completed will be applied toward the new degree program where appropriate. Any student receiving financial aid contemplating a change of degree should see the Office of Financial Aid. Completed documentation must be submitted to the Office of Registration and Records after academic dean approval.

Double Degree Requirements

Undergraduate students who are currently enrolled and want to pursue two degrees (AAS or BS) must have a cumulative GPA (grade point average) of 2.5 or higher. For a second BS degree, the student must complete a minimum of 150 credits, with a minimum of 18 credits distinction between majors, of which at least 12 must be upper-level credits completed at Capitol Technology University. For a second AAS degree, the student must complete a minimum of 75 credits, with a minimum of nine credits distinction between majors, of which at least six must be 200-level or above. Undergraduate students who are currently enrolled in an AAS program and a different BS program must complete nine credits of distinction between the two degrees.

Graduate students who want to obtain two degrees may overlap two to three courses, depending on the degree program, but must otherwise complete all the requirements for both degrees. Should more courses overlap than is approved, the student must take additional courses to make up the credit requirement. Double-degree-seeking graduate students are encouraged to consult the dean of academics for advisement. All students declaring a second degree must have academic dean approval and complete the change of degree program form. This may be obtained in the Office of Registration and Records or online.

Course Drop

There are two course drop periods. The first course drop period occurs during the registration period and ends on the last day for a 25% refund. The second course drop period occurs following the period for 25% refund and continues until the date indicated on the academic calendar. For a course drop that takes place during the first period students are entitled to a percentage refund as outlined in the refund schedule. The course is removed from the student's transcript and no grade is assigned.

A course drop that takes place during the second period results in a mark of W on the student's transcript. A grade of W does not affect students' cumulative GPA. Failure to attend class does not constitute withdrawal from the course and does not eliminate a student's academic or financial responsibilities. If a student drops all courses for the semester (zero credits), he/she is considered withdrawing from the university and should follow the procedure for withdrawal (as listed in the next section). Deadline dates for dropping a course with or without a W from a course are listed in the university calendar on page 126 and online.

Withdrawal from the University

Students who want to withdraw from the university or are dropping from all classes in a term or semester must complete a withdrawal form from the Office of Student Life or online. Students who interrupt their attendance for less than one academic year and are in good standing with Capitol Technology University at the time of the withdrawal do not need to reapply to the university. Also see “Readmission.” Failure to attend classes does not constitute withdrawal and does not eliminate students' academic or financial responsibilities. Students cannot withdraw during the week of final exams.

Withdrawal from the university may affect financial aid awards. Anyone receiving financial aid or VA benefits must see a financial aid administrator before withdrawing. Consult the university calendar on page 126 for specific withdrawal dates.

Readmission

Students who withdraw from the university are eligible for readmission at any time, unless they have been in violation of the university's academic regulations, or have been dismissed for disciplinary reasons. Students who have been admitted to the university and interrupt their attendance for more than one academic year (three consecutive semesters) must reapply for admission. In this case, a readmitted student must meet the degree requirements in place at the time of readmission in order to qualify for graduation. Applications are available online. Arrangements for payment of outstanding tuition should be submitted to the Office of Registration and Records.

Students interested in cross divisional study may need to consult the independent study and the dean of academics must give permission for the course.
tuition balances must be made with the Business Office before readmission is approved.

**Leaves of Absence**

Doctoral students may request a Leave of Absence (LOA) by completing the “Request for Leave of Absence” form on the myCapitol portal (Doctoral Student tab). When requesting an LOA, keep in mind all coursework must be completed within a five-year time period. Please note this does not include the additional two years allowed for dissertation completion.

All LOA requests must be submitted in writing, include the reason for the request and be signed and dated. In order to adhere to federal regulations of the Department of Education, the LOA, together with any additional leaves of absence, must not exceed a total of 180 days in any 12-month period. The 12-month period begins on the initial date of your LOA. At leave expiration, students must re-enroll or (if qualified) request an LOA extension. If you have not returned at the end of the 180-day period, the school is required to notify the Department of Education of your last date of attendance. This will affect your federal financial aid and your loan repayment status. Students with circumstances requiring LOA beyond 180 days should consider withdrawing from the program, retaining the right to reapply at a later date. LOA forms are provided on the MyCapitol portal.

**Course Cancellation**

The university can cancel a course for which an insufficient number of students are enrolled. Students will be notified of a cancellation by the first class session, and any payments made will be refunded in full or credited to your next term.

**Course Prerequisites**

When planning schedules for upcoming semesters, students should pay special attention to the course prerequisites. Students must obtain a grade of C or better in prerequisites for degree required courses. Those students not meeting the course criteria will not be allowed to register without approval from the dean of academics.

**Completion of English Courses**

Students seeking bachelor’s degrees at Capitol Technology University must complete EN-101 and EN-102 before being permitted to register for junior-level classes. Transfer students must have equivalent transfer credits for EN-101 and EN-102 before being permitted to register for junior-level classes. Transfer students of junior status who do not have equivalent transfer credits for EN-101 and EN-102 must meet with the academic before registering.

**Class Attendance**

Each professor establishes regulations regarding class attendance at Capitol Technology University. Regular class and laboratory attendance is necessary to achieve maximum success in university work. Students receiving financial aid who do not attend classes will lose their aid.

**Transcripts**

Student academic records are maintained exclusively by the Office of Registration and Records. These records are considered privileged documents between the student and the university and will be released only upon a signed, written request from the student, except as may be required by law. Transcripts will be issued when the student submits a signed request form and the student’s financial account is current. A $10 transcript fee is assessed for each issuance. Transcript request forms are available in the Office of Registration and Records and on the myCapitol portal. Capitol Technology University will neither issue a transcript that reflects only part of a student’s record nor make copies of transcripts on file from other colleges or universities. Federal guidelines prohibit the faxing or emailing of grades and transcripts. Unofficial transcripts are available at any time with proper photo identification if the student’s financial account is current.

**Summer Session**

The undergraduate summer semester is composed of 8- and 11-week sessions with a week for final examinations. All summer sessions will contain the same amount of material normally covered during a semester. Class schedules will be modified to accommodate the shortened period. Please refer to the university calendar beginning on page 126 for the summer session schedule. Graduate online courses offered in the summer session maintain the 8-week accelerated term and 16-week semester.

**Identification Cards**

All enrolled undergraduate students will receive a Capitol Technology University identification card. ID cards are required to check out laboratory equipment or library materials. The student activity fee covers the cost of the original ID card. At the beginning of each semester, information about obtaining an ID card is posted on campus and online. Graduate students may request an ID card from the Office of Student Life.

**Scholastic Standing**

**Grading System**

The quality of a student’s academic performance is evaluated by letter grades that are assigned quality points as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standard</th>
<th>Quality Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>Average</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>Below average</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>Failing</td>
<td>0</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
<td>0</td>
</tr>
<tr>
<td>NG</td>
<td>No grade</td>
<td>0</td>
</tr>
<tr>
<td>P</td>
<td>Pass</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>Repeat</td>
<td>0</td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory</td>
<td>0</td>
</tr>
<tr>
<td>U</td>
<td>Unsatisfactory</td>
<td>0</td>
</tr>
<tr>
<td>V</td>
<td>Validation credit</td>
<td>0</td>
</tr>
<tr>
<td>W</td>
<td>Withdrawn (officially)</td>
<td>0</td>
</tr>
<tr>
<td>X</td>
<td>Audit</td>
<td>0</td>
</tr>
<tr>
<td>T</td>
<td>Transfer credit</td>
<td>0</td>
</tr>
</tbody>
</table>

*A grade of C shows minimum expectations have been met at the graduate level.

**Grade Reports**

Graduate reports are available at https://mycapitol.CapTechU.edu within three weeks after the last day of final exams. Students who want to have grades sent to sponsors must complete the proper request form available in the Office of Registration and Records or online. Federal regulations prohibit the use of phone, email or fax for official grade distribution.

**Grade Appeal**

Students who believe their posted grade is incorrect should speak directly to the professor. If the student and professor cannot
If the CGPA of an undergraduate student is in good academic standing if they have a cumulative grade point average of at least 2.0 in their degree program and a grade of C or above in each attempt. The university reserves the right to terminate academic standing for any student who has been dismissed for unsatisfactory progress. The Office of Registration and Records will maintain a record of each VA student’s grades in accordance with VA regulations. A student can request official transcripts from the Office of Registration and Records as long as his or her financial accounts are current.

Academic Suspension

Undergraduate students who have not completed the prerequisites for MA-110 or MA-114 and EN-101 through placement testing, or successful completion of MA-005 and EN-001 after attempting 24 credit hours, will be suspended from the university until it is demonstrated to the faculty that they can achieve and maintain good academic standing at the university level. Undergraduate students whose cumulative GPA falls below 2.0 for three consecutive semesters will be suspended from the university for one academic semester after which they may return to the university. Students suspended from the university are not relieved of their financial obligations. Upon return, students will remain on probation and must achieve an acceptable standing or be suspended from the university until it is demonstrated to the faculty that they can achieve and maintain good academic standing at the university level. To demonstrate to the faculty that a student can achieve and maintain good academic standing at the university level, he or she must complete at least six academic courses with a minimum of 18 credits with grades of C or better at another accredited college or university. Before a student is readmitted to Capitol Technology University, the director of admissions will review his or her file.

Repeating a Class

A specific course may be repeated twice in order to improve a grade or replace a W or X. Therefore, a student may take a specific course only three times. Three-time enrollment is limited to a maximum of five different courses during a student’s academic career. The higher grade is used and the lower grade is omitted in computing the CGPA. All grades are recorded on the student’s transcript.

Any student who has taken a course required for their degree three times and has not achieved a satisfactory grade will be dismissed from that academic program. The dismissed student is permitted to apply for any other program that does not require that specific course. An academically dismissed student with extenuating circumstances can appeal in writing to the dean of academics for recommendation to the vice president of academic affairs.

Satisfactory Academic Progress for Students Receiving Financial Aid

Undergraduate and graduate students receiving federal aid must meet satisfactory academic progress (SAP) standards or risk the cancellation of financial awards and repayment of funds already received. See page 25 for the policy.

Academic Probation

Academic probation alerts students that they are in academic trouble and will be suspended from the university if their GPA and CGPA fall below 2.0. Undergraduate students are placed on academic probation under the following conditions:

- If a student registers for MA-005 or EN-001 and does not complete the course with a P
- If the CGPA of an undergraduate student with fewer than 30 attempted credits falls below 1.7
- If the CGPA of an undergraduate student with more than 30 attempted credits falls below 2.0.

Undergraduate students on academic probation must have a mandatory meeting with their advisor before registration and may not register for more than 12 semester credits or no more than four courses.

Master’s degree students whose cumulative GPA falls below 3.0 are placed on last warning. Students on academic probation will be given three semesters (registered for coursework) to raise their CGPA to 3.0 and must consult with their advisor on the best course options.

Doctoral students must maintain a 3.0 GPA. A grade of C or below is not acceptable. A student who receives a C or lower in any course must repeat that course, achieving a B or higher before moving on in the program. Students failing to successfully achieve a grade of B or higher in a single course after three attempts will be dismissed from the program. A student whose cumulative grade point average falls below 3.0 will be placed on academic probation. Probation will be lifted when the student achieves a cumulative GPA of 3.0. Students failing to meet any of these criteria will be dismissed from the doctoral program.

Academic Dismissal

A second suspension, undergraduate students who have been readmitted to Capitol Technology University after completing 18 credits at another institution must earn a 2.0 GPA each semester. If their GPA falls below 2.0 at any time, they will be dismissed and not permitted to return to Capitol Technology University. Graduate students who fail to reach the 3.0 requirement in the allowed period will be automatically dismissed and may not be readmitted to the university for at least one year after the effective date of dismissal.

Students dismissed from the university are not relieved of their financial obligations.

The U.S. Department of Veterans Affairs regional office will be notified if students receiving VA educational benefits are suspended or terminated. The dean of academics will consider re-entry requests on an individual basis from students who have been dismissed for unsatisfactory progress.

The Office of Registration and Records will maintain a record of each VA student’s grades in accordance with VA regulations. A student can request official transcripts from the Office of Registration and Records as long as his or her financial accounts are current.

Any doctoral student who has been dismissed for failure to meet academic standards becomes eligible to reapply no sooner than one year after the dismissal date. Students will be required to submit a letter with the application, outlining why the student believes that they have remediated and why the student is now confident that he or she will succeed in the program. The student must meet all the requirements of the degree existing at the time of readmission. Students are still subject to the time limit for completion (see pg. 19).

Disciplinary Dismissal

The continued enrollment of any student is dependent upon proper conduct. Failure to comply with the university’s regulations, or conduct deemed by the faculty as inconsistent with general good order, is regarded as sufficient cause for irreversible dismissal. The university reserves the right to terminate a student’s enrollment at any time for cause. Students dismissed from the university are not relieved of their financial obligations. Stu-
Monters who are dismissed for academic dishonesty or other breaches of student conduct will not be considered for readmission.

Matriculation:
Classification of Undergraduate Students:
- Freshmen: 29 semester credits or fewer
- Sophomores: 30-65 semester credits
- Juniors: 66-95 semester credits
- Seniors: 96 semester credits or more

Residency Requirements:
- A minimum of 15 semester credits, including 12 semester credits in the student’s degree program, must be completed at Capitol Technology University in order to receive an associate degree. At least 30 semester hours of academic credit must be earned by direct instruction. Direct instruction does not include instruction through correspondence, credit for prior learning, cooperative education activities, practica, internships, externships, apprenticeships, portfolios, reviews, departmental examinations, or challenge examinations.
- A minimum of 30 semester credits, including 18 semester credits in the student’s degree program, must be completed at Capitol Technology University in order to receive a bachelor’s degree. At least 60 semester hours of academic credit must be earned by direct instruction. Direct instruction means synchronous or asynchronous instruction for academic credit that allows regular interaction between student and instructor, such as academic credit that allows regular interaction between student and instructor, such as

Graduation Requirements:
- Undergraduate students must complete 1-11 credits considered part time
- 12-18 credits considered full time
- Master’s: 1-8 credits considered part time
- 9 or more credits considered full time
- Doctoral: 1-5 credits considered part time
- 6 or more credits considered full time

Graduate Requirements:
- Graduate students must have a minimum CGPA. Grades of D will not apply towards program requirements. Graduate students must submit an application for graduation no later than the end of the summer before the semester of completion. The student’s file is reviewed and forwarded to the dean of academics for final approval. Students are subsequently notified of approval and status. Applications for graduation are available in the Office of Registration and Records and online. The graduation fee is due by April 15, cannot be waived. Undergraduate students are considered degree candidates only when the above procedures have been completed. Students who change their plans for graduation must notify the Office of Registration and Records in writing.

Academic Honors:
- Honors are awarded and noted on the transcript of students who graduate with the following cumulative GPAs:
  - Undergraduate: 3.9 - 4.0 summa cum laude
  - 3.75 - 3.8999 magna cum laude
  - 3.5 - 3.7499 cum laude
  - Master’s: 4.0 with honors
- If an undergraduate student is completing more than one degree, the overall CGPA is used to calculate honors for the multiple degree programs.
- If a master’s student is completing more than one degree, the overall CGPA is used to determine honors.

Honor Societies:
- Alpha Chi National Honor Society: The Maryland Beta Chapter represents the Alpha Chi National Honor Society at Capitol Technology University. Membership is based on demonstrated service to the university community, good reputation and character, as well as high academic standing. Juniors and seniors enrolled in one of the bachelor’s degree programs at Capitol Technology University for at least one year and who rank among the top 10 percent of their class are eligible for election to the chapter by the faculty. Alpha Chi offers opportunities for public performance at conventions; publication in...
Transfer Credits

Undergraduate Transfer Policies

Unofficial transfer credit evaluations are completed during the admissions process in consultation with the academic departments. Once the transfer student is enrolled at Capitol Technology University, an official evaluation is conducted by the assistant director of registration and records in consultation with the academic departments and approved by the director of registration and records. The approved transfer credits are then added to the student’s permanent academic record and the student will receive written notification of the official transfer evaluation from the Office of Registration and Records. Once students matriculate at Capitol Technology University, they must meet the academic standards for their degree program.

Capitol Technology University will consider credit for transfer coursework completed at a regionally accredited institution, ABET-accredited program, or, in special cases, other qualified institutions acceptable to the standards of Capitol Technology University. Capitol Technology University will consider transfer credit for courses taken at an unaccredited institution on a probationary status, in which the student must complete a minimum of 24 credits at Capitol Technology University with a CGPA of 2.0 before the credits will transfer. Coursework must also meet the following requirements:

- Courses must be relevant to the Capitol Technology University curriculum.
- Only a passing grade of C or higher will be considered for transfer (courses are evaluated and transferred individually).
- Grades do not transfer, therefore transfer credits are not used in computing the CGPA.
- Capitol Technology University credit requirements are based on the semester-credit system. Transfer credits from other institutions operating on other academic calendar systems will be converted to semester credits.
- The grade of D will not be accepted for credit even when it is part of a degree.
- Comply with Residency Requirements as stated on page 18. Capitol Technology University will transfer a maximum of 70 semester-credit hours from any combination of the following:
  - community or junior colleges
  - proprietary or technical schools
  - the military
- College Level Examination Program (CLEP)
- Advanced Placement (AP)
- International Baccalaureate (IB)
- Massive Open Online Course (MOOC)
- Credits transferred are limited to the first two years and up to 50% of the baccalaureate degree program.

Military Credits

Capitol Technology University will award credit for military courses based on the American Council on Education’s Guide to the Evaluation for Educational Experiences in the Armed Forces and program relevancy. Applicants must present a certificate of completion and/or an official DD214 or DD295 to the Capitol Technology University Office of Registration and Records.

Industrial Courses

Capitol Technology University will not accept credits for courses taken at an industrial site unless the American Council on Education has approved the course. Students who have taken industrial courses may elect to take validation exams (see below).

Continuing Education Units

Capitol Technology University will not accept continuing education units (CEU) for transfer.

CLEP Tests

The official results of all CLEP exams must be submitted to the Office of Registration and Records no later than two semesters before completion.

Validation Exams

Students who can demonstrate competence in a subject without having completed the specific coursework, due to relevant work or life experience, may take a specially arranged validation examination. Not every course, however, lends itself to the validation process, and the dean of academics must grant permission for the examination to be given. Validation examinations are thorough and cannot be taken a second time. After paying the proper fee in the Business Office, interested students may register for a validation exam in the Office of Registration and Records, where forms and procedures are available. Students who pass the validation examination receive a V on their transcript and the appropriate number of semester credits. No partial credit or quality points are awarded.

Professional Certifications

Capitol Technology University will consider transfer credit for industry recognized certifications that are relevant to the program curriculum.

Waived/Substituted Courses

In some circumstances, transfer credits may count toward a waived or substituted course. If a Capitol Technology University course is waived, the student must complete the equivalent number of credits in a related subject area to fulfill the requirements of the degree. If a course is substituted, the credit is transferred and the requirement is therefore considered complete. Waivers and substitutions are conducted by the assistant director of registration and records and approved in writing by the dean of academics.

Engineering Programs

Students transferring credits into the engineering programs must follow additional guidelines.

Credits for military, vocational or technical training may be used to satisfy some electronics- and technology-based freshman and sophomore level EL courses.

Such courses do not fulfill the objectives of engineering, engineering science, or social science courses; they may be used as engineering electives in the engineering programs.

Graduate Transfer Policies

Unofficial transfer credit evaluations are completed during the admissions process in consultation with the academic depart-
ments. Once the student is enrolled at Capitol Technology University, an official evaluation is conducted by the assistant director of registration and records in consultation with the academic departments and approved by the director of registration and records. The approved transfer credits are then added to the student’s permanent academic record and the student will receive written notification of the official transfer evaluation from the Office of Registration and Records.

Depending on the program, a maximum of six to nine semester credits of comparable accredited coursework taken elsewhere may be applied toward a graduate degree. Only courses with a B or better will be accepted for transfer. Capitol Technology University will not accept continuing education units (CEUs) for transfer. Results from a certification exam may not be used for transfer. Validation exams for credit are not available at the graduate level. In some cases, military training and ACE-accredited government courses may be transferred. Official transcripts of such coursework may be submitted for evaluation of transfer credit. These materials should be submitted to the Office of Registration and Records for evaluation. The graduate programs will not award transfer credit for any course identified as correspondence. Credit that is part of a completed graduate degree may be used as transfer credit. Transfer credits are limited to six credits in 30-credit programs and nine credits in programs containing more than 30 credits except in the case of students who participated in selected NDU programs (see page 9 for details). Once the student enrolls at Capitol Technology University, all remaining credits must be completed at Capitol Technology University.

The time limit for degree completion applies to transfer credits. Therefore, any course that was taken more than seven years before the date of graduation will not fulfill graduation requirements at the master’s level and will be removed from the student’s transcript. At the doctoral level, courses taken within five years of admission will be considered for transfer. Once accepted, doctoral transfer credits do not expire. Transfer credits cannot be applied to any capstone or research-related course. Grades do not transfer, therefore transfer credits are not used in computing the CGPA.

### Tuition and Fees

The following rates are in effect for the 2015-2016 academic year beginning fall 2015 and continuing through summer 2016. Tuition rates are subject to change without notice.

#### Undergraduate Tuition

**Engineering, Computer and Technology Degree Programs**

- Full-time tuition, per semester (12-18 credits) $11,394
- Full-time credits above 18 (per credit) $950
- Part-time 1-11 credits (per credit) $750
- Audited courses (per credit) $750
- Southern Maryland Higher Education Center (per credit) $636

**Business and Management Degree Programs**

- On-campus and Online (per credit) $411
- Independent Study (per credit) $495
- Southern Maryland Higher Education Center (per credit) $411
- 3-credit course, plus fees $1,278

#### Graduate Tuition

**Master’s Programs**

- Online (per credit), plus fees $794
- Independent study (per credit), plus fees $571
- Southern Maryland Higher Education Center (per credit), plus fees $571
- Online 3-credit course, including fees $1,758

**Doctoral Program**

- Per credit $824
- 3-credit course $2,472

#### Fees

**Admissions**

- Undergraduate (paper) application $25
- Undergraduate online application free
- Master’s program online application free
- Processing fee for international students $150
- Doctorate application $100

**Registration**

- Late registration for continuing students $40
- Drop/add (each form) $10
- Deferred payment plan $30
- Late payment $25

### Information Technology, per semester

- Undergraduate Full-time (flat fee, 12+ credits) $300
- Undergraduate Part-time (per credit, 1-11 credits) $15
- Southern Maryland Higher Education Center (per credit) $15
- Master’s (per credit) $15

#### Academic Services

- Transcripts (each) $10
- Certificates (each) $25
- Replacement of Diploma $75

#### Graduation

- (non-refundable) $75
- AAS degree programs $75
- Additional degrees $75

#### Validation exam

- Doctorate entrance exam $250

#### Business and Management Degree Subscription Fee (per academic year)

- Student Tuition Lock $16

#### Campus Residence Halls

- Single room (per semester) $2,990
- Double room (per semester) $2,590
- Triple room (per semester) $2,190
- Room reservation deposit, continuing students $50
- Security deposit (refundable)* $200

#### Off-Campus University Housing

- Single room (per semester) $2,826

*See Guide to Residence Life to determine eligibility for refund.

### Full-time Student Tuition Lock

Capitol Technology University offers a tuition-lock program for undergraduate students registered full-time. Tuition is locked in from the students’ first full-time semester and remains unchanged for up to five years.
To remain eligible for the tuition-lock rate, students must adhere to the following terms and conditions:

- Maintain continuous full-time enrollment during the academic year (minimum 12 credits per semester).
- Keep all financial accounts up to date. (Consult the academic calendar on page 126 for due dates.)
- Remain in good academic standing. (See page 16 for academic performance.)

If these terms are not met, the student will no longer be eligible for the tuition lock and will be subject to the prevailing tuition rate.

### Payment Options

#### Undergraduate Payment Options

- Full payment at time of registration
- Deferred payment plan
- Financial aid (see page 25)
- VA Benefits (see page 30)
- Employer sponsorship

#### Undergraduate Deferred Payment Plan

The undergraduate deferred payment plan allows semester students to pay their tuition in three installments: one-third at registration, one-third on or before the second week of classes and one-third on or before the sixth week of classes. The cost of the deferred payment plan is $30, which is due with the first installment.

Nonpayment of tuition deposits may result in registration cancellation. Failure to adhere to the arrangements of the deferred payment plan may result in immediate dismissal from the university. Students who abuse the deferred payment plan will not be allowed to defer their tuition in the future.

Students on academic last warning are not eligible to use the deferred payment plan and must pay their tuition in full at registration.

#### Undergraduate Employer Sponsorship

Undergraduate students who are sponsored by an employer or other appropriate third party must submit authorization forms to the Business Office at the time of registration. Sponsors will be billed directly. Tuition not covered will be the responsibility of the student.

#### Undergraduate Employer Tuition Reimbursement

Undergraduate Students who are reimbursed by their employers must pay in full or use the undergraduate deferred payment plan.

#### Doctorate Program Payment Options

- Full payment prior to start of classes
- Financial aid (see page 25)
- VA Benefits (see page 30)
- Employer sponsorship
- Employer reimbursement

#### Master's Programs Deferred Payment Plan

- Full payment prior to start of classes
- Financial aid (see page 25)
- VA Benefits (see page 30)
- Employer sponsorship
- Employer reimbursement

#### Master's Programs Refund Schedule

- 100% Student drops after the first day of classes
- 75% Student drops during the first week of classes
- 50% Student drops during the second week of classes
- 25% Student drops during the third week of classes
- 0% Student drops after the third week of classes

### Refund Policy

#### Dropping or Withdrawing from Classes

It is the students' responsibility to officially drop any class in which they are enrolled. This includes situations in which the student never attended the first class meeting. Never attending or ceasing to attend classes does not constitute an official withdrawal or relieve students of their financial obligation to Capitol Technology University.

Full tuition refunds are available only to students who officially drop a class before the first day of classes. After the first day of classes, any student who drops or withdraws from class will be subject to the tuition refund schedule, outlined below. Refunds are effective on the date the drop or withdrawal is submitted to the Office of Registration and Records.

Refunds are computed according to the following schedule and are a percentage based on the full tuition amount for each course. The percentage listed equates to the student refund in the event the balance was paid in full before the start of class. Students on company contract may be personally responsible for the balance of their tuition, in the event their company only pays for completed courses.

Please refer to the published semester and term calendars beginning on page 126 of this catalog or online for specific dates of refunds.

### Tuition Refund Schedules

#### 8-week Term Courses

- 100% Student drops before the first day of classes
- 75% Student drops during the first week of classes
- 50% Student drops during the second week of classes
- 25% Student drops during the third week of classes
- 0% Student drops after the third week of classes

#### 16-week Semester Courses

- 100% Student drops before the first day of classes
- 75% Student drops during the first or second week of classes
- 50% Student drops during the third week of classes
Federal Return of Funds Policy

The Financial Aid Office is required by federal statute to recalculate federal financial aid eligibility for students who withdraw, drop out, are dismissed or take a leave of absence before completing 60% of a payment period or term. The federal Title IV financial aid programs must be recalculated in these situations.

If a student leaves Capitol Technology University before completing 60% of a payment period or term, the financial aid office recalculates eligibility for Title IV funds. Recalculation is based on the percentage of earned aid using the following Federal Return of Title IV funds formula:

Percentage of payment period or term completed = number of days completed up to the withdrawal date divided by the total days in the payment period or term. (Any break of five days or more is not counted as part of the days in the term.) This percentage is also the percentage of earned aid.

Funds are returned to the appropriate federal program based on the percentage of unearned aid using the following formula:

Amount of aid to be returned = (100% of the aid that could be disbursed minus the percentage of earned aid) multiplied by the total amount of aid that could have been disbursed during the payment period or term.

If a student earned less aid than was disbursed, the institution would be required to return a portion of the funds. Keep in mind that when Title IV funds are returned, the student borrower may owe a debit balance to the institution.

If a student earned more aid than was disbursed, the institution would be required to return a portion of the funds. Keep in mind that when Title IV funds are returned, the student borrower may owe a debit balance to the institution.

Funds are returned to the appropriate federal program based on the percentage of unearned aid using the following formula:

Amount of aid to be returned = (100% of the aid that could be disbursed minus the percentage of earned aid) multiplied by the total amount of aid that could have been disbursed during the payment period or term.

If a student earned less aid than was disbursed, the institution would be required to return a portion of the funds. Keep in mind that when Title IV funds are returned, the student borrower may owe a debit balance to the institution.

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Financial Aid

Capitol Technology University understands that paying for college is a major hurdle for parents and students. To help families meet tuition and living expenses, the university offers a variety of financial assistance programs including loans, work-study, scholarships and grants to help cover tuition and living expenses. Regardless of income level, all degree-seeking students are encouraged to apply for assistance.

Financial aid is available to both full- and part-time undergraduate students who are U.S. citizens or eligible non-citizens. Audited courses, some repeated courses, and credit by examination are not counted as meeting enrollment requirements. A student receiving financial aid must demonstrates satisfactory progress toward degree completion.

The Capitol Technology University student handbook contains additional information about financial aid at Capitol Technology University.

Application Procedures

One of the most important aspects of the financial aid process is to apply for assistance as early as possible. The application due dates are priority deadlines. Students who meet the priority deadlines enjoy the security of having their award authorization ready in time for class registration.

1. You must complete and submit the Free Application for Federal Student Aid (FAFSA) to apply for federal and state financial aid. Complete the application by March 1 or as far in advance of the starting term as possible. Applying online with FAFSA on the web at www.fafsa.ed.gov is faster and easier than using a paper FAFSA. Be sure to list Capitol Technology University on the FAFSA School Code 001436 so the FAFSA information will be electronically forwarded to the university. A paper FAFSA can be obtained by requesting one from the Department of Education at 1-800-433-3243.

2. After reviewing your processed FAFSA data, the Office of Financial Aid will send an award letter listing the awards for which you are eligible.

3. Sign and return one copy of the award letter to the Office of Financial Aid. Students may also review, accept and decline their financial aid on the myCapitol portal. This portal is located within myCapitol and is available 24 hours a day from any location.

Renewal of Financial Aid

Financial aid is not automatically renewed, except as may be noted. The entire financial aid application process must be completed every year in order for your request for federal, state and institutional aid to be considered.

Enrollment Status for Financial Aid

Undergraduate and Graduate – Federal

• 6-8 credits is considered half time
• 9-11 credits is considered three-quarter time
• 12+ credits is considered full time

Undergraduate – Veterans

• 3 to 5 credits is considered part time
• 6 to 8 credits is considered half time
• 9 to 11 credits is considered three-quarter time
• 12+ credits is considered full time

Graduate – Veterans

• 3 or more credits taken during an 8-week term session is considered full time
• 3 to 5 credits taken during a 16-week semester is considered greater than one-quarter but less than half time

• 6 or more credits taken during a 16-week semester is considered full time

Continuing Eligibility

The Office of Financial Aid reserves the right to review or modify financial aid commitments at any time based on information affecting eligibility. This includes the availability of funds, changes in financial status, satisfactory academic progress, and changes in enrollment status.

Return of Federal Funds

Students who have received financial aid awards and withdraw from classes (officially or unofficially) may be required to return a portion of the federal funds. See the federal return of funds policy on page 26.

Federal Satisfactory Academic Progress (SAP) Standards

The Department of Education has passed a new federal satisfactory academic progress policy effective July 1, 2011.

This policy applies to both undergraduate and graduate students receiving federal financial student aid funds. This financial aid policy is separate from the university’s general satisfactory academic progress policy.

Under the Federal SAP policy there are two components: a qualitative SAP component (Grade Point Average) and a quantitative SAP standard (earned credit hours versus attempted credit hours). Students receiving federal student aid must be in compliance with both standards in order to be considered making financial aid satisfactory academic progress.

Repeated Coursework

A student may repeat any coursework previously taken in the student’s program as long as the repeated course is not a result of more than one repetition of a previously passed course.

Undergraduate Student Requirements

Qualitative Standard (Grade Point Average Component)

A minimum cumulative Grade Point Average of 1.7 for undergraduate students who
have attempted fewer than 30 semester credit hours; a minimum Grade Point Average of 2.0 for undergraduate students who have attempted 30 semester credit hours or more and have completed their second academic year, whichever comes first. Transfer credits are also counted in the earned credit hours.

Quantitative Standard (number of credit hours attempted versus number of credit hours earned)

Under the quantitative component of the financial aid satisfactory academic progress standard, an undergraduate student must successfully complete coursework within a certain time frame. Charts showing the minimum number of credits you must earn each enrollment period and year of study are in the table below and on the university website.

A student under financial aid warning will have his/her financial aid terminated if the standards (GPA and credit hour) are not met following the warning period.

Graduate Student (Master’s and Doctoral) Financial Aid Progress Requirements

Master’s and Doctoral degree students receiving federal student aid

Graduate students must maintain a 3.00 Cumulative Grade Point Average. Not meeting this standard will place you on financial aid warning for one semester. A student on financial aid warning will receive financial aid for one more semester. However, before registering for classes the student must consult with advisor on the best course options.

A student under financial aid warning will have his/her financial aid terminated if the GPA standard is not met during the warning period.

Graduate students must adhere to the time limit for degree completion. See page 19.

Financial Aid Termination – Undergraduate and Graduate (Master’s and Doctoral) students

An undergraduate or graduate student whose financial aid is terminated following the warning period will not receive financial aid again unless the student has submitted an appeal requesting financial aid reinstatement. In your letter of appeal, you must explain the reason for your poor academic performance and provide medical documentation or other documents which help to explain your exceptional circumstances.

Your letter of appeal and accompanying documentation will be sent to the university’s Financial Aid Appeals Committee for review. You will be notified in writing of the Committee’s decision.

If your appeal is granted you will be placed in a probationary status for one semester.

Types of Financial Aid

The financial aid program at Capitol Technology University consists of grants, scholarships, loans and work-study employment. Detailed information about each aid program is available from the Office of Financial Aid.

Scholarships

The scholarship program at Capitol Technology University is designed to reward students for their academic accomplishments, leadership qualities or other special talents. The scholarships come from a variety of sources and donors, and each scholarship has its own set of criteria and annual value, ranging from $2,000 to full tuition. Scholarships are available to full-time undergraduate students enrolled for 12 credits or more per semester. Scholarships do not have to be repaid.

Institutional Scholarships

Each full-time undergraduate degree applicant is automatically considered for an institutional scholarship when applying for admission to the university. Initial institutional scholarship notification is sent by the Office of Admissions and is based on prior academic performance and SAT scores. For eligibility requirements, contact the Office of Admissions. All of the scholarships are annually renewable to recipients who maintain at least a 3.0 GPA and complete 24 credits each year.

Richard J. Heiman Scholarship

Awards range from $10,000 to $12,000. Named in memory of a dedicated member of the Capitol Technology University Board of Trustees, this scholarship is the highest offered by the university to new students.

Presidential Scholarship

Awards range from $7,000 to $9,000.

Board of Trustee Scholarship

Awards range from $4,000 to $6,000. The scholarship is named to recognize the service and support of the university Board of Trustees members.

Capital Technology University Scholarship

This scholarship is offered to qualifying community university students who are transferring to Capitol Technology University, with awards ranging from $4,000 to $10,000.

Corporate and Foundation Scholarships

A number of corporations and foundations have invested funds with the university to be awarded annually to students meeting criteria specified by the donors, such as academic merit or financial need. Students continuing to meet the awarding criteria will be reconsidered for subsequent scholarship awards. However, corporate and foundation scholarships are not automatically renewed.

Interested students must submit a completed scholarship application with a typed essay on an assigned topic between March 1 and March 30, before the academic year they want to be considered for a corporate and foundation scholarship. Applications are available between March 1 and March 30 on the university website under Financial Aid Office. For a complete listing of corporate and foundation scholarships and eligibility criteria, please consult the student handbook or visit the financial aid section online.

Maryland State Scholarships

Maryland students seeking Maryland state scholarships should complete the FAFSA by the March 1 filing deadline. Students who are residents of other states should check with their state scholarship agencies for available scholarships, proper application procedures and deadline dates.

Grants

Grants are awarded to undergraduate students. Grants do not have to be repaid.

Richard A. Wainwright Grant

This grant provides support for students who have academic ability and demonstrate financial need. The Richard A. Wainwright Grant is the highest level of institutional grant offered to the most qualified students.

PELL Grant and Federal Supplemental Educational Opportunity Grant (SEOG)

These grants are funded by the federal government and are awarded by the Office
of Financial Aid to eligible students based on financial need as determined by the U.S. Department of Education.

Maryland Part-time Grant
These grants are funded by the state of Maryland and are awarded to Maryland residents enrolled on a half-time basis. Interested students enrolled on a half-time basis must complete the FAFSA. Funds are limited.

The Howard P. Rawlings Educational Excellence Awards
These grant program funds (Guaranteed Access Grant, Educational Assistance Grant and Part-time Grant) are awarded to full-time eligible students who filed their FAFSA before the state’s March 1 deadline.

Loans
Loans are a serious financial obligation that must be repaid. Both undergraduate and graduate students can apply for loans. Students must be enrolled at least half time (six credits each semester) and cannot borrow more than their cost of attendance minus other financial aid received. The Federal Family Education Loan Program (FFELP) includes the Federal Direct Stafford and graduate PLUS loans for students and the Federal Direct PLUS loan for parents. Students can apply for loans online through Department of Education website: www.studentloans.gov

Federal Perkins Loan
The Federal Carl Perkins Loan program is for undergraduate and graduate students with exceptional financial need. Eligibility is determined by the Department of Education, based on the information provided on the FAFSA. Funds are limited and are not awarded to graduate students.

Alternative Loan Programs
These loans are available if additional funds are needed over and above what you receive under the federal, state, and institutional financial aid programs.

Work-Study Employment
On-campus jobs are available to both undergraduate and graduate students under the Federal College Work-Study and Capitol Technology University Work-Study programs. These work programs offer students the opportunity to earn money to meet educational and personal expenses during the year and to get on-the-job work experience.

Federal Work-Study
Federal Work-Study is funded by the federal government and awarded by the Office of Financial Aid to eligible students who have filed the FAFSA. It is the policy of Capitol Technology University that while class is in session during fall and spring, students cannot work more than 20 hours each week.

Capitol Technology University Work-Study
Students not awarded Federal Work-Study can consider employment under the Capitol Technology University Work-Study Program. Funding for this program is provided by various campus departments. Admitted students can contact the Office of Human Resources for more information. The employer decides the maximum hours students may work each week.

Other Aid Programs
Private Organizations
In addition to federal, state and institutional financial aid programs, there are private organizations that offer financial aid funds for a college education. Many local clubs, religious organizations and other groups provide scholarships for deserving students. Students should visit their public library to research these possible sources or contact organizations such as the American Legion, 4-H clubs, Kiwanis, Jaycees, Chamber of Commerce, Girl Scouts and Boy Scouts. Do not overlook organizations connected with family, friends, and field of interest, such as the American Society of Professional Engineers or the Society of Women Engineers.

A scholarship packet has been developed by the Financial Aid Office to assist students. It is available for download at the university’s website under Financial Aid Office and on myFA.

Veterans’ Benefits
To qualify for financial aid, veterans’ benefits or both students must be enrolled in a degree program and submit all necessary transcripts. Non-degree students are not eligible for veterans’ benefits or federal financial aid. Certification and certificate courses are not eligible for veterans’ benefits or federal financial aid, unless they are taken as part of an approved degree program. A veteran will not receive educational benefits for an audited course. Private loan programs can be used for these programs.

A counselor is available to assist veterans, active duty personnel and spouses, and children of deceased veterans who may be eligible for educational assistance through the VA. The counselor is located in the Office of Registration and Records.

Vocational Rehabilitation
Assistance is available to individuals with physical and/or mental disabilities. For further information, contact the Vocational Rehabilitation Service nearest you.

Additional Information
Course withdrawals (W) after the drop/add period are considered a non-completion of attempted credit hours.

An audit grade is not considered attempted coursework.

Incomplete grades are not included in the GPA calculation nor are they counted as attempted coursework. When the course is completed and a permanent grade is assigned the Office of Financial Aid will reevaluate the student’s academic progress.

Students will not receive financial aid for audited courses.

The Capitol Technology University student handbook contains additional information about financial aid at Capitol Technology University.

Student Complaints
A student who wishes to file a complaint against the university should contact the Maryland Higher Education Commission, 6 N. Liberty St., Baltimore, MD 21201, 410-767-3301 and/or the university’s accrediting agency: Commission on Higher Education, Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104 (215-662-5606).
Undergraduate Program Offerings

Bachelor of Science (BS) Degrees

• Astronautical Engineering
• Business Administration
• Computer Engineering
• Computer Engineering Technology
• Computer Science
• Cyber and Information Systems
• Electrical Engineering
• Electronics Engineering Technology
• Management of Cyber and Information Technology
• Mobile Computing and Game Programming
• Software Engineering
• Telecommunications Engineering Technology
• Web Development

Associate in Applied Science (AAS) Degrees

• Computer Engineering Technology
• Electronics Engineering Technology
• Telecommunications Engineering Technology

Programs of Study

Capitol Technology University’s programs of study for associate in applied science and bachelor of science degrees are outlined beginning on page 37.

Undergraduate Certificates

Lower Division
• Object-Oriented Programming
• Programming and Data Management
• Web Programming

Upper Division
• Acquisitions Management
• Computer and Network Security
• Project Management
• Software Engineering
• Space Missions and Operations Specialist
• Website Development

Requirements for undergraduate certificates are outlined beginning on page 53.

Undergraduate Admissions

Degree-seeking Students

First-Time, Full-Time Freshman

A first-time, full-time freshman is defined as any applicant who has graduated from high school within one year of the proposed entrance term and is entering Capitol Technology University on a full-time basis. A full-time student must carry 12 or more credits per semester.

Application Requirements

1. File a formal application for admission as far in advance of the proposed entrance date as possible. An application for admission can be obtained from the Office of Admissions or online.

2. Enroll a $25 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.) The application fee is waived for those students submitting electronic applications through the university website.

3. Forward all official transcripts to the Office of Admissions. Applicants who are completing, or who have already earned, an associate or bachelor’s degree from a regionally accredited university need only forward university transcripts. Applicants who have less than 30 college credits must forward an official high school transcript denoting graduation date or General Equivalency Diploma (GED) record and college transcripts, if applicable.

4. For transfer credit policies, see page 20 of this catalog.

Admissions Requirements

• Full-time transfer applicants who have successfully completed an associate or bachelor’s degree are generally accepted into Capitol Technology University once their application file is complete. Admissions requirements for other students are based on previous academic coursework (including high school, college, proprietary institution, the military or appropriate work experience), with an emphasis on postsecondary achievement. Students must be in good standing at all previous institutions. Students not in good standing are subject to further review.

• If applicants are not eligible to transfer credits for MA-114 or EN-101, completion of a skills assessment test may be required.

Part-time Degree-seeking Students

A part-time degree-seeking student is defined as any student pursuing an undergraduate degree at Capitol Technology University on a part-time basis. A part-time student may carry 11-11 credits per semester.

Application Requirements

1. File a formal application for admission as far in advance of the proposed entrance date as possible. An application for admission may be obtained from the Office of Admissions or online.

2. Enclose a $25 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.) The application fee is waived for those students submitting electronic applications through the university website.
3. Forward all official transcripts to the Office of Admissions. Applicants who are completing, or who have already earned, an associate or bachelor’s degree from a regionally accredited college need only forward college transcripts. Applicants who have less than a degree or no college credits must forward an official high school transcript denoting graduation date or General Equivalency Diploma (GED) record and college transcripts, if applicable.

4. For transfer credit policies, see page 20 of this catalog.

Admissions Requirements
Part-time applicants who have successfully completed an associate or bachelor’s degree are generally accepted into Capitol Technology University once their application file is complete. Admissions requirements for all other students are based on previous academic course work (including high school, college, proprietary institutions, the military or appropriate work experience). Students must be in good standing at all previous institutions. Students not in good standing are subject to further review.

If applicants are not eligible to transfer credits for MA-114 or EN-101, completion of a skills assessment test may be required.

Concurrent, Readmit and Other Types of Students

Concurrent Enrollment
Concurrent students are any qualified high school juniors or seniors who want to enroll in a limited number of courses at Capitol Technology University while completing their high school graduation requirements. Concurrently enrolled students are not eligible for financial aid.

Application Requirements
1. File a formal application for admission as far in advance of the proposed entrance date as possible. An application for admission may be obtained from the Office of Admissions or online.
2. Enclose a $25 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.) The application fee is waived for those students submitting electronic applications through the university website.
3. Forward an up-to-date official high school transcript to the Office of Admissions.
4. Forward a letter of recommendation from the high school principal or guidance counselor.
5. Meet with an admissions counselor at Capitol Technology University for a personal interview.

Admissions Requirements
Once the application requirements have been completed, the applicant will be eligible for concurrent enrollment. Concurrent students are required to complete all prerequisites for courses in which they intend to enroll. Concurrent enrollment is considered a non-degree-seeking status, so the student will not be accepted into a specific degree program. If the student wants to apply for degree-seeking status after high school graduation, the student must complete the application requirements for a first-time, full-time freshman, outlined on page 32 of this catalog, and should do so as far in advance of the proposed start term as possible.

Concurrent students who want to enroll in MA-114 or EN-101 may be required to complete a skills assessment test.

Readmission
A readmit applicant is defined as any applicant who has previously completed any amount of coursework at Capitol Technology University, has not attended Capitol Technology University in at least one full academic year, and wants to resume study. Students who were at any time in violation of the university’s academic, financial or disciplinary regulations may be denied readmission. Readmitted students may be required to submit or resubmit required documents, such as official transcripts. Readmitted students will enter Capitol Technology University’s degree program under the current graduation requirements and will be subject to current policies and procedures. A course audit will be completed to determine what coursework must be completed for graduation. Readmission is contingent upon an application for admission, which may be obtained from the Office of Admissions or online, and review by the admissions staff.

Other Types of Students
Applicants who do not match any of the undergraduate types discussed herein should contact the Office of Admissions to determine the application and admissions requirements that apply. To reach the Office of Admissions, call 800-950-1992 or send email to admissions@CapTechU.edu.

Certificate Students
An undergraduate certificate student is any student pursuing one or more of Capitol Technology University’s state-approved undergraduate certificates, maintaining less than 12 credits per semester and not pursuing a degree. Undergraduate certificate students are not eligible for financial aid.

Application Requirements
1. File a formal application for admission as far in advance of the proposed entrance date as possible. An application for admission can be obtained from the Office of Admissions or online.
2. Enclose a $25 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.) The application fee is waived for those students submitting electronic applications through the university website.
3. Forward all official transcripts to the Office of Admissions. Applicants who are completing, or who have already earned, an associate or bachelor’s degree from a regionally accredited college need forward only college transcripts. Applicants who have less than a degree or no college credits must forward an official high school transcript denoting graduation date or General Equivalency Diploma (GED) record and college transcripts, if applicable.

Admissions Requirements
Undergraduate certificate applicants who have successfully completed an associate or bachelor’s degree are generally eligible to register for classes once their application file is complete. Admissions requirements for all other students are based on previous academic coursework (including high school, college, proprietary institutions, the military or appropriate work experience). Students must be in good standing at all previous institutions. Students not in good standing are subject to further review.

All certificates require that students have completed MA-110, MA-114 or have equivalent experience. All coursework must be completed through Capitol Technology University. Students must complete the specific courses listed for the certificate; no substitutions are permitted. Once the course requirements are completed, students must apply for the certificate in the Office of Registration and Records. A $25 processing fee is due with the certificate request. A student must have a minimum cumulative GPA of 2.0 in all certificate coursework to be awarded the certificate.

Non-degree-seeking Students
A non-degree-seeking student is any student pursuing a non-degree certification program or taking individual courses not applying to a degree. Non-degree study is not eligible for financial aid.

Application Requirements
1. File a formal application for admission as far in advance of the proposed entrance date as possible. An application for admission can be obtained from the Office of Admissions or online.
2. Enclose a $25 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.) The application fee is waived for those students submitting electronic applications through the university website.

Admissions Requirements

Once the application and processing fee are received, applicants are notified of their acceptance and may register for classes during the appropriate registration period. Information about registration is continually updated online.

After successful completion of 15 semester credits at Capitol Technology University, non-degree students must complete the admissions procedure for degree-seeking status, or receive approval for continued non-degree status from the dean of academics.

International Students
An international student is defined as any applicant from a country other than the United States who will be pursuing an undergraduate degree program at Capitol Technology University. Eligibility requirements, listed below, must be met for acceptance. International students...
Astronautical Engineering

The Astronautical Engineering program is structured to provide students with a balance between theory and practice. Students receive hands on design experience via the university’s high altitude balloon payload program, course assignments, laboratory exercises and the Space Operations Institute. The focus is on spacecraft and ground systems design rather than research.

The main objectives of the program is to produce skilled systems oriented astronautical engineers to support the needs of NASA and the aerospace industry.

In order to achieve this objective, students study space systems engineering, orbital mechanics, spacecraft subsystems, spacecraft attitude and control, autonomous ground systems as well as other areas of satellite mission planning, design and operations. Graduates have the ability to work on multidisciplinary teams, meet the expectations of employers of astronautical engineers, and pursue an advanced degree if desired.

All engineering majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and impact of their engineering solutions in a global context.

Each bachelor of science student must complete a capstone where they propose, design, develop and deliver a satellite mission plan or other space related project.

Course Requirements

Bachelor of Science 130/131 Credits

Course Credits

Computer Sciences

CS-150 Intro to Programming Using C 4

Engineering

AE-150 Introduction to Space 3
AE-311 Spacecraft Systems 3
AE-350 Autonomous Ground Systems 3
AE-351 Orbital Mechanics 3
AE-361 Introduction to Satellite Imaging 3
AE-411 Space Systems Engineering 3
AE-454 Spacecraft Dynamics and Control 3
AE-455 Satellite Communications 3
AE-458 Senior Project in Space Science 3

EE-309 Circuit Design and Simulation 3
EE-453 Control I 3
AE-463 Spacecraft Simulations 3
Astronautical Engineering electives (3)* 9

Language

English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3

Humanities and Social Sciences 19 Credits
FS-100 Freshman Seminar 1
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
Humanities electives (2)* 6
Social Sciences electives (2)* 6

Mathematics and Sciences 36 Credits
CH-120 Chemistry 3
MA-230 Intro to MATLAB 3
MA-261 Calculus I 4
MA-262 Calculus II 4
MA-263 Calculus III 4
MA-340 Ordinary Differential Equations 3
MA-360 Laplace and Fourier Analysis 3
Phi-261 Engineering Physics I 4
Phi-262 Engineering Physics II 4
Phi-263 Engineering Physics III 4

Technical Courses 18 Credits
EE-159 Circuit Theory 4
EL-200 Electronic Devices and Circuits 4
EL-204 Digital Electronics 3
EL-250 Advanced Analog Circuits 4
EL-261 Introduction to Communications Circuits and Systems 3

*See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300 level or above. For descriptions of required courses, see courses beginning on page 72.
Business Administration

The business administration (BA) curriculum provides students with the knowledge necessary to integrate business, analytical and decision-making skills into a culturally, politically, socially and demographically diverse environment. Graduates will bring to the job market the ability to effectively apply the acquired skills and knowledge (theory, tools and models) to everyday work situations of current or future employers. The goals of the program are to give students an understanding of how private and public sector organizations function effectively and efficiently. Students will gain a clear picture of how the functional business areas work together to achieve organizational success in a global environment. Course content builds a solid business and management foundation to include marketing, accounting, finance, information technology and human resource management. The combined required and elective courses provide students with a breadth of skills important in today’s technology-driven business climate.

Course Requirements

Bachelor of Science 120/121 Credits

Course Credits
Business Administration 33 Credits
BUS-200 Business Communications 3
BUS-270 Financial Accounting I 3
BUS-271 Financial Accounting II 3
BUS-280 Macroeconomics 3
BUS-281 Microeconomics 3
BUS-376 Marketing Principles 3
BUS-378 Human Resource Management 3
BUS-384 Production and Operations Management 3
BUS-386 Organizational Theory and Behavior 3
BUS-410 Strategic Management 3
BUS-458 Senior Project 3
BUS-174 Introduction to Business and Management 3
BUS-275 Human Resource Management 3
BUS-279 Introduction to Leadership 3
BUS-283 Managerial Accounting 3
BUS-372 Financial Management 3
BUS-454 International Business 3
English Communications I 9 Credits
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3
General electives 15 Credits
General electives (5)* 15
Humanities and Social Sciences 19 Credits
FS-100 Freshman Seminar 1
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
Humanities/Philosophy electives (2)* 6
Social Sciences electives (2)* 6
Information Technology 12 Credits
BUS-250 Database for Managers 3
BUS-301 Project Management 3
BUS-362 Information Systems for Managers 3
SE-321 Human-Computer Interaction 3
Mathematics and Sciences 15 Credits
BUS-400 Research Methods 3
MA-110 Business Math I 3
MA-111 Business Math II 3
MA-128 Introduction to Statistics 3
Science elective 3
Recommended Electives
Group One
CS-100 Introduction to Programming Logic 3
BUS-240 Introduction to Business Intelligence 3
BUS-246 Quantitative Methods for Business Analytics 3
BUS-310 Data Mining for Effective Decision Making 3
BUS-393 Consumer Analytics 3
Group Two
BUS-379 Integrated Marketing Communication 3
BUS-385 Marketing Information Technology 3
BUS-393 Consumer Analytics 3
BUS-395 Marketing Process and Strategy 3
BUS-443 Marketing Analytics: Decision making in the Information Age 3
Group Three
BUS-289 Entrepreneurship and Small Business Management 3
BUS-290 Corporate Entrepreneurship 3
BUS-373 Entrepreneurial Finance and Venture Capital Investment 3
BUS-377 Entrepreneurial Marketing and Selling 3
BUS-401 New Product Development 3

Computer Engineering

The computer engineering (CE) program is structured to teach students to design and program computers and computer-based systems, including the latest embedded technology. The main objective of the computer engineering program is to produce practical design engineers who will be capable of analyzing the technical needs of society, and to create the next generation of integrated hardware and software solutions to meet system requirements. CE majors study digital systems, computer organization and architecture, software design and testing, operating systems and programming languages, microcontroller systems, and the latest programmable chip technology. All engineering majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their engineering solutions in a global context. All students complete a capstone course in which they propose, design, build, test and deliver a computer-based system.

Course Requirements

Bachelor of Science 131 Credits

Course Credits
Computers and Programming 19 Credits
CS-150 Introduction to Programming Using C 4
CS-200 Programming Using C++ 3
CS-220 Database Management 3
CS-231 Assembly Language Programming 3
CT-152 Introduction to Unix 3
CA-418 Operating Systems 3
Engineering 30 Credits
EE-304 Digital Design I 3
EE-354 Digital Design II 3
EE-362 Microcontroller System Design 3
EE-364 Computer Architecture 3
EE-404 Large-Scale Digital Design 3
EE-452 Advanced Microcontroller System Design 3
EE-458 Senior Project 3
EL-452 Automated Test Systems 3
Computer or Engineering electives (3)* 9
English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.
Computer Engineering Technology

The Computer Engineering Technology (CET) program is structured to teach students to work at the interface between hardware and software linking digital technology to computer applications. The main objective of the program is to produce technologists who support industry in areas ranging from computers and computer manufacturing to networking and network programming. CET majors study software design and testing, operating systems, programming languages, digital systems, computer organization and architecture, micro-controller systems, and the latest programmable chip technology. Students are trained to work in a wide range of technical jobs in the information technology industry. All bachelor of science students complete a capstone course in which they propose, design, build, test and deliver a computer-based system.

Associate in Applied Science Degree

The AAS degree program is designed to prepare graduates to work in technical positions of the computer technology industry. The program also provides further education for people who seek to broaden their base of knowledge and update their skills.

Bachelor of Science Degree

The BS degree program is designed to educate students for computer technology fields by providing a comprehensive understanding of computers. Academic instruction is augmented by requiring students to design and write programs, and through carefully planned laboratory exercises during which students build, interconnect, test, service and operate computer devices and systems.

Course Requirements

Associate in Applied Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>English Communications</td>
<td>6 Credits</td>
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<tr>
<td>EN-101 English Communications I</td>
<td>3</td>
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<tr>
<td>EN-102 English Communications II</td>
<td>3</td>
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<tr>
<td>Humanities and Social Sciences</td>
<td>7 Credits</td>
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<tr>
<td>FS-100 Freshman Seminar</td>
<td>1</td>
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<tr>
<td>History/Humanities/Philosophy elective (1)*</td>
<td>3</td>
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<tr>
<td>Social Sciences elective (1)*</td>
<td>3</td>
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<tr>
<td>Mathematics and Sciences</td>
<td>20 Credits</td>
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<tr>
<td>MA-112 Intermediate Algebra</td>
<td>3</td>
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<tr>
<td>MA-114 Algebra and Trigonometry</td>
<td>4</td>
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<tr>
<td>MA-124 Discrete Mathematics</td>
<td>3</td>
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<td>MA-261 Calculus I</td>
<td>4</td>
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<td>PH-201 General Physics I</td>
<td>3</td>
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<tr>
<td>PH-202 General Physics II</td>
<td>3</td>
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<tr>
<td>Technical Courses</td>
<td>32 Credits</td>
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<tr>
<td>CS-150 Introduction to Programming Using C</td>
<td>3</td>
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<tr>
<td>CS-200 Computer Science Fundamentals II</td>
<td>3</td>
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<tr>
<td>CT-152 Introduction to Unix</td>
<td>3</td>
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<tr>
<td>EL-100 Introductory DC/AC Circuits</td>
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<tr>
<td>EL-200 Electronic Devices and Circuits</td>
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<tr>
<td>EL-204 Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>EL-262 Microprocessors/Microassembly</td>
<td>3</td>
</tr>
<tr>
<td>TC-110 Introduction to Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>NT-100 Computer Architecture and Construction</td>
<td>3</td>
</tr>
<tr>
<td>NT-150 Computer Networking</td>
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</table>

Bachelor of Science

All requirements for the associate in applied science degree, plus the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Communications</td>
<td>3 Credits</td>
</tr>
<tr>
<td>EN-408 Writing Seminar in Technical Research</td>
<td>3</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>12 Credits</td>
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<tr>
<td>HU-331 or HU-332 Arts and Ideas</td>
<td>3</td>
</tr>
<tr>
<td>SS-351 Ethics</td>
<td>3</td>
</tr>
<tr>
<td>History/Humanities/Philosophy elective (1)*</td>
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</tr>
<tr>
<td>Social Science elective (1)*</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics and Sciences</td>
<td>13 Credits</td>
</tr>
<tr>
<td>CH-120 Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MA-128 Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MA-262 Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>Math or Science elective (1)*</td>
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</tr>
<tr>
<td>Technical Courses</td>
<td>39 Credits</td>
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<tr>
<td>CS-220 Database Management</td>
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<tr>
<td>CS-418 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CT-240 Network Routers and Switches</td>
<td>3</td>
</tr>
<tr>
<td>EE-304 Digital Design I</td>
<td>3</td>
</tr>
<tr>
<td>EE-364 Digital Design II</td>
<td>3</td>
</tr>
<tr>
<td>EE-362 Microcontroller System Design</td>
<td>3</td>
</tr>
<tr>
<td>EL-452 Automated Test Systems</td>
<td>3</td>
</tr>
<tr>
<td>IAE-201 Intro to Information Assurance</td>
<td>3</td>
</tr>
<tr>
<td>SE-458 Senior Project</td>
<td>3</td>
</tr>
</tbody>
</table>

* See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.
Computer Science
The computer science (CS) program is structured to teach students to design and program computers and computer-based systems to meet the needs of all areas of society. The main objective of the computer science program is to produce practical computer science professionals with the credentials to prove it. All CS students must take courses in the humanities and social sciences to broaden their understanding of professional and ethical responsibilities and the impact of their CS solutions in a global context. All students complete a capstone course in which they propose, design, build, test and deliver a computer-based system.

Course Requirements

Bachelor of Science 129 Credits

Course Credits

English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3

Computers and Engineering Science 47 Credits
CS-130 Computer Science Fundamentals I 4
CS-250 Introduction to Programming Using C 4
CS-220 Database Management 3
CS-225 Intermediate Java Programming 3
CS-230 Computer Science Fundamentals II 3
CS-310 Computer Algorithms 3
CS-316 Intelligent Systems 3
CS-330 iPhone Application Development 3
CS-351 Assembly Language 3
CS-405 Introduction to Software Design with UML 3
CS-418 Operating Systems 3
CT-152 Introduction to Unix 3
CT-376 Javascript 3
SE-458 Senior Project 3

Computer Science Electives 12 Credits
Computer Science electives (3)** 9

Mathematics and Sciences 30 Credits
Science elective 3
EL-100 Introductory DC/AC Circuits 3
MA-114 Algebra and Trigonometry 4
MA-124 Discrete Mathematics 3
MA-128 Introduction to Statistics 3
MA-261 Calculus I 4
MA-262 Calculus II 4
PH-201 General Physics I 3
PH-202 General Physics II 3

Technical Courses 9 Credits
EL-204 Digital Electronics 3
EL-262 Microprocessors/Microassembly 3
TC-110 Introduction to Telecommunications 3

Social Sciences 22 Credits
Course Credits

History/Humanities/Philosophy elective (2)** 6
SS-351 Ethics 3
HU-331 or HU-332 Arts and Ideas 3
BUS-301 Project Management 3

Science elective (1)** 3

Cyber and Information Security
The cyber and information security (CSIS) program is designed to meet current and anticipated needs for highly-skilled cybersecurity professionals, particularly as it relates to securing information and defending the information systems that store it. As society becomes increasingly reliant on information in electronic form, identifying and addressing vulnerabilities where information resides is vital to any public, private or government organization. The BSIS degree develops and builds upon students’ mastery in computer networking and programming, so that they become effective technologists for managing information security risk. In addition, BCIS students complete courses by the end of their sophomore year that prepare them to pass industry certification exams to include A+, Network+, CEH, CISSP and Security+. By attaining a combination of the BSIA degree and one or more of the industry certifications, graduates will not only possess the professional knowledge required for a successful career in information assurance, but also have the credentials to prove it.

Course Requirements

Bachelor of Science 127/130 Credits

Course Credits

Programming and Computer 31 Credits
CS-130 Computer Science Fundamentals I 4
CS-150 Introduction to Programming Using C 3
CS-220 Database Management 3
CS-230 Computer Science Fundamentals II 3
CS-320 Database Administration 3
CS-418 Operating Systems 3
CT-152 Introduction to Unix 3
CT-206 Scripting Languages 3
CT-240 Internetworking with Routers and Switches 3
SE-458 Senior Project 3

Information Assurance Courses 27 Credits
IAE-201 Introduction to Information Assurance Concepts 3
IAE-301 Comprehensive Computer and Network Security 3
IAE-315 Secure System Administration and Operation** 3
IAE-321 Applied Wireless Network Security 3
IAE-325 Secure Data Communications and...
Electrical Engineering

The electrical engineering (EE) program is structured to teach students a blend of theory and practice directed at engineering design, rather than research. The main objective of the program is to produce practical design engineers who are capable of analyzing the technical needs of society, and to create the next generation of electrical and electronic circuits to meet systems requirements. To meet this objective, students start in the program with basic circuit theory and laboratory projects that provide them a practical background. The students are then taught to use increasingly sophisticated design and testing techniques to conduct experiments, and interpret data. As students progress through the program they are taught more theoretical methods of circuit modeling and computer-aided circuit simulation tools that enable them to design, build, test and analyze sophisticated circuits and systems. There are elective courses that allow for specialization in communications systems, micro-controller system design, signals and systems, digital signal processing, microwave engineering, VHDL and telecommunications. All engineering majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their engineering solutions in a global context. All students complete a capstone course in which they propose, design, build, test and deliver a working prototype circuit to meet engineering standards and realistic constraints.

Course Requirements

Bachelor of Science 134 Credits

Course Credits
Electrical Engineering 66 Credits
EE-461 Communications Theory 3
CT-150 Intro to Programming Using C 4
Engineering elective (2)* 6
English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3
Humans and Social Sciences 19 Credits
FS-100 Freshman Seminar 1
BUS 301 Project Management 3
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
Humans electives (1)* 3
Social Science electives (2)* 6
Mathematics and Sciences 39 Credits
CH-120 Chemistry 3
MA-230 Intro to MATLAB 3
MA-261 Calculus I 4
MA-262 Calculus II 4
MA-263 Calculus III 4
MA-340 Ordinary Differential Equations 3
MA-345 Probability and Statistics for Engineers 3
MA-360 Laplace and Fourier Analysis 3
PH-261 Engineering Physics I 4
PH-262 Engineering Physics II 4
PH-263 Engineering Physics III 4
Technical Courses 21 Credits
EE-159 Circuit Theory 4
EL-200 Electronic Devices and Circuits 3
EL-204 Digital Electronics 4
EL-250 Advanced Analog Circuits 4
EL-261 Introduction to Communications Circuits and Systems 3
EL-262 Microprocessors and Microassembly 3

*See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300 level or above. For descriptions of required courses, see courses beginning on page 72.

Electronics Engineering Technology

The electronics engineering technology (EET) program is structured to teach students a foundation in electronics technology with a strong emphasis on laboratory work and further the students’ knowledge with more advanced studies in theoretical analysis and design. The main objective of the program is to produce technologists who support industry in areas ranging from circuit analysis to digital design to control and robotics. To meet this objective, EET majors study circuit design and simulation, network analysis and synthesis, transmission lines, micro-system design and fiber-optic communications with options for specialization in areas such as communications, computer design, control theory, micro-controllers and telecommunications. Students are trained to work in a wide range of practical electronics jobs and conduct design and theory work in the electronics field. All EET students must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their engineering solutions in a global context. All bachelor of science students complete a capstone course in which they propose, design, build, test and deliver a working electronic project.

Associate in Applied Science Degree

The AAS degree program is designed to provide students a foundation in electronics technology with a strong emphasis on laboratory work and to prepare graduates to work in technical positions of the electronics technology industry. Some theoretical courses are included to prepare students who are continuing to pursue a bachelor’s degree.

Bachelor of Science Degree

The BS degree program is designed to build on the AAS program with more advanced studies in theoretical analysis and design. Courses in design, modeling and simulation provide students with the necessary background to do design work in the electronics field and to pursue continued studies in order to avoid technical obsolescence.

Course Requirements

Associate in Applied Science 66 Credits

Course Credits
English Communications 6 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
Humans and Social Sciences 7 Credits
FS-100 Freshman Seminar 1
Humanities elective (1)* 3
Social Science elective (1)* 3
Mathematics and Sciences 17 Credits
MA-112 Intermediate Algebra 3
MA-114 Algebra and Trigonometry 4
MA-261 Calculus I 4
PH-201 General Physics I 3
PH-202 General Physics II 3
Technical Courses 36 Credits
CS-150 Introduction to Programming Using C 4
EL-100 Introductory DC/AC Circuits 3
EL-150 DC/AC Circuit Analysis 3
EL-200 Electronic Devices and Circuits 4
EL-204 Digital Electronics 3
EL-212 Transmission Lines 3
EL-250 Advanced Analog Circuits 4
EL-255 Control and Robotics 3
EL-261 Introduction to Communications Circuits and Systems 3
EL-262 Microprocessors/Microassembly 3
Technical elective* 3

* See appropriate department for approved list.
** Students who intend to stop at the associate degree may replace Calculus II with another math course.
Bachelor of Science 133 Credits
All requirements for the associate in applied science degree, plus the following:

Course Credits
English Communications 3 Credits
EN-408 Writing Seminar in Technical Research 3
General Electives 6 Credits
General electives (2)* 6
Humanities/Social Sciences 12 Credits
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
Humanities elective (1)** 3
Social Science elective (1)** 3
Mathematics and Sciences 16 Credits
CH-120 Chemistry 3
MA-262 Calculus II 4
MA-230 Intro to MATLAB 3
MA-340 Ordinary Differential Equations 3
MA-360 Laplace and Fourier Analysis 3
Technical Courses 36 Credits
EE-304 Digital Design I 3
EE-309 Circuit Design and Simulation 3
EE-354 Digital Design II 3
EE-362 Microcontroller System Design 3
EE-409 Network Analysis and Synthesis 3
EE-453 Control I 3
EE-458 Senior Project 3
EL-301 Advanced Communications Circuits and Systems 3
EL-307 Noise and Shielding 3
CP-301 Fiber Optic Communications 3

* Any course may be taken to satisfy the general elective requirement.
** See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.

Management of Cyber and Information Technology

The management of cyber and information technology (MCIT) program prepares students for positions in the information assurance industry or in businesses that rely on the use of sophisticated information resources and tools. Students are trained to understand the demands of technical jobs and to facilitate, from a managerial standpoint, an effective and efficient working environment for employees. The main objective of the program is to produce systems thinkers with both management expertise and technical competence. MCIT majors study principles of management, organizational behavior, production and operations management, business telecommunications analysis, marketing and personnel management. All students complete a capstone course in which they propose, design, test and deliver a management project.

Course Requirements

Bachelor of Science 121/122 Credits

Course Credits
Business Foundations 21 Credits
BUS-174 Introduction to Business and Management 3
BUS-200 Business Communications 3
BUS-270 Financial Accounting I 3
BUS-280 or BUS-281 Macro/Microeconomics 3
BUS-372 Financial Management 3
BUS-375 Human Resource Management 3
BUS-400 Research Methods 3

Business Administration 21 Credits
BUS-208 Internet and the Law 3
BUS-279 Introduction to Leadership 3
BUS-301 Project Management 3
BUS-386 Organizational Theory and Behavior 3
BUS-410 Strategic Management 3
BUS-454 International Business 3
BUS-458 Senior Project 3

Information Technology 34 Credits
BUS-250 Database for Managers 3
BUS-362 Information Systems for Managers 3
CS-130 Computer Science Fundamentals I 3
CS-150 Introduction to Programming Using C 3
CT-101 Computer Applications 3
CT-152 Introduction to Unix 3
IAE-201 Introduction to Information Assurance Concepts 3
IAE-301 Comprehensive Computer and Network Security 3
IAE-315 Secure Systems Administration and Operation 3
IAE-402 Introduction to Incident Handling and Malicious Code 3
TC-110 Introduction to Telecommunications 3

General electives (2)* 6
English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3
EN-408 Writing Seminar in Technical Research 3
 Humanities and Social Sciences 19 Credits
FS-100 Freshman Seminar 1
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
History/Humanities/Philosophy electives (2)** 6
Social Sciences electives (2)** 6

Mathematics and Sciences 12 Credits
MA-110 Business Math I 3
MA-111 Business Math II 3
MA-128 Introduction to Statistics 3
Science elective (1)* 3

* See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.
Mobile Computing and Game Programming

The mobile computing and game programming degree program offers students the opportunity to gain the skills and knowledge needed for success in an increasingly critical area of information technology. The objective of the mobile computing and game programming is to produce programmers who can design and develop the next generation of mobile computer applications. Students in the program take courses in such specialized areas as iPhone application development and Javascript, while also reinforcing the fundamentals of computer science, programming and software design. Mobile computing and game programming majors must also fulfill general requirements in mathematics and science. To help in placing their studies and knowledge in a broader context, they must also take courses in the humanities and social sciences. All students complete a capstone course in which they design, build, test and deliver a mobile application.

Course Requirements

**Bachelor of Science 126 Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers and Software</td>
<td>64</td>
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<tr>
<td>CS-130 Computer Science Fundamentals I</td>
<td>4</td>
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<tr>
<td>CS-220 Database Management</td>
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<tr>
<td>CS-431 Graphics and Game Programming</td>
<td>4</td>
</tr>
<tr>
<td>CS-225 Intermediate Java Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS-230 Computer Science Fundamentals II</td>
<td>3</td>
</tr>
<tr>
<td>CS-305 Android Applications Development</td>
<td>3</td>
</tr>
<tr>
<td>CS-316 Intelligent Systems</td>
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</tr>
<tr>
<td>CS-330 iPhone Application Development</td>
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<tr>
<td>CS-340 Game Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS-356 Dynamic Web Page Development</td>
<td>3</td>
</tr>
<tr>
<td>CS-430 Game Programming/Phone Platform</td>
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</tr>
<tr>
<td>CT-102 Intro/Internet Applications</td>
<td>3</td>
</tr>
<tr>
<td>CT-152 Intro/Unix</td>
<td>3</td>
</tr>
<tr>
<td>CT-206 Scripting languages</td>
<td>3</td>
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<tr>
<td>CT-376 Javascript</td>
<td>3</td>
</tr>
<tr>
<td>CS-406 Web Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>IAE-201 Intro to Information Assurance</td>
<td>3</td>
</tr>
<tr>
<td>IAE-301 Comprehensive Computer/Network Security</td>
<td>3</td>
</tr>
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<td>IAE-311 Mobile Computing Security</td>
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<td>SE-321 Human Computer Interaction</td>
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<td>SE-458 Senior Design Project</td>
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<tr>
<td>General Electives</td>
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<tr>
<td>Business</td>
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<tr>
<td>BUS-174 Intro to Business Management</td>
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<tr>
<td>BUS-208 E-Commerce and the Law</td>
<td>3</td>
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<tr>
<td>BUS-289 Entrepreneurship/Small Business Management</td>
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<td>Humanities and Social Sciences</td>
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<td>EN-102 English Communications II</td>
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<td>EN-408 Writing Seminar in Tech Research</td>
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<tr>
<td>HU-210 Game Design Theory</td>
<td>3</td>
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<tr>
<td>HU-331 or HU-332 Arts and Ideas</td>
<td>3</td>
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<tr>
<td>SS-351 Ethics</td>
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<td>Humanities electives (2)*</td>
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<td>Social Sciences electives (2)*</td>
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<tr>
<td>Mathematics and Sciences</td>
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<tr>
<td>MA-114 Algebra and Trigonometry</td>
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<td>MA-124 Discrete Mathematics</td>
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<tr>
<td>MA-128 Introduction to Statistics</td>
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<td>PH-201 General Physics I</td>
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<tr>
<td>PH-202 General Physics II</td>
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<tr>
<td>EE-362 Microcontroller System Design</td>
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<td>EE-364 Computer Architecture</td>
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<td>SE-321 Human Computer Interaction</td>
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<td>Software or Engineering electives (2)*</td>
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<tr>
<td>English Communications</td>
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<td>EN-101 English Communications I</td>
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</tr>
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<td>EN-102 English Communications II</td>
<td>3</td>
</tr>
<tr>
<td>EN-408 Writing Seminar in Technical Research</td>
<td>3</td>
</tr>
</tbody>
</table>

**Software Engineering**

The software engineering (SE) program is structured to teach students to design and program computers and computer-based systems to meet the needs of all areas of society. The main objective of the program is to produce practical software engineers who can analyze and determine the needs of a system and apply engineering principles to create software and hardware solutions. SE majors study modern programming languages and applications, algorithm development, and software design and testing in the software component, computer organization and architecture, micro-controller system design and the latest programmable chip technology in the hardware portion, and modern approaches to knowledge acquisition using UML in both individual and team environments. All engineering majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their engineering solutions in a global context. All students complete a capstone course in which they propose, design, build, test and deliver a working software application.

Course Requirements

**Bachelor of Science 131 Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers and Software</td>
<td>37</td>
</tr>
<tr>
<td>CS-130 Computer Science Fundamentals I</td>
<td>4</td>
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<tr>
<td>CS-150 Introduction to Programming Using C</td>
<td>3</td>
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<tr>
<td>CS-220 Database Management</td>
<td>3</td>
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<tr>
<td>CS-225 Intermediate Java Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS-230 Computer Science Fundamentals II</td>
<td>3</td>
</tr>
<tr>
<td>CS-320 Computer Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CS-330 iPhone Application Development</td>
<td>3</td>
</tr>
<tr>
<td>CS-376 Javascript</td>
<td>3</td>
</tr>
<tr>
<td>CS-405 Introduction to Software Design with Unified Model Language</td>
<td>3</td>
</tr>
<tr>
<td>CS-418 Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CT-152 Intro to Unix</td>
<td>3</td>
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<tr>
<td>IAE-201 Intro to Information Assurance</td>
<td>3</td>
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<td>SE-458 Senior Design Project</td>
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<tr>
<td>Engineering</td>
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<tr>
<td>EE-304 Digital Design I</td>
<td>3</td>
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<tr>
<td>EE-362 Microcontroller System Design</td>
<td>3</td>
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<tr>
<td>EE-364 Computer Architecture</td>
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</tr>
<tr>
<td>SE-321 Human Computer Interaction</td>
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</tr>
<tr>
<td>Software or Engineering electives (2)*</td>
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<tr>
<td>Humanities and Social Sciences</td>
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<td>FS-100 Freshman Seminar</td>
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<tr>
<td>HU-331 or HU-332 Arts and Ideas</td>
<td>3</td>
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<tr>
<td>SS-351 Ethics</td>
<td>3</td>
</tr>
<tr>
<td>Humanities electives (2)*</td>
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<tr>
<td>Social Sciences electives (2)*</td>
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<tr>
<td>Mathematics and Sciences</td>
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<tr>
<td>CH-120 Chemistry</td>
<td>3</td>
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<tr>
<td>MA-114 Algebra and Trigonometry</td>
<td>4</td>
</tr>
<tr>
<td>MA-124 Discrete Mathematics</td>
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<td>MA-128 Introduction to Statistics</td>
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<tr>
<td>MA-261 Calculus I</td>
<td>4</td>
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<td>MA-262 Calculus II</td>
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<tr>
<td>PHI-261 Engineering Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHI-262 Engineering Physics II</td>
<td>4</td>
</tr>
<tr>
<td>Science elective (1)*</td>
<td>3</td>
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</tbody>
</table>

**Technical Courses 6 Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL-204 Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>EL-262 Microprocessors and Microassembly</td>
<td>3</td>
</tr>
</tbody>
</table>

* See appropriate department for approved list.
** Any course may be taken to satisfy the general elective requirement.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.
Telecommunications Engineering Technology

The telecommunications engineering technology (TET) program is structured to teach students to design, build, maintain, troubleshoot and expand networks of all types. The main objective of the program is to produce technologists who support industry in areas ranging from data communications and networking to routers and switches to network modeling and design. To achieve this objective, TET majors study digital electronics, noise and shielding, fiber-optic communications, microprocessors and micro assembly, and may specialize in either data communications and networking or RF and satellite communications. Students are trained to work in a wide range of telecommunications and computer networking jobs on both the technical and the design sides. TET majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their technological solutions in a global context. All bachelor of science students complete a capstone course in which they propose, design, build, test and deliver a working telecommunications project.

Associate in Applied Science Degree

The AAS degree program is designed to teach students about the design and construction of networks by giving them a broad foundational background in the field of telecommunications. Students at the AAS level will be able to construct and test telecommunications circuits and networks using many different types of test equipment. Some theoretical courses are included to prepare students who are continuing with the bachelor’s degree.

Bachelor of Science Degree

The BS degree program is designed to build on the AAS program with more advanced studies in simulation, analysis and modeling of communications circuits and networks. Courses in optical communications, data communications and networking and internet networks provide students with the necessary background to do network design and administration work and to pursue continued studies in engineering, engineering technology or information technology.

Course Requirements

**Associate in Applied Science 65 Credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Communications</td>
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<tr>
<td>EN-101 English Communications I</td>
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<tr>
<td>EN-102 English Communications II</td>
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<tr>
<td>Humanities and Social Sciences</td>
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<tr>
<td>FS-100 Freshman Seminar</td>
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<tr>
<td>Humanities elective (1)*</td>
<td>3</td>
</tr>
<tr>
<td>Social Sciences or MIT elective (1)*</td>
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<tr>
<td>Mathematics and Sciences</td>
<td>17</td>
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<tr>
<td>MA-114 Algebra and Trigonometry</td>
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<tr>
<td>MA-129 Introduction to Statistics</td>
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<tr>
<td>MA-261 Calculus I</td>
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<tr>
<td>PH-201 General Physics I</td>
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<td>PH-202 General Physics II</td>
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<tr>
<td>Technical Courses</td>
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<tr>
<td>CS-130 Computer Science Fundamentals</td>
<td>4</td>
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<tr>
<td>CS-150 Introduction to Programming Using C</td>
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</tr>
<tr>
<td>CT-152 Introduction to Unix</td>
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</tr>
<tr>
<td>CT-240 Internetworking with Routers and Switches</td>
<td>3</td>
</tr>
<tr>
<td>EL-100 Introductory DC/AC Circuits</td>
<td>3</td>
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<tr>
<td>EL-200 Electronic Devices and Circuits</td>
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</tr>
<tr>
<td>EL-204 Digital Electronics</td>
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<tr>
<td>IAE-201 Introduction to Information Assurance Concepts</td>
<td>3</td>
</tr>
<tr>
<td>NT-100 Computer Architecture and Construction</td>
<td>3</td>
</tr>
<tr>
<td>NT-150 Computer Networking</td>
<td>3</td>
</tr>
<tr>
<td>TC-110 Introduction to Telecommunications</td>
<td>3</td>
</tr>
</tbody>
</table>

* See appropriate department for approved list.

**Bachelor of Science 129 Credits**

All requirements for the associate in applied science degree, plus the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Communications</td>
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</tr>
<tr>
<td>EN-408 Writing Seminar in Technical Research</td>
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<tr>
<td>General Electives</td>
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<td>General electives (2)*</td>
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<tr>
<td>Humanities/Social Sciences</td>
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<tr>
<td>HU-331 or HU-332 Arts and Ideas</td>
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<td>SS-351 Ethics</td>
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<td>Humanities elective (1)**</td>
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</tr>
<tr>
<td>Social Science elective (1)**</td>
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<tr>
<td>Mathematics and Sciences</td>
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<tr>
<td>CH-120 Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MA 128 Introduction to Mathematics</td>
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</tr>
<tr>
<td>MA-262 Calculus II</td>
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</tr>
<tr>
<td>MA-340 Ordinary Differential Equations</td>
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<tr>
<td>CS-250 Intro to Network Programming in C</td>
<td>3</td>
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<tr>
<td>EL-261 Introduction to Communications Circuits and Systems</td>
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<tr>
<td>EL-307 Noise and Shielding</td>
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<tr>
<td>IAE-301 Comprehensive Network Security</td>
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<td>OP-301 Fiber Optic Communications</td>
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<tr>
<td>TC-309 Network Simulation</td>
<td>3</td>
</tr>
<tr>
<td>TC-312 Voice over IP</td>
<td>3</td>
</tr>
<tr>
<td>TC-359 Network Modeling and Design</td>
<td>3</td>
</tr>
<tr>
<td>TC-458 Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>Technical elective (1)**</td>
<td>3</td>
</tr>
</tbody>
</table>

* Any course may be taken to satisfy the general elective requirement.

** See appropriate department for approved list.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.
Web Development

The web development (WD) degree program is structured to prepare students to understand and effectively respond to the entire spectrum of Internet issues and challenges, with a strong emphasis on web development. The main objective of the program is to produce well-rounded web development experts who can design the visual aspect of web sites on the front end while possessing the more technical development and programming knowledge that resides on the back end. Front end instruction includes HTML, Flash, Javascript and Javascript libraries (Jquery, Prototype, Scriptaculous), complemented by back end instruction that includes Unix, SQL, PHP, Java Server Pages, Java Servlets, and .NET (C#). Students also study courses in business and entrepreneurship to enable them to develop websites and support. Web development majors must take courses in humanities and social science to broaden their understanding of professional and ethical responsibilities and the impact of their web development solutions in a global context. All students complete a capstone course in which they propose, design, test and deliver a web-based project.

Course Requirements

Bachelor of Science 126 Credits

Course Credits
Computers 50 Credits
CS-130 Computer Science Fundamentals I 4
CS-150 Introduction to Programming Using C* 4
CS-220 Database Management 3
CS-230 Computer Science Fundamentals II 3
CS-225 Intermediate Java Programming 3
CS-321 Computer Human Interaction 3
CS-356 Dynamic Web Page Development 3
CT-102 Introduction to Internet Applications 3
CT-152 Introduction to Unix 3
CT-101 Multimedia Applications 3
CT-206 Scripting Languages 3
CT-376 Javascript 3
CT-406 Web Programming Languages 3
IAE-201 Intro to Information Assurance 3
IAE-301 Comprehensive Network Security 3
SE-458 Senior Design Project 3
English Communications 9 Credits
EN-101 English Communications I 3
EN-102 English Communications II 3

EN-408 Writing Seminar in Technical Research 3

General Electives 12 Credits
General electives (A)** 12

Humanities and Social Sciences 19 Credits
FS-100 Freshman Seminar in Computers 1
HU-331 or HU-332 Arts and Ideas 3
SS-351 Ethics 3
History/Humanities/Philosophy electives (2) 6
Social Sciences/Management electives (2) 6

Mathematics and Sciences 12 Credits
MA-112 Intermediate Algorithms 3
MA-124 Discrete Mathematics 3
MA-128 Introduction to Statistics 3
Science elective (1) 3

Option 12 Credits
Choose four related courses (4)** 12

* Students who validate CS-150 may replace this course with any technical course not already required for the WD degree.
** Examples of options:
- Gaming option: HU-210, CS-305, CS-430
- IA option: CS-320, IAE-315, IAE-325, IAE-402
- System hardware option: NT-100, NT-150, CT-240 and NT-250

Students may create their own option. Students should consult with an advisor in selecting an option.

All bachelor of science degrees require a minimum of 27 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 72.

Undergraduate Certificates

The undergraduate certificates are targeted at specialized jobs in distinct information technology and management fields. The courses required for these certificates are offered in a standard 16-week format. Consult the schedule of classes for more information. Students seeking an undergraduate certificate must complete all coursework at Capitol Technology University.

For descriptions of required courses, see courses beginning on page 68.

Acquisitions Management (12 credits)

This upper-level certificate is designed to provide students with knowledge of the broad concepts and strategies of procurement and contract management, which contributes to the ability to make sound business decisions. Major topics include the foundations of pricing and negotiations, basic aspects of contracting, procurement of services and products, software acquisitions, and mergers and acquisitions.

Required Courses
BUS-301 Project Management 3
BUS-385 Federal Acquisitions Management 3
BUS-387 Mergers and Acquisitions 3
BUS-388 Software Acquisitions 3

Computer and Network Security (13 credits)

This upper-level certificate provides students with a fundamental knowledge of general network security concepts, which can then be applied to an advanced training program in specific security software and platforms. Students learn the basics of practical and theoretical network and computer security. The first course introduces students to introductory computer programming to support the advanced courses. The remaining courses provide students with an understanding of computer and network security issues, including encryption, SSL, privacy issues, directory services protocols such as LDAP, intrusion detection, viruses, firewalls and network management.

Required Courses
CS-130 Computer Science Fundamentals I 4
IAE-201 Intro to Information Assurance Concepts 3
IAE-301 Compr. Computer & Network Security 3
IAE-315 Secure System Administration and Operation 3

Object-Oriented Programming (13 credits)

This lower-level certificate provides a solid grounding in object-oriented programming to students with no prior programming experience. Students learn to analyze and design programs from the object-oriented perspective. Implementing object-oriented solutions to problems in two languages, C++ and Java, helps to reinforce an understanding of object-oriented concepts from coupling and cohesion to inheritance and polymorphism. In addition, Java provides students with the tool necessary to implement graphical user interfaces as well as a variety of features and classes useful in webpage and Internet programming. C++ requires students to develop a good understanding of structures, such as lists, queues and trees, and to implement them using the classes defined in the C++ Standard Template Library.

Required Courses
CS-130 Computer Science Fundamentals I 4
CS-150 Introduction to Programming Using C 3
CS-220 Intermediate Java Programming 3
CS-230 Computer Science Fundamentals II 3

Project Management (12 credits)

This upper-level certificate is built on core processes defined in the Project Management Body of Knowledge (PMBOK). The certificate consists of four core courses, which provide students the opportunity to learn the basic concepts and strategies of project management required to successfully manage projects in both government and private industry.
Required Courses

BUS-301 Project Management 3
BUS-302 Methods of IT Project Management 3
BUS-303 Project Management Competitive Advantage 3
BUS-375 Human Resource Management 3

Programming and Data Management (13 credits)

This lower-level certificate provides a good understanding of how programmers store and manage computer data. Students learn the fundamental aspects of the storage and management of computer data. Courses in C++ and Java introduce the student to the object-oriented paradigm and the underlying principles of the structures and methods associated with data management. In addition, Oracle is used in the database management course, which introduces students to relational databases and the techniques for analyzing and designing database solutions. Finally, a course in advanced data structures teaches students the theory and underlying techniques used to store, search, sort and access computer data.

Required Courses

CS-130 Computer Science Fundamentals I 4
CS-220 Database Management 3
CS-225 Intermediate Java Programming 3
CS-310 Computer Algorithms 3

Software Engineering (13 credits)

This upper-level certificate introduces students to relational databases software design, and user interaction with technology. Students learn the practical aspects of programming and database management, as well as the theoretical issues involved in analyzing, designing and implementing computer applications that are accessible, reliable and maintainable. The software engineering course allows students to apply basic engineering principles to help them understand software performance, modularity, portability and reliability. A course in human-computer interaction investigates the relationship between the functionality and usability of computer systems in order to maximize their efficiency by selecting appropriate input-output devices and interaction styles.

Required Courses

CS-130 Computer Science Fundamentals I 4
CS-290 Computer Science Fundamentals II 3
CS-310 Computer Algorithms 3
CS-405 Introduction to Software Design with Unified Modeling Language 3

Space Missions and Operations Specialist (12 credits)

This upper-level certificate provides students with a general overview of satellites, including simple physics of satellite orbits and the history of NASA and scientific mission operations. Students will learn satellite design with emphasis on power management, heating and cooling considerations, telemetry and communications and control systems. Coursework includes the study of orbital mechanics and the physics of the instruments used to monitor and analyze the earth and atmosphere. Prerequisites for the certificate include an understanding of mathematics through differential equations with basic engineering physics.

Required Courses

AE-150 Introduction to Space 3
AE-250 Ground Systems Engineering 3
AE-350 Autonomous Ground Systems 3
AE-411 Space Systems Engineering 3

Web Programming (12 credits)

This lower-level certificate provides students the foundation to write programs that support transactions conducted over the Internet. Students learn about the web and the basic tools used for webpage construction, including HTML, DHTML, scripting, CSS and an overview of XML. The database management course provides students with an understanding of relational databases, how they are designed, how data is stored in them, and how that data can be accessed. The final two courses, Intermediate Java Programming and Web/CGI Programming Using Perl, provide students with the programming techniques and tools needed to create truly dynamic webpages.

Required Courses

CT-102 Introduction to Internet Applications 3
CT-201 Multimedia Applications 3
CT-376 Javascript 3
CT-406 Web Programming Languages 3

Prerequisite: CT-115, CS-130 or equivalent.

Website Development (12 credits)

This upper-level certificate is designed for students interested in building websites. Students learn a variety of tools and applications such as HTML, Java Script, ASP, PHP, Microsoft FrontPage and Macromedia Director used to build webpages and add multimedia content to them. The website construction course deals with website and browser requirements, platform selection issues, web server functions, client and server side applications, cookies and other topics. In the website administration course, students learn concepts in the use of software to monitor and optimize website operations, alternatives to CGI such as ASP and website security.

Required Courses

CT-152 Introduction to Unix 3
CS-130 Computer Science Fundamentals I 4
CS-220 Database Management 3
CS-320 Database Administration 3

Prerequisite: CT-115, CS-130 or equivalent.
Graduate Program Offerings

Doctor of Philosophy (PhD) Degree
- Management and Decision Sciences
- Cybersecurity

Doctor of Science (DSc) Degree
- Cybersecurity

Doctoral classes are taught in real-time, accelerated 8-week classes except for three residency courses which are held on campus over three weekends.

Master of Business Administration (MBA) Degree

Master of Science (MS) Degrees
- Astronautical Engineering
- Computer Science
- Cyber and Information Security
- Electrical Engineering
- Information Systems Management
- Internet Engineering

All master’s degrees and certificates are taught online in real time alternating between regularly scheduled live lectures and asynchronous learning sessions. The majority of courses are offered in 8-week accelerated terms. However, some courses in the MSCS, MSIA and MSIE programs are offered only in the 16-week semester format. All courses in the MSEE program are the 16-week semester format.

Post-baccalaureate Certificates
- Acquisitions Management
- Client/Server and Wireless Devices
- Component Technologies and Online Collaboration
- Information Assurance Administration
- Information Technology
- Project Management
- Network Protection
- Security Management

Doctoral Admissions

Requirements
- Master’s degree in information assurance, computer science, information technology or related field from a regionally accredited college or university
- Minimum of five years of direct work experience
- Three letters of recommendation
- Currently hold one of the following industry certifications: CISSP, GSE, CGEIT or CISM. Applicants who do not have one of these certifications must pass a comprehensive entrance exam. Information about the exam and how to register will be sent to students lacking a certification.

Application Deadline
All application materials must be submitted by the following dates to be considered for admission to the program:
- Start: Fall
- Application Deadline: Oct. 1 (classes start early Jan.)

Once an applicant’s file is complete, it will be sent to the Admissions Committee for review. Applicants will be notified of their acceptance status.

Master’s Degree Admissions

Applications for admission are accepted at any time and are processed and reviewed upon receipt of all necessary documents, on a case-by-case basis. Students whose application packages are incomplete will be classified as decision-pending.

Full Acceptance Status
For full acceptance, students must have completed an undergraduate degree from a regionally accredited institution, with a cumulative GPA of no less than 3.0 on a 4.0 scale. In addition, students must also meet the program-specific prerequisites for their intended program.

Program-Specific Prerequisites
- Astronautical Engineering
  - Bachelor of science in astronautical engineering with a minimum cumulative GPA of 3.0; or, a bachelor of science in a closely related field with minimum GPA of 3.0 and a minimum of three years of work experience
  - A current resume
  - Personal essay describing your vision for achieving your career goals in the field of astronautical engineering

Students who do not meet these requirements may still be considered for admission to the program under the provisional status. Additional documents such as letters of recommendation or an interview by a member of the faculty may be required. Applicants may also be required to take additional prerequisite courses.

Business Administration (MBA)

Applications for admission are accepted at any time and are processed and reviewed upon receipt of all necessary documents, on a case-by-case basis. Students whose application packages are incomplete will be classified as decision-pending.

Full Acceptance Status
Students who have not met the 3.0 cumulative GPA requirements or do not meet all of the program-specific prerequisites are provided an opportunity to gain full acceptance. Depending on the degree program, additional information may be requested. In this case, students are provisionally admitted and limited to three courses of enrollment. To achieve full acceptance, provisional students must maintain a 3.0 cumulative GPA in their first three graduate courses. Upon doing so, students are automatically converted to full acceptance status. If a provisional student fails to achieve a minimum 3.0 cumulative GPA after completing three courses, then he or she will be academically dismissed, and will not be permitted to enroll in any further courses.

Decision-Pending Status
Students with incomplete application packages (missing transcripts, missing essay, etc.) are classified as decision-pending until the application package is complete. Decision-pending students who have been approved to register are limited to two courses of enrollment and are not permitted to enroll in a third class until their application is complete.

Program-Specific Prerequisites
- Astronautical Engineering
  - Bachelor of science in astronautical engineering with a minimum cumulative GPA of 3.0; or, a bachelor of science in a closely related field with minimum GPA of 3.0 and a minimum of three years of work experience
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  - Bachelor of science in astronautical engineering with a minimum cumulative GPA of 3.0; or, a bachelor of science in a closely related field with minimum GPA of 3.0 and a minimum of three years of work experience
  - A current resume
  - Personal essay describing your vision for achieving your career goals in the field of astronautical engineering

Students who do not meet these requirements may still be considered for admission to the program under the provisional status. Additional documents such as letters of recommendation or an interview by a member of the faculty may be required. Applicants may also be required to take additional prerequisite courses.

Business Administration (MBA)

Applications for admission are accepted at any time and are processed and reviewed upon receipt of all necessary documents, on a case-by-case basis. Students whose application packages are incomplete will be classified as decision-pending.

Full Acceptance Status
Students who have not met the 3.0 cumulative GPA requirements or do not meet all of the program-specific prerequisites are provided an opportunity to gain full acceptance. Depending on the degree program, additional information may be requested. In this case, students are provisionally admitted and limited to three courses of enrollment. To achieve full acceptance, provisional students must maintain a 3.0 cumulative GPA in their first three graduate courses. Upon doing so, students are automatically converted to full acceptance status. If a provisional student fails to achieve a minimum 3.0 cumulative GPA after completing three courses, then he or she will be academically dismissed, and will not be permitted to enroll in any further courses.

Decision-Pending Status
Students with incomplete application packages (missing transcripts, missing essay, etc.) are classified as decision-pending until the application package is complete. Decision-pending students who have been approved to register are limited to two courses of enrollment and are not permitted to enroll in a third class until their application is complete.
Electrical Engineering
- Bachelor of science in electrical engineering is preferred, but not required
- Fluency in mathematics: Calculus I, Calculus II, Linear Algebra, Ordinary and Differential Equations, Laplace and Fourier Analysis, and Probability and Statistics for Engineers required
- Engineering and Science: upper level courses in Control Theory, Signals and Systems, Communication Theory and Microprocessors required. Students with a BS in equivalent are likely missing these course pre-requisites, and can gain access to the curriculum by completing the summer bridge course, EE-500 Advanced Signals and Systems

Information and Telecommunications Systems Management
- Working knowledge of statistics, economics, finance and accounting
- An undergraduate course in each topic is preferred

Internet Engineering
- Working knowledge of object-oriented programming
- C++ or Java is preferred, but not required

Doctor of Philosophy in Management and Decision Sciences
The Ph.D. in Management and Decision Sciences program is designed to prepare accomplished professionals for senior positions in either public or private sectors. The mission of the Doctor of Philosophy in Management and Decision Sciences degree (Ph.D. MDS) is to enable professionals from the field to understand and evaluate the scope and impact of decision sciences and associated technology from the institutional as well as from an industry and global perspective. The program will provide the student an academic environment to support the development of high-level critical thinking and leadership skills as they relate to management and decision sciences, to develop high-level decision science technical skills, and to provide doctoral level research experience allowing innovative and practical contributions to the management and decision sciences body of knowledge.

Graduates of Capitol Technology University’s Ph.D. program can expect to lead local, national, or global organizations in related fields and provide expert guidance for the understanding of and the utilization of organizational information assets. Graduates can expect to be hired into senior leadership positions in industry, government and academia, and will be able to create and manage unique solutions for any business decision challenge that may arise.

Course Sequence of Study

<table>
<thead>
<tr>
<th>Year</th>
<th>First Semester</th>
<th>Second Semester</th>
<th>Third Semester</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>DSM-802 Fundamentals of Doctoral Learning (Sixteen week course)</td>
<td>PHL-900 Management Theory in a Global Economy (Term One)</td>
<td>DSM-910 Analytics and Decision Analysis (Term One)</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>2</td>
<td>DSM-915 Applied Statistics and Visualization for Analytics (Term One)</td>
<td>DSM-920 Big Data Warehousing and Analytic Systems (Term Two)</td>
<td>RSC-811 Professional Research Theory and Practice (Term Two)</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>3</td>
<td>DSM-920 Big Data Warehousing and Analytic Systems (Term Two)</td>
<td>PHL-910 Special Topics in Management (Term One)</td>
<td>DSM-921 Contemporary Research in Management (Residency)</td>
</tr>
<tr>
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</tbody>
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Electives
- DSM-925 Supply Chain Design and Analysis
- DSM-935 Decision Support and Knowledge Based Systems
- DSM-940 Web Analytics
- DSM-945 Optimization Techniques for Management Decisions
- DSM-950 Strategic Management

As new electives are added, this list will expand. Please consult the School of Business and Information Sciences to inquire about new elective offerings or to propose new ones.

For descriptions of required courses, see courses beginning on page 72.
Doctor of Science in Cybersecurity

The Doctor of Science in Cybersecurity degree program integrates content from academia, government, and industry into a challenging curriculum that adheres to high federal standards, prepares individuals for the rigors of federal agencies and industry, and results in graduates who are prepared to lead the field’s top organizations.

Students take courses in small cohort groups comprised of government, industry, and military personnel. Upon graduation, doctoral students are able to conduct research as a foundation for executive action, demonstrate innovation and creativity as it relates to the strategic performance of an agency or organization, and apply a local, national, and global perspective to the decision-making process.

The program provides students an academic environment to support the development of high-level critical thinking and leadership skills, technical skills and research experience in order to provide significant contributions to the IA body of knowledge. The program maintains balance between a strong theoretical foundation, hands-on experience and innovative research. Graduates are well prepared to lead local, national or global organizations in IT-related fields and provide expert guidance for the protection of information assets.

Course Sequence of Study

Doctor of Science  54-66 Credits

Course  Credits

YEAR 1
First Semester
RSC-802 Fundamentals of Doctoral Learning
(Sixteen week course)  6

IAE-630 IA Research Literature (Term One)
RSC-810 Professional Research: Theory and Practice (Term Two)  3

IAE-820 Situation Awareness Analysis and Action Plan Processes (Residency Course, 3-day weekend)  3

Second Semester
RSC-825 Applied Research in IA (Term One)
RSC-813 Professional Ethics and Leadership (Term Two)  3

YEAR 2
First Semester
IAE-860 Advanced Research Methods
(Term One)  3
Elective (Term Two)  3

RSC-812 Professional Research: Theory and Practice II
(Term One)  3

IAE-880 Special Topics in IA (Term Two)  3

DSR-925 Dissertation Preparation
(Residency Course, 3-day weekend)  3

Third Semester
Electives (Term One)  12 Credits
IAE-835 Information Assurance Strategic Management  3
IAE-837 Contemporary Issues in IA  3
IAE-845 Pedagogy and Information Assurance  3
IAE-871 Software Assurance Assessment  3
IAE-872 Software Assurance Development  3
IAE-873 Software Assurance Administration  3
IAE-874 Assured Software Analytics  3
IAE-881 Special Topics in IA, Part II  3
IAE-882 Special Topics in IA, Part III  3
IAE-883 Special Topics in IA, Part IV  3
IAE-884 Special Topics in IA, Part V  3
RSC-815 Problem Solving and Decision Making with Quantitative Methods  3

DSR-940 Proposal Writing I (as needed)  3

DSR-941 Proposal Writing II (as needed)  3

DSR-942 Proposal Writing III (as needed)  3

As new electives are added, this list will expand. Please consult the IA department to inquire about new elective offerings or to propose new ones.

For descriptions of required courses, see courses beginning on page 72.

Master of Business Administration

The master of business administration (MBA) program is crafted to support professionals who are seeking credentials necessary to qualify for high level management and leadership positions, both in government and industry, MBA core coursework and projects focus on strengthening leadership skills, enhancing your understanding of new technologies, expanding your ability to use technology to solve business problems, and understanding the process of innovation. Specialization options include leadership, information assurance, technology management and policy. An additional specialization option emphasizing federal acquisition and DoD contracting is under development. Students complete the 36-39 credit hour program through a combination of accelerated  8-week terms and 16-week semesters.

Course Requirements

Master of Business Administration  36-39 Credits

Course  Credits

Core Courses
MBA-600 Fundamentals of Professional Mgmt 3*  3
MBA-615 Financial Management  3
MBA-620 Managerial Accounting  3
MBA-625 Organizational Behavior  3
MBA-630 Marketing Process and Strategy  3
MBA-635 Production and Operations Management  3
MBA-640 Managerial Economics  3
MBA-646 Project Management  3
MBA-650 Strategic Management  3

Capstone Course
MBA-700 Capstone Project  3

MBA Electives
Complete a 9-credit specialization option, or with permission, choose any three graduate-level courses from the university inventory. Students may choose from the following options or choose master level electives from other Capitol Technology University degree programs. Prerequisites must be met.

Specialization options:
Leadership
The leadership specialization combines the best theories with proven strategies to help leaders manage change and achieve organizational objectives.
MBA-657 Transformational Leadership and Innovation  3
MBA-658 Legal, Political, and Ethical Implications for Leadership  3
MBA-659 Leadership and Managing Human Capital  3

Information Assurance
The IA specialization emphasizes information assurance challenges, to include general security issues, protection methodologies, and malicious software defense.
IAE-670 Network Systems Security Concepts  3
IAE-682 Internal Protection  3
IAE-677 Malicious Software  3

Information Technology
The information technology specialization provides a broad overview of IT management issues, to include the supporting role of info systems, telecommunications fundamentals, and the role of computers in management.
SM-563 Managing Information Systems  3
SM-567 Business Data Communications and Networking  3
SM-569 Decision Support and Expert Systems  3

Technology Management
This specialization focuses on regulatory compliance, to include contracting and marketing law, cyber security law, and the law that governs the legal use of intellectual property.
IAE-671 Legal Aspects of Computer Security and Information Privacy  3
IE-717 Invention, Innovation, and the Use of Intellectual Property  3
SM-587 Law and Regulation of E-Commerce  3

* MBA 600 is waived for students with a recent undergraduate degree (completed within the past 5 years) in business.

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 72.
Master of Science in Astronautical Engineering

The astronautical engineering (AE) degree is structured to focus on satellite and mission operations, and systems engineering. Coursework focuses on project management, remote sensing, systems engineering, satellite operations, and mission planning.

AE majors study all phases of a satellite mission design, planning, and operations, and systems engineering. Concepts relating to cybersecurity in Astronautical engineering are also stressed.

The master of science in astronautical engineering is a 30-credit degree program. All students complete two capstone classes involving research methods and, in consultation with faculty, develop a project-based research paper by integrating prior coursework and experiences. Students may choose to use two elective courses in conjunction with the capstone courses to specialize in one area of astronautics.

Course Requirements

<table>
<thead>
<tr>
<th>Master of Science</th>
<th>30 Credits</th>
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</thead>
<tbody>
<tr>
<td>Course Credits</td>
<td></td>
</tr>
<tr>
<td>Core Courses</td>
<td>18 Credits</td>
</tr>
<tr>
<td>AE-602</td>
<td>Spacecraft Mission Architecture and Management</td>
</tr>
<tr>
<td>AE-611</td>
<td>Space Systems Engineering</td>
</tr>
<tr>
<td>AE-652</td>
<td>Orbital Mechanics II</td>
</tr>
<tr>
<td>AE-654</td>
<td>Spacecraft Propulsion</td>
</tr>
<tr>
<td>AE-655</td>
<td>Spacecraft Sensors</td>
</tr>
<tr>
<td>IAE-572</td>
<td>Software Assurance Development</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>6 Credits</td>
</tr>
<tr>
<td>Choose any two.</td>
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</tr>
<tr>
<td>AE-621</td>
<td>Satellite Ground Systems Operation</td>
</tr>
<tr>
<td>AE-662</td>
<td>Atomic and Molecular Spectroscopy</td>
</tr>
<tr>
<td>AE-701</td>
<td>Project Management</td>
</tr>
<tr>
<td>AE-712</td>
<td>Principles of Space Navigation</td>
</tr>
<tr>
<td>AE-711</td>
<td>Space Mission Analysis and Design</td>
</tr>
<tr>
<td>AE-720</td>
<td>Space Mission Design</td>
</tr>
<tr>
<td>EE-600</td>
<td>Mathematical Modeling and Analysis</td>
</tr>
<tr>
<td>IAE-571</td>
<td>Software Assurance Assessment</td>
</tr>
<tr>
<td>IAE-573</td>
<td>Software Assurance Management</td>
</tr>
<tr>
<td>IAE-574</td>
<td>Assured Software Analytics</td>
</tr>
</tbody>
</table>

Course are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 72.

Master of Science in Computer Science

The computer science (CS) degree is structured to focus on new technologies, graphics aimed at virtual realities, and the Internet. The main objective of the program is to provide students with the advanced knowledge and skills necessary to design and use modern computer-based systems, with an emphasis on emerging technologies such as embedded languages, wireless technologies, miniaturization (PDAs), and data security.

CS majors study computer language design, intelligent systems design, and Multithreaded and distributed programming and may specialize in an area of their choice, including information architecture, network security, or advanced computer science.

The master of science in computer science is a 30-credit degree program. All students complete a capstone course pair of Research Methods and the Capstone Research Project in which they identify a research topic in consultation with the faculty and develop a major project-based research paper by integrating prior coursework and personal experiences.

Course Requirements

<table>
<thead>
<tr>
<th>Master of Science</th>
<th>30 Credits</th>
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<tbody>
<tr>
<td>Course Credits</td>
<td></td>
</tr>
<tr>
<td>Core Courses</td>
<td>12 Credits</td>
</tr>
<tr>
<td>CS-504</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>CS-512</td>
<td>Computer Language Design</td>
</tr>
<tr>
<td>CS-701</td>
<td>Designing Intelligent Systems</td>
</tr>
<tr>
<td>CS-705</td>
<td>Multithreaded and Distributed Programming</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>12 Credits</td>
</tr>
<tr>
<td>Choose any four.</td>
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</tr>
<tr>
<td>CS-507</td>
<td>Database Systems Implementation</td>
</tr>
<tr>
<td>CS-511</td>
<td>Numerical Methods</td>
</tr>
<tr>
<td>CS-513</td>
<td>Gaming Theory - Real-time 3D Graphics</td>
</tr>
<tr>
<td>IAE-670</td>
<td>Network Systems Security Concepts</td>
</tr>
<tr>
<td>IAE-673</td>
<td>Secure Information Transfer and Storage</td>
</tr>
<tr>
<td>IAE-677</td>
<td>Malicious Software</td>
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<tr>
<td>IAE-682</td>
<td>Internal Protection</td>
</tr>
<tr>
<td>IAE-684</td>
<td>Complimentary Security</td>
</tr>
<tr>
<td>IE-705</td>
<td>Comparison of Operating Systems and Web Servers</td>
</tr>
<tr>
<td>IAE-674</td>
<td>Assured Software Analytics</td>
</tr>
</tbody>
</table>

Courses are offered only online in 16-week formats. For descriptions of required courses, see courses beginning on page 72.
Master of Science in Cyber and Information Security

The Master of Science in Cyber and Information Security (CIS) degree is structured to meet the needs of government and industry to understand, prepare for, respond to, and recover from threats to our information infrastructures. The main objective of the program is to provide information system and security professionals with in-depth instruction on new security ideas, concepts and techniques to prevent and react to malicious intrusion and to secure information assets. The National Security Agency and Department of Homeland Security have designated Capitol Technology University a National Center of Academic Excellence in Information Assurance Education. The Master of Science in Cyber and Information Security curriculum is mapped to all current federal domains at the most advanced level specified in the standards, and also covers the 10 domains of the CISSP (Certified Information Systems Security Professional), considered the gold-standard of industry certification. Some students may be required to take IAE-500 and CS-620; however, waivers may be granted in some cases with department chair or dean approval. CS-620 can be used as an elective or substituted with another course.

Course Requirements

Master of Science 36-39 Credits
Course Credits
Core Courses 24-27 Credits
IAE-500 Intro/Information Assurance* 3
CS-620 Operating System Principles for Information Assurance* 3
IAE-671 Legal Aspects of Computer Security and Information Privacy 3
IAE-673 Secure Information Transfer and Storage 3
IAE-677 Malicious Software 3
IAE-680 Penimeter Protection 3
IAE-682 Internal Protection 3
IAE-685 Principles of Cybersecurity* 3
IAE-500 and CS-620 may be waived with department chair or dean approval. CS must be substituted.

Project Management Electives
MBA-501 Professional Writing Practicum 3
MBA-646 Project Management 3
MBA-647 Methods of Project Management 3

Software Assurance Electives
IAE-571 Software Assurance Assessment 3
IAE-572 Software Assurance Development 3
IAE-573 Software Assurance Management 3
IAE-574 Assured Software Analytics 3

Electives 12 Credits
Choose any combination of four courses from the following list of electives or, with permission, choose any courses from graduate course inventory:

Information Assurance Electives
IAE-605 Master’s Research 3
IAE-610 Advanced Penetration Testing 3
IAE-611 Mobile Computing Security 3
IAE-620 Mobile Device Forensics 3
IAE-621 Applied Wireless Network Security 3
IAE-630 SCADA Networks and ICS Security 3
IAE-640 Access and Identity Management 3
IAE-670 Network Systems Security Concepts 3
IAE-672 Cryptography 3
IAE-673 Secure Information Transfer and Storage 3
IAE-679 Vulnerability Mitigation 3
IAE-686 Managing Information Security 3
IAE-688 Mobile Medical Device/Application Security 3
IAE-705 Master’s Thesis 3

Network Engineering Electives
IE-701 Principles of Designing and Engineering Computer Networks 3
IE-707 Network Architecture Convergence Using Wireless Technology 3
IE-712 Design and Practice of Secure Information Networks 3
IE-730 SCADA Networks and Industrial Control Systems 3

Master of Science in Electrical Engineering

The electrical engineering (EE) degree is structured to educate students to design and develop applications from the inception stage through the manufacturing, testing, and delivery of a product. The main objective of the program is to provide traditional engineers with the fundamentals of circuit modeling and design, circuit analysis, circuit construction and testing, government and industry regulations, and the advanced knowledge and skills necessary to design and use modern computer-based design and analysis software. EE majors study mathematical modeling and analysis, electromagnetic interference and compatibility, and advanced concepts of design for reliability, manufacturability and testability with the emphasis on the program on the practical applications of theoretical principles to the design and construction of circuits to meet industrial, military and international standards.

The master of science in electrical engineering is a 30-credit degree program. All students complete a capstone course pair in which they choose a project in consultation with the faculty and carry the research of the project through proposal, design, testing and delivery. Students may choose to use the two elective courses in conjunction with the capstone courses to obtain a four-course certificate in an area of specialization.

The university has developed a bridge course, EE-500 Advanced Signal Processing, to allow students who do not meet the upper-level prerequisites an opportunity to qualify for acceptance. Credit for EE-500 is not awarded toward MSEE degree completion.

Course Requirements

Master of Science 30 Credits
Course Credits
Core Courses 18 Credits
EE-600 Mathematical Modeling and Analysis 3
EE-601 Modern Circuit Design and Simulation 3
EE-606 Signal Processing 3
EE-607 Electromagnetic Interference and Compatibility 3

Electives Courses 6 Credits
Choose any two courses below.
EE-611 Space Systems Engineering 3
EE-634 Large Scale Integrated Design 3
EE-651 Communications Theory 3
EE-652 Microcontroller System Development 3
EE-653 Analog and Digital Control Theory 3
EE-656 Image Processing 3
EE-665 Microwave Circuit Theory and Design 3
IAE-621 Applied Wireless Network Security 3
IE-701 Principles of Designing and Engineering Computer Networks 3
IE-707 Network Architecture Convergence Using Wireless Technology 3

Capstone Courses 6 Credits
EE-708 Master’s Project Research 3
EE-758 Master’s Project 3

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 72.
Master of Science in Information Systems Management

The mission of the Master of Science in Information Systems Management (MSISM) is to deliver a program of excellence in the study of systems management and business analytics. The program delivers a core set of advanced courses in both systems management and business analytics. Graduates are prepared to influence decision making, strategies, and operations with fact-based insight and an in-depth understanding of business performance analysis from a systems view. MSISM provides an integrated curriculum and a global perspective using evolving technology platforms to facilitate and support the learning process. This program is designed for students who want to enter or advance a career in business analytics. It is also designed for students who have an interest in quantitative methods, exploring and uncovering relationships through data analysis, and using the data to solve business problems.

The MSISM is also ideal for MBA students seeking a quantitative second degree.

Course Requirements

**Master of Science**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td>27 Credits</td>
</tr>
<tr>
<td>MBA-646 Project Management</td>
<td>3</td>
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<tr>
<td>SM-525 Statistics for Managers</td>
<td>3</td>
</tr>
<tr>
<td>SM-570 Business Analytics</td>
<td>3</td>
</tr>
<tr>
<td>SM-513 Systems Management and Organization Theory</td>
<td>3</td>
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<tr>
<td>SM-517 Psychological Factors in Systems Management</td>
<td>3</td>
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<tr>
<td>SM-518 Principles of Systems</td>
<td>3</td>
</tr>
<tr>
<td>SM-563 Managing Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SM-567 Business Data Communications and Networking</td>
<td>3</td>
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<tr>
<td>SM-569 Decision Support and Expert Systems</td>
<td>3</td>
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</tbody>
</table>

**Specialization Options**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Leadership MBA-657 Transformational Leadership and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>MBA-658 Legal, Political, and Ethical Implications for Leadership</td>
<td>3</td>
</tr>
<tr>
<td>MBA-659 Leadership and Managing Human Capital</td>
<td>3</td>
</tr>
<tr>
<td>Information Assurance IAE-670 Network Systems Security Concepts</td>
<td>3</td>
</tr>
<tr>
<td>IAE-677 Malicious Software</td>
<td>3</td>
</tr>
<tr>
<td>IAE-682 Internal Protection</td>
<td>3</td>
</tr>
<tr>
<td>Technology Management Law &amp; Policy IAE-671 Legal Aspects of Computer Security</td>
<td>3</td>
</tr>
<tr>
<td>IE-717 Invention, Innovation, and the Use of Intellectual Property</td>
<td>3</td>
</tr>
<tr>
<td>SM-587 Law and Regulation of E-Commerce</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 72.

Master of Science in Internet Engineering

Technological advances are driving the convergence of separate voice, data, message switch and video networks onto a single, network-based platform using TCP/IP technology. To stay competitive, companies must if they want to integrate their existing network or rebuild from scratch. The master of science in Internet engineering degree (IE) prepares students to choose the best option.

The 30-credit graduate program is designed to fill the need for professionals who know how to build new networks or migrate existing ones onto platforms based primarily on TCP/IP technology. Network reliability, survivability and outage-recovery design techniques are also featured in the program, as is the practical use and integration of wireless networks. Network security is taught and practiced throughout the degree program.

Graduates of this degree program are prepared for career opportunities as senior network administrators, engineers and consultants, chief technical officers and chief information officers.

Many of the courses use OPNET, recognized by network engineers and planners as the most advanced network modeling software in the world. Throughout the MSIE program, students will practice network convergence and migration techniques by accessing the OPNET lab applications remotely from personal computers. OPNET lab exercises also include network design techniques that increase the security, survivability and recoverability of networks.

Course Requirements

**Master of Science**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core Courses</td>
<td>27 Credits</td>
</tr>
<tr>
<td>IE-701 Principles of Designing and Engineering Computer Networks</td>
<td>3</td>
</tr>
<tr>
<td>IE-703 Thin and Fat Client Deployment with Multilayered/Service-Oriented Architecture and Web 2.0</td>
<td>3</td>
</tr>
<tr>
<td>IE-705 Comparison of Operating Systems and Web Servers</td>
<td>3</td>
</tr>
<tr>
<td>IE-707 Network Architecture Convergence Using Wireless Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

IE-709 Comparison of Object-Oriented and Scripting Languages | 3 |

IE-712 Design of Cloud Networks and Services | 3 |

IE-713 Multimedia and Web Casting | 3 |

IE-715 Identifying and Integrating Component Collaboration Technologies | 3 |

IE-717 Invention, Innovation, and the Use of Intellectual Property | 3 |

Capstone Course | 3 Credits |

IE-719 Capstone Course* | 3 |

* Students may substitute an elective according to their specific career goals.

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 72.
Post-baccalaureate Certificates

The post-baccalaureate certificates are targeted toward systems managers and information assurance professionals seeking to augment or update their skills and career with graduate-level credentials. Certificate students must complete the specific courses listed for the certificate; no substitutions are permitted. Once the course requirements are completed, students must apply for the certificate through the Office of Registration and Records. A $25 processing fee is due with the certificate request. A student must have a minimum cumulative GPA of 3.0 in all certificate coursework to be awarded the certificate.

The courses required for these certificates are offered only online in accelerated 8-week terms and 16-week semesters. Consult the schedule of classes for more information.

For descriptions of required courses, see courses beginning on page 72.

Acquisition Management (12 credits)

This certificate is designed to provide students with knowledge of the broad concepts and strategies of procurement and contract management, which contributes to the ability to make sound business decisions. Major topics include the foundations of pricing and negotiations, basic aspects of contracting, procurement of services and products, software acquisitions, and mergers and acquisitions.

Required Courses

- MBA-646 Project Management
- MBA-703 Mergers and Acquisitions
- MBA-702 Software Acquisitions

Client/Server and Wireless Devices (12 credits)

This certificate provides students with a specialization in the hardware and software that drive local, Internet and wireless computing. Students learn the technical aspects of network and wireless devices and the standards and protocols of connectivity. An introductory course in network devices explores the technologies that link personal computers to servers and servers to servers. The three additional courses explore the movement from cable-connected terminals to remote server technology, the similarities and differences between operating systems and web servers, and the various wireless technologies and devices for personal and business communications.

Required Courses

- IE-701 Principles of Designing and Engineering Computer Networks
- IE-703 Thin and Fat Client Deployment with Multitiered/Service-Oriented Architecture and Web 2.0
- IE-705 Comparison of Operating Systems and Web Servers
- IE-707 Network Architecture Convergence Using Wireless Technology

Component Technologies and Online Collaboration (12 credits)

This certificate provides students with an advanced understanding of the sophisticated technologies used to develop, integrate, and deploy e-business solutions. Students learn aspects of programming tools for online applications, technologies and policies of multimedia products, and component integration for on-demand communications. Courses in object-oriented and scripting languages and component collaboration technologies explore the development and optimization of electronic commerce applications. A multimedia and web casting course and a policy course in intellectual property explore the technical, marketing and legal aspect of online multimedia.

Required Courses

- IE-709 Comparison of Object-Oriented and Scripting Languages
- IE-713 Multimedia and Web Casting
- IE-715 Identifying and Integrating Component Collaboration Technologies
- IE-717 Invention, Innovation, and the Use of Intellectual Property

Digital Forensics and Incident Handling (12 credits)

This certificate prepares students to analyze computer systems and components such as hard drives, memory, networks and mobile devices. Students will also learn the art of the detecting Malware and effective incident handling to maintain the security of customer data. Students will also learn basic UNIX operating system commands and concepts, C programming as well as use state of the art Forensics tools.

Required Courses

- IAE-620 Mobile Device Forensics
- IAE-675 Computer Forensics and Incident Handling
- IAE-677 Malicious Software
- CS-620 Operating System Principles for Information Assurance

Information Assurance Administration (12 credits)

This certificate provides a thorough understanding of the general methodologies for security risk assessment and security test and evaluation, including the interviews and documentation research necessary. Incident handling and response is addressed, as well as intrusion detection and defense in depth. In addition, students learn how to reduce their risk of potential legal liability for computer security or information privacy failures. This certificate is restricted to MSIA degree seeking students or seasoned IA professionals.

Required Courses

- IAE-671 Legal Aspects of Computer Security & Information Privacy
- IAE-674 Security Risk Management
- IAE-675 Computer Forensics and Incident Handling
- AE-680 Perimeter Protection

Information Technology (12 credits)

This certificate provides students with a foundational knowledge of systems management with respect to telecommunications systems as well as the computer systems that support managerial decision-making. Students learn principles of technology management and information systems. Introductory courses in systems management and telecommunications networks provide the fundamental principles applied in the decision support and expert systems course. A course in strategic management of business technology lays the foundation for business management in a global environment with specific attention given to electronic commerce management goals.

Required Courses

- MBA-650 Strategic Management
- SM-563 Managing Information Systems
- SM-567 Business Data Communications and Networking
- SM-569 Decision Support and Expert Systems

Network Protection (12 credits)

This certificate provides a detailed understanding of methods computer hackers utilize to infiltrate web and application technologies, including wireless networks. Emphasis is placed on how security professionals can anticipate and protect against attacks through internal and external vulnerability assessment. Students learn the anatomy of viruses and worms and study a range of defense mechanisms applicable to the daily challenges faced by today’s security professionals. In addition, students are trained to use the most popular hacking, cracking and wireless security network analysis tools in order to test and secure wireless networks.

Required Courses

- IAE-621 Applied Wireless Network Security
- IAE-677 Malicious Software
- IAE-679 Vulnerability Mitigation
- IAE-682 Internal Protection

Project Management (12 credits)

The graduate certificate in Project Management is built on core processes defined in the Project Management Body of Knowledge (PMBOK). The certificate consists of four core courses, which provide students the opportunity to learn the basic concepts and strategies of project management required to successfully manage projects in both government and private industry.
Secure Cloud Computing (12 credits)

This certificate prepares students to design, develop, operate and maintain the security of cloud architectures, customer data and the services offered to customers. Students will learn basic and advanced cyber defense strategies and techniques to secure customer systems and data and incident handling in case a breach is detected. Students will also learn basic UNIX operating system commands and concepts, C programming as well as use state of the art Forensics tools.

Required Courses
- IAE-680 Perimeter Protection 3
- IE-712 Design of Cloud Networks and Services 3
- CS-620 Operating Systems Principles for Information Assurance 3
- CS-710 Bigdata Warehousing and Analytics Systems 3

Secure Software Development (12 credits)

This certificate prepares students to design, develop, operate and maintain secure software (i.e., software that performs only its intended functions without the presence of exploitable vulnerabilities). Topics covered by this certificate are programming, security design principles, and IT systems components and analytics. This course prepares students to deliver software that is both secure and efficient code.

Required Courses
- IAE-571 Software Assurance Assessment 3
- IAE-572 Software Assurance Development 3
- IAE-573 Software Assurance Management 3
- IAE-574 Assured Software Analytics 3

Secure Mobile Technology (12 credits)

This certificate prepares students to design, develop, operate and maintain the security of mobile technologies, devices and services. Students will learn how to properly assess the security of and secure mobile devices as well as IEEE 802.11 networks. Students will also be exposed to state of the art mobile forensics tools. Students will be prepared to address their organizations requirements for mobile device management.

Required Courses
- IE-707 Network Architecture Convergence Using Wireless Technology 3
- IAE-611 Mobile Computing Security 3
- IAE-620 Mobile Device Forensics 3
- IAE-621 Applied Wireless Network Security 3

Security Management (12 credits)

This certificate provides students with a fundamental understanding of network systems security as it applies to the overall enterprise mission. Students learn aspects of detection, recovery and damage control methods as well as the laws and rights to privacy.

An introductory course in network systems security concepts introduces students to the terminology, principles and special issues facing industries, including the importance of user involvement, security training, ethics, trust and informed management. The three additional courses focus on secure data transfer and storage with a history of cryptography and a study of public- and private-key algorithms, risk management with detailed instruction in contingency/disaster recovery planning research and security policy formulation and enforcement, and computer forensics and incident handling with a focus on legal and ethical issues of privacy associated with information and intellectual property and managing trouble tickets and analyzing events.

Required Courses
- IAE-611 Mobile Computing Security 3
- IAE-673 Secure Information Transfer and Storage 3
- IAE-684 Managing Information Security 3

Non Credit Course and Certificate Offerings

Professional Development and Workforce Training

Capitol Technology University has a long history of supporting workforce development in industry and government. From technical training in areas such as Computer Forensics and SCADA protection to managerial areas such as project management and supply chain management, Capitol Technology University provides dedicated faculty who bring years of experience with theory and concepts. These customized programs are offered through our Critical Infrastructures and Cyber Protection Center (CICPC). Our programs can be delivered on customer site, on campus, and/or via our synchronous distance-learning platform. For more information about the center, see page 8.
Credit Bearing Courses

The numbers in parentheses indicate the following: for undergraduate, (in sequence) class hours – laboratory hours – semester credit hours; for graduate, the number of semester credit hours. Students must have completed the listed prerequisite or its equivalent before registering for a course.

Course Descriptions

AE-100 Introduction to Astronomy
Provides a general overview of topics in astronomy. Includes the history and evolution of our understanding of the solar system, stars, galaxies and cosmos. Basic processes that explain observations of phenomenon in our universe are discussed. May be used as a science elective. Corequisite: MA-114. Offered during Spring semester only. (3-0-3)

AE-150 Introduction to Space
Introduces the student to elements of astronomy and space science, the history of NASA and earth missions and operations and simple physics of satellite orbits, types of orbits and orbital terminology. Space environment and its effects on satellite and equipment. Discussion of satellites, types of satellites and their uses. Prerequisite: MA-114 or Corequisite: MA-261 Offered during Fall semester only. (3-0-3)

AE-200 High Vacuum Testing Techniques
This course covers the basic theory and practical knowledge to use, operate, manage and conduct tests in vacuum chambers. Terminology, equipment and methods of obtaining and maintaining vacuum environments, especially in regards to space simulation testing are covered. Topics will include types of vacuum pumps, system components, vacuum gauges, fittings, flanges, materials and their integration. Basic test procedures and standards. Offered Fall even years only. (3-0-3)

AE-265 Cubesat Engineering
End-to-end rapid development of a Cubesat-type satellite sensor system, power bus, and Arduino-based CPU. Students will form multi-disciplinary teams to collectively build, integrate and test a working design. Emphasis on design formalism, key trades, resource calculations, and integration of systems. Recipes and hardware components will be provided. Prerequisites: AE-150 or CS-130 or EE-100 (3-2-2)

AE-250 Ground Systems Engineering
Provides an introduction to the components that make up a satellite ground system. Included is the design and analysis of ground system components. Provides an introduction to satellite telemetry, command and control subsystems, as well as the software needed to build and run a ground system. Introduction to COTS standards and mission planning. Corequisite: CS-130 or equivalent. Prerequisite: AE-150. Offered Spring semester only. (3-0-3)

AE-311 Spacecraft Systems
Design of spacecraft for different applications and missions. Passive and active devices. Designing with redundancy and reliability. Heating and cooling thermal issues. Power handling, telemetry and communications with antenna design. Propulsion, Thrusters and maneuvering, Command and control systems. Prerequisite: AE-150 or equivalent background. Offered during Fall semester only. (3-0-3)

AE-350 Autonomous Ground Systems
Provides an in-depth introduction to the components that compose satellite ground systems in the commercial, military, and civil sectors from the inception of the space program to present day. Discusses conceptual and planned software development, integration and testing, launch operations, sustainment engineering, decommissioning of ground systems components and the system engineering processes involved in these activities. Introduces students to the tools and methods used to create dynamic economic ground system components based on automation and autonomous principles. Cover COTS, ISO-9001, CMMI, space planning, right dynamics principles and risk mitigation/analony resolution practices. Provides an introduction to STOL, CECIL, XML and YIVO languages. Prerequisite: AE-150, AE-311, CS-130 (or equivalent), and EN-102 Offered Fall even years only. (3-0-3)

AE-351 Orbital Mechanics
Newton's equations and Kepler's laws. Use of spherical coordinates to solve for orbital equations. Corrections to basic equations caused by earth's geometry, the moon and the sun. Other effects depending on orbital parameters. Prerequisite: MA-340. Offered during Fall semester only. (3-0-3)

AE-361 Introduction to Satellite Imaging
This is an introductory remote sensing and sensor course with a focus on methods, instruments and techniques used to obtain satellite imagery. Students will be introduced to physical principles of remote sensing. Earth and other planetary observing systems and sensors, and various digital processing techniques related to satellite sensing imagery. Topics include optics, solar radiation, principles of satellite imaging, image quality analysis, Introduction to charged coupled devices (CCDs), and basics of sensor design. Prerequisite: PH-263 and AE-311. Offered Spring even years only. (3-0-3)

AE-400 Special Topics in Astronautical Research
Research into astronautical engineering subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. (1-4)

AE-401 Computational Dynamics
Advanced Orbital Mechanics: Effects of various gravitational variations of the earth, moon and sun and other bodies on orbital equations. Perturbation and modeling of orbital equations. Use of numerical methods and commercial computer modeling to determine orbital paths. Prerequisites: MA-230 (or equivalent) and AE-351. Offered Spring even years only. (3-0-3)

AE-402 Special Topics in Astronautical Research II
Research into astronautical engineering subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. (3)

AE-410 Spacecraft Contamination
To understand the effective implementation of contamination control (CC) from component level to spacecraft level for mission success, including missions with planetary protection requirements. The importance of winning management and team support for the CC program will be emphasized. Definitions; nomenclature; symbols; units of measure; similarities and differences between aerospace, semiconductor and pharmaceutical cleanrooms. Discuss the ISO 14644 family of cleanroom standards. Missions lost or compromised by contamination from the early days to present Prerequisites: CH-120, PH-263, MA-340, AE-311. Offered Fall even years only. (3-0-3)

AE-454 Spacecraft Dynamics and Control
Analysis of methods of monitoring maintaining and controlling spacecraft altitude and position. Propulsion systems. Effects of gravity gradient and atmospheric drag. Stabilization using controllers, actuators, sensors and impulse devices. Design of control subsystems. Systems engineering approach. Prerequisites: MA-230 (or equivalent). Offered: Fall odd years only. (3-0-3)

AE-455 Satellite Communications
Analysis of satellite communications systems. Communications subsystems, telemetry, tracking, monitoring, data handling, satellite link design, propagation effects, modulation techniques and performance, error control, Satellite control networks and TDSS systems, position control and control. Prerequisites: AE-311 and MA-262 or equivalent. Offered Fall even years only. (2-2-3)

AE-457 Senior Project in Space Science
Continuation of EN-408 into project implementation phase of project. Students work on senior project and submit progress reports and design reviews. Presentation of final project with written and oral report required. Prerequisite: EN-408 (3-0-3)

AE-463 Space Systems Engineering Simulation and Modelling
This course focuses on software-based simulation relating to current era space and ground operations industry toolkits. The course has four components: basic concepts, use of the STK toolkit and other network simulation tools such as OPNET, evaluation of a COTS system, and student presentations and paper. Initial lectures will cover both the basics of per-component computational modeling as well as end-to-end concerns mission and information assurance requirements for real-world full scale systems. There will be additional focus on a risk based approach to securing such communications systems based on confidentiality, integrity and availability of data. Students will then work with the Satellite Tool Kit (STK) and other network simulation tools to model a single discrete space asset or a multi-component ground communications system, including preparation for the STK Certification Exam. The student will then model their own scenario using mission modelling software. Finally, each student will present their specific scenario to the class, including critical analysis (report) of advantages and deficiencies in the tool of choice in terms of end-to-end systems engineering to include information and mission assurance concerns.
AE-513 Systems Management & Organization
Basic concepts applied to managing large-scale systems. Perspectives and philosophies of organization, functions and processes of systems management and organizational leadership. (3)

AE-518 Principles of Systems
Systems theories, methodologies, thinking and practice; hard and soft systems approaches; multidisciplinary approaches to organizational problem solving, feedback loops and system change. (3)

AE-571 Software Assurance Assessment
This course covers the fundamentals of establishing a required level of software and system assurance, applying methods and determining measures to assess whether the required level of assurance has been achieved. Topics include assessment methods; defining product measures, process measures and other performance indicators; measurement processes and frameworks; performance indicators for business survivability and continuity; and comparing selected measures to determine whether the software/system meets its required level of assurance. These fundamentals are applied to newly developed software and systems as well as during the acquisition of software and services. (3)

AE-572 Software Assurance Development
This course covers the fundamentals of incorporating assurance practices, methods, and technologies into software and system development and acquisition life-cycle processes and models. With this foundation, the course provides students with rigorous methods for eliciting software assurance requirements, using threat identification, characterization, and modeling; assurance risk assessment, and misuse/abuse case analysis. Students will also learn how to evaluate methods and environments for creating software and systems that meet their functionality and security requirements. (3)

AE-573 Software Assurance Management
This course covers the fundamentals of software and system assurance management, including making the business case for assurance; planning and managing development projects that include assurance practices; compliance with laws, regulations, standards and policies related to assurance; and risk assessment, identification, analysis, mitigation and monitoring for assurance. The focus is on how to manage business and technical requirements. (3)

AE-574 Assured Software Analytics
This course covers methods for assuring the security and functionality of existing software and services, whether legacy, internally developed, or externally acquired, with emphasis on detection of vulnerabilities and malicious content. It also discusses assurance considerations for system architecture, networks and databases in their role as underlying enablers of software operations. Methods for structuring and reverse engineering of existing software are covered, as are techniques for acquiring and assuring software and services through suppliers, service-oriented architectures and cloud computing environments. (3)

AE-602 Spacecraft Mission Architecture and Design
Provides an overview of all aspects of space mission design for practical approaches to reducing risk. Also, will examine the different programmatic/conceptual designs to achieve design methods for space missions. Space system engineering/architecture tools will be used to create creative projects. (3)

AE-611 Space Systems Engineering
Understand the basic principles and processes for designing effective systems, including how to determine customer needs vs wants, translate customer requirements into designs for systems that provide required performance and that are reliable, supportable and maintainable throughout the system’s life cycle. Explore illustrative case studies. Team projects are assigned. Written reports and oral presentations are required. This is the graduate version of AE-411. (3)

AE-621 Satellite Ground Systems Operation
Provides an introduction to satellite operation centers in both the NASA and NOAA environments. Examines the roles of flight operations, communication/mission planning, and other entities needed to perform successful satellite ground systems operations. (3)

AE-647 Methods of IT Project Management
Continuation of Advanced Project Management. Theory of perturbations of orbits; numerical methods in orbital mechanics; satellite dynamics; averaging methods; resonance; mission analysis. Prerequisite: AE-351 (3)

AE-652 Orbital Mechanics II
Continuation of Orbital Mechanics I. Theory of perturbations of orbits; numerical methods in orbital mechanics; satellite dynamics; averaging methods; resonance; mission analysis. Prerequisite: AE-351 (3)

AE-654 Space Propulsion
Introduction to rocket engineering, space missions and thrust requirements; liquid and solid-fueled rockets; nuclear and electric propulsion, propellant thermodynamics. Prerequisites: AE-351 or equivalent, AE311 or equivalent (3)

AE-655 Spacecraft Sensors
The operation, accuracy, resolution, and application of instruments which either produce images of ground scenes or probe the atmosphere as viewed primarily from space. Design of thermal and other satellite detectors and instrumentation as related to remote sensing applications. (3)

AE-661 Remote Sensing II
This course will build on the understanding and concepts of remote sensing introduced in the AE-361, Remote Sensing I, course. The course will emphasize the use of remote sensing data and image interpretation and processing techniques for environmental and urban applications. The main objective of this course is to provide students with the conceptual foundations and technical skills to work on remote sensing missions in the NASA and NDIA environments. Through laboratory projects students will be able to practice the concepts learned in lecture. Weekly discussion of peer reviewed journal articles or book chapters. (3)

AE-662 Atomic and Molecular Spectroscopy
The course will cover topics in Atomic and Molecular Spectroscopy applied to satellite-borne remote sensing instruments designed to study and monitor the earth system. The topics will include: Structure of one-electron and many electron atomic systems; influence of external and internal forces on atomic and molecular electronic and ionic fields on atomic systems; Spectra of molecules and the signatures for rotational and vibrational energy transitions; Atmospheric scattering processes including Rayleigh, Mie and Raman scattering; Spectroscopic instruments including spectrometers, detectors, and filters; Fourier Spectroscopy; Optical properties of materials. (3)

AE-700 Research Topics in AE
Research into astronautical engineering subjects. Students primarily works in a guided study format through discussion of peer reviewed journal articles or book chapters. Laboratory projects students will be able to practice the concepts learned in lecture. Weekly discussion of peer reviewed journal articles or book chapters. (3)

AE-708 Master’s Project Research
This course will cover all aspects of proposing and executing a research and development task. Pin response to Broad Agency Announcements. Creating Preliminary response, including including abstract, statement of work, schedule, milestones, deliverables, risk mitigation, preplanned follow-on efforts, procurement, subcontracts, describing the labor mix, and developing a full cost proposal. Attention will be given to protection of proprietary information, protection of intellectual property, and to compliance with Federal Acquisition Regulations (FAR). The course will culminate with the execution of a mock project, with final deliverables, and final closeout of the project. Examples from Federal R&D projects in public domain will be used throughout the course. (3)

AE-710 Space Systems Design for Reliability
Design methodology and standards applied in the construction and assembly of electronic circuits for reliability. Redundancy, parallel structure and majority rule circuits. Materials and component selection, Vibrational analysis, thermal analysis and packaging. Classification of hardware for commercial, military or space application. MIL-SPEC and IPC standards discussed. Normally offered during summer semester. (3)

AE-711 Space Mission Analysis and Design
Spacecraft mission design, space environment, attitude determination and control, telecommunication, propulsion, structures and mechanisms, thermal control, power systems, launch systems and facilities, System components; vehicle structure, propulsion systems, flight dynamics, thermal control, power systems, telecommunication, interfaces and tradeoffs between these components. Testing, system reliability, and integration. Emphasis on studying NASA and NDIA past and current space missions. (3)

AE-712 Principles of Space Navigation
Statistical orbit determination: least squares, batch and Kalman (sequential) processing, online ephemeris generation, determination of potentially hazardous bodies/objects; launch vehicles, payloads, and staging. Prerequisites: AE-401 and EE-600 (3)

AE-720 Space Mission Design
Focus is on the development of human spacecraft from Vostok to the International Space Station. Spacecraft design requirements based on the space environment and human physiology will be discussed and a design process will be taught using systems providing life support.
Students will study the designs of a spacecraft for a human interplanetary exploratory mission and will include technical design and program management. Course includes a student spacecraft design project with presentation of proposals, design reviews and completed design projects. Prerequisite: AE-711 (3)

BUS-174 Introduction to Business and Management
This course presents a survey of the general business and management environment. Topics include an introduction to the various forms of business, organizational structure, and their legal implications. Modern management and supervisory concepts, history and development of theory and practice, the roles of managers, and the relationship between manager and employee are examined. This is a seminar course with emphasis on class discussion and collaborative learning. Prerequisite or Corequisite EN-001 or EN-101. (3-0-3)

BUS-200 Business Communications
This course includes preparation for various kinds of both written and oral business communication. The course will develop and sharpen the critical thinking and writing skills, including report/proposal preparation and presentation needed in the workplace. Effective written and effective communication will also be explored. Prerequisite: EN-101. (3-0-3)

BUS-208 E-Commerce and the Law
This course examines legal concepts that arise out of conducting business through the Internet. This course examines a wide variety of concepts and issues that have a significant influence on the use of the Internet for business or personal gain. In addition to basic legal terms, topics such as contracts, digital property, privacy, e-commerce, domain names, and electronic contracting will be discussed. Prerequisite: EN-101. (3-0-3)

BUS-238 Macroeconomics
This course is an introduction to macroeconomic concepts and analysis. It deals with the relationship between government, business, and the overall economy. The key areas focused on include gross domestic product, the public sector, unemployment, and aggregate supply and demand. The global economy is covered with discussion of issues such as international trade and protectionism. Prerequisite: EN-101. (3-0-3)

BUS-250 Database for Managers
A course that introduces the student to the basic concepts, organization, and implementation models of databases, with an emphasis on the relational model. Projects include hands-on projects with entity-relation and relational models. (3-0-3)

BUS-270 Financial Accounting I
This is an introductory accounting course that will provide students with a strong basic knowledge of accounting terms, concepts, and procedures. Analyzing business transactions as they relate to the General Ledger and the use of special journals will be addressed as well as the various processes and procedures related to the full accounting cycle. The accounting principles described are those endorsed by the Financial Accounting Standards Board. Corequisite: MA-110. (3-0-3)

BUS-271 Financial Accounting II
This course continues the focus on accounting principles, theories, and applications introduced in Financial Accounting I. It builds additional skills in ledger entry and organization, payroll accounting, and the development of financial statements. The foundation acquired in Accounting I is integral to exploring topics as accounting for partnerships and corporations, pension plans, and valuation of assets. Prerequisite: BUS-270. (3-0-3)

BUS-275 Human Resource Management
Human Resource Management is a course with dual purposes. First, the development of employer-employee relations in both the public and private sector in order to facilitate organization productivity. Second, the management of scarce human resources in terms of planning and development techniques in both the private and public sector. Wage and salary administration, forecasting employment needs, recruiting and selection, evaluation, and training issues will be the focus of discussion and lecture. Prerequisites: EN-102 and BUS-275. (3-0-3)

BUS-279 Introduction to Leadership
This course focuses on the interactions of leaders in organizations. Topics include leadership theories, styles, skills, and behaviors. Emphasis will be placed on the development of leadership skills. Prerequisite: BUS-274 and BUS-275. (3-0-3)

BUS-283 Managerial Accounting
This course focuses on budgeting and planning. Emphasis is on the use of accounting information to plan and redirect allocations to support business decisions. Managerial Accounting is designed to follow Principles of Accounting. Prerequisite: BUS-270. (3-0-3)

BUS-289 Entrepreneurship and Small Business Management
This course provides an overview of the principles and practices of entrepreneurship and small business management. Students learn to identify characteristics of entrepreneurs; identify business innovations; conduct feasibility analyses; develop formal business plans; and finance, organize, and operate a small business. Prerequisite: EN-101. (3-0-3)

BUS-301 Project Management
This course is a full range introduction to project management. It covers the origins, philosophy, methodology, and involves acts of applications and use of tools such as MS Project. The System Development Cycle is used as a framework to discuss project management in a variety of situations. Illustrative cases are used and project leadership and team building are covered as integral aspects of good project management. Prerequisites: BUS-174 and EN-101 or permission of department chair. (3-0-3)

BUS-302 Methods of IT Project Management
Methods of IT Project Management focuses on IT project management and is built around the Project Management Body of Knowledge (PMBOK). You will learn how IT projects differ from other kinds of projects and how the methods and techniques of project management must be modified/adapted for IT projects. In addition, students will gain an increased understanding of what managers do (or should be doing) and why managers ask you to do the things that they do. The course presents methods, tools, and techniques that can be used to effectively manage IT projects, both large and small. Prerequisite: BUS-301, Project Management, or equivalent (3-0-3)

BUS-303 Project Management Competitive Advantage
Project Management takes decision-making and a business-oriented approach to the management of projects, which is reinforced throughout the course with current examples of project management in action. Project management is central to operations within the context of a variety of successful organizations, whether publicly held, private, or not-for-profit. Prerequisite: BUS-301 or equivalent (3-0-3)

BUS-350 Decision Models with Spreadsheets
The main objective of this course is to teach how to solve modern business problems using a spreadsheet application. Popular spreadsheet applications are examined. Students will use the case study method to address analytical problems. Prerequisites: MA-128, BUS-301 and BUS-384. (3-0-3)

BUS-362 Information Systems for Managers
Computer-based information systems and online information systems to increase individual and organizational efficiency and productivity constitute the foundation of this course. Topics include information systems for database management, transaction processing, client/server issues. Prerequisite: EN-102 and BUS-279. (3-0-3)

BUS-372 Financial Management
This course is designed to familiarize the student with the principles that guide a firm’s financial resources management. The primary philosophy around which this course is organized is wealth maximization and the decision criterion used to achieve such a state. Topics such as capital management, fixed asset investment, cost of capital, capital structure, long-term finance, mergers, leasing, and multinational finance are covered. In addition, accounting terminology and concepts relevant to financial analysis and decision making will be presented. Prerequisites: BUS-270, MA-111 or MA-114. (3-0-3)

BUS-376 Marketing Principles
The role of marketing and the strategies used by marketing managers to solve problems is the content of this course. Emphasis is placed on the relationship among consumers, business, and government is regard to product, promotion, pricing, and distribution strategies. Industry standards and ethical practice are focal points of...
BUS-377 Special Topics in Marketing

This is an advanced course in selected issues in the theory and application of marketing. Actual topics and cases will be chosen by the instructor and may vary from term to term. Prerequisites: BUS-200, BUS-375, BUS-386 and BUS-378 or BUS-208. (3-0-3)

BUS-378 Legal Environment of Business

This course introduces the student to legal reasoning; ethical norms; the legal process and the American legal system; administrative law process and the role of business people in that process; the study of selected areas of public and private law, such as securities regulation, antitrust, labor, product liability, contracts, and consumer and environmental law; and international dimensions of the legal environment of law. The purpose of the course is to establish legal literacy and to develop an understanding of legal dynamics, particularly in the business world. Prerequisites: EN-102, BUS-279. (3-0-3)

BUS-379 Integrated Marketing Communications

This course examines the development of marketing strategies and creative campaigns utilizing multiple marketing disciplines (paid advertising, public relations and promotions) and media (print, broadcast, online and social). Emphasis is placed on the coordinated impact of these communication tools in reaching target audiences. Prerequisite: BUS-376. (3-0-3)

BUS-384 Production and Operations Management

This course stresses the decisions that managers make in increasing productivity in a world economy, productions and operations management examines the processes by which goods and services are produced. Strategies, techniques and problems in forecasting, statistical quality control, total quality management, inventory management, scheduling, maintenance and reliability, product process, technology, location, layout, and purchasing are the core topics of this course. Prerequisites: MA-128 and BUS-386. (3-0-3)

BUS-385 Federal Acquisitions and Contracting

This course covers the fundamentals of Federal acquisitions and contracting and will provide a comprehensive understanding of the acquisition environment. Students will develop professional skills for making business decisions and advising other acquisition team members to successfully meet customers’ needs. Participation in small group simulation exercises will prepare students to provide contracting support within the overarching business relationships of government and industry. Prerequisites: BUS-301 and BUS-384 or equivalent. (3-0-3)

BUS-386 Organizational Theory and Behavior

The content of this course represents a synthesis of behavioral sciences providing a broad framework for management. Topics include organization goals, authority and leadership, motivation and morale, work groups and group dynamics, communications, planning and management by objectives, concepts of organizational development, organizational structure and processes, and organizational conflict and change. Prerequisites: BUS-279 and EN-102. (3-0-3)

BUS-387 Mergers and Acquisitions

This course surveys the drivers of success in mergers and acquisitions (M&A) and develops your skills in the design and evaluation of these transactions. The M&A transactions will cover the foundation for a wide range of mergers and acquisition fields including corporate development, investment banking, consulting, and advising senior management. Prerequisite: BUS-301 and BUS-384 or equivalent. (3-0-3)

BUS-388 Software Acquisitions

This course covers the acquisition of open systems and commercial off-the-shelf (COTS) products. It examines the value and corporate and government procurement. Properly managed software acquisition offers potential for significant time and cost savings over a system’s lifetime. The transition from proprietary, custom-built systems to systems based on standards and commercial products is not easy, however. Managers and their staff must understand the risks and opportunities associated with this approach. Prerequisite: BUS-301 and BUS-384 or equivalent. (3-0-3)

BUS-389 Logistics & Supply Chain Management

This course examines the efficient flow of materials, products, and information within and among organizations. Logistics management examines a wide variety of activities that have a significant influence on customer service, including inventory control, transportation, warehousing, facility location analysis, packaging, materials handling, parts and service support and product returns. Supply chain management examines the integration of business processes across organizations, from material sources and suppliers through manufacturing and processing, to the final customer. Prerequisites: BUS-386 and MA-128. (3-0-3)

BUS-390 Marketing

This class will prepare students for the dynamic and evolving field of Internet Marketing. Through classroom and hands-on activities, students will gain experience with e-marketing approaches including websites, search engine marketing, online advertising, email marketing, various forms of social media, and mobile commerce. The emphasis is on the practical application of e-marketing technologies, including promotional methods, web analytics tools, and customer relationship management (CRM) processes used for consumer, business, and institutional markets. Students will study both current and emerging online marketing methods, along with their benefits and limitations. The objective is for students to develop an understanding of Internet marketing both in terms of strategy and tactics. Prerequisite: BUS-174, BUS-376. (3-0-3)

BUS-391 eCommerce

This course examines the opportunities and challenges faced in an increasingly digital world. More and more product information and selling strategies are linked to the worldwide web. The course is for those students who wish to learn the principles and processes of electronic commerce. The course provides an overview of web promotion strategies, technology and infrastructure concerns, security, supply chain management, and back-office processes. Students will study topics such as: website development and promotion, online marketing and advertising, outsourcing or in house development decisions, back office operations and information technology, and sourcing and cost analysis of key services and technologies. Prerequisite: BUS-376, BUS-384. (3-0-3)

BUS-392 Retail Management

This course examines retailing theory and research to understand the way retailers work. Methods, strategies, resources and techniques required for retail management are stressed. Both brick and mortar and online retailing are covered. Prerequisite: BUS-386. (3-0-3)

BUS-393 Consumer Analysis

This course examines the identification and evaluation of distinguishing customer characteristics so as to better segment them in the marketplace and target marketing efforts to them. Prerequisites: BUS-376, MA-128 and SS-171. (3-0-3)

BUS-400 Research Methods

Introduction to business research methods. Through the coursework students will learn elements of the research process including problem definition, literature review, hypothesis development, types of research design and data collection methods; sampling strategies; data analysis and interpretation; qualitative research approaches; ethical issues in research; and the reporting of research results. The course encourages students to step outside the classroom and engage in research projects based on the real life case studies. Prerequisites: MA-128 and EN-102. (3-0-3)

BUS-410 Strategic Management

This senior level course is designed to provide students with a general overview of systematic and continuous planning processes used by management to gain strategic and competitive advantage. The students are exposed to, and practice, the complex interrelationships between strategy, structure, culture, and management. Strategic and tactical strategies are explored using case studies, projects and discussions. Students develop and assess the role of management in strategy formulation, implementation and evaluation. Prerequisites: BUS-372, BUS-384, BUS-375 and BUS-378 or BUS-208. (3-0-3)

BUS-454 International Business

Drawing upon previous management and business courses, this course studies the nature and scope of international trade and investment, international institutions, the international monetary system and exchange markets, and the cultural factors affecting international business operations and their influence on global trade. The principal business functions. The effects of the revolution in electronic technologies on global business are also examined. Case study analysis and a variety of current media are used in this course. Prerequisites: BUS-372, BUS-376 and BUS-386. (3-0-3)

BUS-458 Senior Project

This is a BA/MIT capstone course designed to challenge students as they work individually or in small teams on a real-world business/industry problem requiring technical expertise and management acumen. Drawing upon the course in technical report writing, students are required to submit a major report outlining and analyzing the problem and proposing management solutions. Prerequisites: BUS-400, BUS-410 and EN-408. EN-408 should be taken immediately before this course. (3-0-3)

BUS-460 Special Topics in Business

This course is designed to challenge students as they work individually or in small teams on a real-world business/industry problem requiring technical expertise and management acumen. This course may be repeated for different projects. Prerequisite: EN-102. (3-0-3)
CS-220 Database Management
An overview of database systems, with an emphasis on relational databases. Terminology, basic concepts, and techniques used in database management. Prerequisite: CS-130 or CS-150. (2-2-3)

CS-310 Computer Algorithms
Mathematical foundations of algorithms and algorithmic techniques. Prerequisites: CS-225 or CS-305 or CS-330. (3-0-3)

CS-351 Assembly Language Programming
This course introduces the student to assembly language, specifically which is used with the Intel x86 architecture. Topics include memory representation, branching and looping, procedures, string operation, bit manipulation and macros. Secure coding techniques will be taught by exploring integer overflow and buffer overflow attacks. By learning how to write in assembly language, the student will better understand how programs are executed in a computer and how to optimize performance of programs written in high level languages, such as C++. The student will be assigned programming projects as homework. Prerequisite: CS-130 or CS-150. (3-0-3)

CS-356 Dynamic Web Page Development
This course teaches the student how to generate dynamic web pages using data from a database. The course begins with an overview of the C# programming language and object-oriented programming. Using ASP.NET, the course explores the processes of web forms and controls, state management, validation and error handling, SQL database access and secure web site coding. Programming projects, including a group project, are assigned as part of the homework requirements. Prerequisites: CS-220 or understanding of SQL. (3-0-3)

CS-400 Special Topics in CS
Applications of computer science principles or research into computer science subjects. Subject primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. (1-4)

CS-405 Introduction to Software Design with UML
Undergraduate version of CS-505. Object-oriented concepts and principles, classes, objects and interfaces; as well as inheritance, encapsulation, polymorphism and aggregation; and object-oriented software life cycle. CASE tools and iterative and incremental software development approaches are also covered. Advantages of Object-Oriented design patterns are demonstrated. Prerequisite: CS-225 or CS-230. (3-0-3)

CS-407 Database Systems Implementation
This is an undergraduate version of the graduate database course CS-507. Emphasis on DBMS programming and a physics engine. Students learn how to use the Unity development environment, design a user interface, make scenes, retain persistent data, create and manage animation, collision detection, and destroy a system of game characters. Students learn how to create and code an end-to-end design of a playable game. Prerequisite: CS-230 and CS-225 or CS-305 or CS-330. (3-0-3)

CH-120 Chemistry
Metric system and significant figures; stoichiometry; fundamental concepts of atomic structure and its relationship to the periodic table; electron configuration; bonds and electronegativity; gases, and oxidation states and redox; solutions, acids and bases, changes of state, thermodynamics, chemical kinetics and equilibrium. (2-2-3)

CS-100 Introduction to Programming Logic
This course will introduce students to the various techniques used in programming logic. The purpose of this course is to build basic logic skills in the building of logic for procedural and object oriented programming with minimal coding but with an in-depth approach to design. This course is an excellent choice for programming beginners who want to obtain a good foundation to program in various languages using various programming approaches. (3-0-3)

CS-130 Computer Science Fundamentals I
Introduces students to the discipline, methodologies, and techniques of software development. The emphasis is on developing essential programming skills, an understanding of object-oriented design and good software engineering practices using the Java Java programming language. Programming constructs include selection, loop, arrays, graphical output of data, the use of the standard Java class library, and construction of simple user-defined classes. Programming projects are assigned as part of the homework requirements. Prerequisite: MA-112. (3-0-3)

CS-150 Introduction to Programming Using C
This introductory course in programming will enable students to understand how computers translate basic human instructions into machine executable applications. The language of choice for this course is C. The C syntax that will be covered includes functions, variables and memory allocations including pointer notation; conditional statements and looping. Students will also learn binary to hexadecimal and decimal conversions along with basic computer architecture. Memory management, data input output and file manipulation will be among some other topics discussed and applied during this course. (3-2-4)

CS-200 Intro to Object-Oriented Programming in C++
Students learn how to program in C++ using an object oriented approach. Design of classes and objects. Inheritance and polymorphism: Use of pointers and data structures based projects. Prerequisite: CS-130 or CS-150. (2-2-3)

CS-220 Database Management
An overview of database systems, with an emphasis on relational databases. Terminology, basic analysis and design using Entity-Relationship diagrams and relational schemas. Database implementation, queries and updates using SQL/Client/server and middleware. An overview of database administration, transactions, isolation and concurrency. Data warehouses. Projects, which are assigned as homework, are implemented in Oracle. Prerequisite: A grade of C or better in CS-130 or CT-115. You may take this course and CS-130 concurrently. (3-0-3)

CS-225 Intermediate Java Programming
This course provides a deeper look into the Java language with a special emphasis on object oriented design. Topics include multidimensional arrays, inheritance, interfaces, polymorphism, graphical user interfaces, exception handling, I/O, multithreading and Java Database Connectivity (JDBC). Programming projects are assigned as homework. Prerequisite: CS-130 Corequisite: CS-220. Offered spring semester only. (3-0-3)

CS-230 Computer Science Fundamentals II
Advance pointers and dynamic memory usage. Concepts of object-oriented design and programming. Includes classes, friend functions, templates, operator overloading, polymorphism, inheritance, exception handlers, objects and the standard template library. Applications involve the use of simple data structures such as stacks, queues, trees, and binary trees. Recursion, searching and sorting algorithms. The above concepts are implemented through a series of homework assignments and one large assignment, which is completed as part of the homework requirements. Prerequisites: CS-130. (3-0-3)

CS-250 Introduction to Network Programming Using C
An introductory network programming course using the C programming language. Students will be provided with an overview of the principles of computer networks with a detailed look at the OSI reference model and the TCP/IP stack. The emphasis is on understanding UNIX interprocess communication and developing network programs using connectionless and connection-oriented sockets. Extensive programming assignments will include the development of client/server and peer-to-peer network applications. Prerequisites: CS-150. (2-2-3)

CS-305 Android Application Development
Writing applications for mobile devices using the Android operating system. Installing and using the Android SDK. Creating GUI layouts, menus and dialog boxes. Graphics and event handling. Interfacing with built in GPS, accelerometer, audio and video. User and file input and output. Web interfaces and sockets. Writing native applications. Debugging native applications from a host. Programming to build a game using a game engine and the standard template library. Applications, including debugging tools, versioning tools, object library, object attributes tools. Object oriented programming using Objective-C. Model-View-Controller architecture in code. Graphical User Interface library, object attributes tools. File system on the iPhone; SQLite and the iPhone. Students learn how to make a complete iphone app with significant functionality and industry-standard user interface from scratch. Security issues with iphone software development. Prerequisites: CS-150 or CS-230. (3-0-3)

CS-340 Game Programming Using 3D Graphics
Students learn how to build a game using the Unity game engine. Students learn how to use 2D and 3D graphics, sound files, and user driven programming to build a game using a game engine and (2-2-3)

CS-350 iPhone App Development
Introduction to objective C, the programming language used for iphone app development. Overview of the xcode development environment, including debugging tools, versioning tools, object library, object attributes tools. Object oriented programming using Objective C. Model-View-Controller architecture in code. Graphical User Interface library and components. File system on the iPhone; SQLite and the iPhone. Students learn how to make a complete iphone app with significant functionality and industry-standard user interface from scratch. Security issues with iphone software development. Prerequisites: CS-150 or CS-230. (3-0-3)

CS-390 Special Topics in CS
Applications of computer science principles or research into computer science subjects. Subject primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. (1-4)
architecture and implementation issues such as storage structures, multidimensional index structures, query optimization, concurrency control and recovery, distributed processing, database security, and parallel database systems. Prerequisite: CS-220 or equivalent. (3-0-3)

CS-418 Operating Systems
Principles underlying computer operating systems are presented from a computer designer’s perspective. Concepts explained include process, concurrency, synchronization, resource management, input/output scheduling, job and process scheduling, scheduling policies, deadlock, semaphore, consumer/producer relationships, storage management, and parallelism. Concepts explained include process, concurrency, synchronization, resource management. Prerequisite: CS-230 or equivalent. (3-0-3)

CS-420 Game Programming on iPhone Platform
Students learn how to develop a game on the iPhone/iPad platform. Students learn the xcode development environment and use the Model-View-Controller architecture. Students will learn to animate objects, control of characters, collision avoidance and tracking the state of a game. Real world projects will be assigned as part of the requirements. Prerequisite: CS-330. (3-0-3)

CS-431 Graphics and Game Design
Students learn how to develop and build a game using an industry-standard game engine such as Unity or Unreal. Students learn how to use 2D and 3D graphics, sound files, and user driven programming to build a 3D game. Students learn how to design and build a scene, manage game characters, manage game levels, manage and store game data. Prerequisite: CS-230. (2-3-3)

CS-432 Computer Graphics
Discussion of some basic types of computer graphic devices. Graphics and text modes, point plotting and line drawing, area filling image array plotting, mathematics and generation off two and three dimensional translations. Rotations, scaling, reflections, orthogonal and perspective transformations. Projects are assigned as part of the homework requirements. Prerequisite: MA-230 and either CS-230 or CS-225. Offered on demand. (3-0-3)

CS-501 Designing Intelligent Systems
The artificial intelligence revival of the late 1980s has produced many new and innovative approaches to the creation of intelligent systems. Such systems permeate today’s computer environment supporting everything from computer games to autonomous robotic systems and intelligent agents. The focus of this course will vary over time. Topics include knowledge representation and rule-based systems, fuzzy-logic systems, learning systems such as artificial neural networks and genetic algorithms, genetic programming and evolutionary computing, hybrid intelligent systems, and intelligent agents. (3)

CS-507 Database Systems Implementation
Emphasis on DBMS architecture and implementation issues such as storage structures, multidimensional index structures, query optimization, concurrency control and recovery, distributed processing, database security, and parallel database systems. (3)

CS-511 Numerical Methods
Analysis of errors in numerical computations; solution of linear algebraic systems of equations, matrix inversion, eigenvalues, roots of nonlinear equations, interpolation and approximation. (3)

CS-512 Computer Language Design
Using parsers and code generation techniques to fashion new mini-languages that can be used to creatively modify the interface between a user and the computer. Topics include language design; grammars; regular expression grammars; parsers and parser construction; parsing expressions; tokenizing; assembly; etc. Students will explore the Unified Process and Object-Oriented software life cycle. CASE tools and iterative and incremental software development approaches are also covered. Advantages of Object-Oriented design patterns are demonstrated. (3)

CS-513 Gaming Theory-Real-Time 3D Graphics
The growing importance of virtual realities in training, scientific modeling, and communication comes on the heels of increasing processor capabilities, new innovations in hardware, increasingly sophisticated programming languages, and advanced math-based modeling techniques. Recent 3D graphics are at the leading edge of these developments. Topics include mathematical foundations and modeling techniques, mapping, perspective, aliasing, real-time rendering, Binary Space Partition Trees, object control issues. Uses C++ and the OpenGL graphics interface. (Offered as a full semester course.) (3)

CS-600 Operating System Principles for IA
This course is an overview of the UNIX operating system. The content will include shell programming, process management, storage management, scheduling algorithms, source protection and system programming. The course will include programming projects focused on Information Assurance problems solving utilizing the C programming language primarily. Students are expected to be familiar with virtual machines, the UNIX command line and basic programming language. Basic knowledge of C programming and UNIX helpful. (3)

CS-601 Introduction to Engineering Methods I
Good programming skills, knowledge of matrices and a basic programming language. Basic knowledge of C programming and UNIX helpful. (3)

CS-602 Operating System Principles for IA
This course is an overview of the UNIX operating system. The content will include shell programming, process management, storage management, scheduling algorithms, source protection and system programming. The course will include programming projects focused on Information Assurance problems solving utilizing the C programming language primarily. Students are expected to be familiar with virtual machines, the UNIX command line and basic programming language. Basic knowledge of C programming and UNIX helpful. (3)

CS-620 Research Methods
This is part of one of two course sequence in research and writing. In part one, students develop a topic to identify a research topic and complete a research project. In the second part, students will write a research paper, and present a research paper. Students may petition for job-related substitute course. (3)

CS-714 Capstone Research Project
This is part of two a course sequence in research and writing. The course is in graduate seminar format. Students integrate prior course work and personal experiences into researching an approved topic to produce a project-based paper. (Offered as a full semester course.) Students may petition for job-related substitute course. (3)

CSH-410 Honors Seminar in Network Architectures
Principles of network architecture and key aspects of network design, implementation, and management. Storage structures, multidimensional index structures, query optimization, concurrency control and recovery, distributed processing, database security, and parallel database systems. (3)

CS-710 Big Data Warehousing and Analytic Systems
This course will introduce the student with the necessary skills to solve complex problems and design solutions using Big Data. The student will be able to gain an understanding of how to design databases to manage large volumes of data, and how that data can be analyzed and translated into meaningful results. The student will be introduced to the field of Analytics, gain an understanding of Enterprise Data Warehousing models, be introduced to Data Mining techniques and tools used for mining the data warehouse, and build specific Data Marts. The student will be introduced to predictive analysis, and be expected to develop models to extract data, perform trend analysis, establish patterns, and make projections. Prerequisites: Ability to use Structured Query Language with a basic relational database system; ability to read pseudocode, and understand basic data structures like arrays; and, an understanding of algebra and basic probability and statistics would be helpful, though not required. (3)

CS-712 Research Methods
This is part of one a course sequence in research and writing. In part one, students develop a topic to identify a research topic and complete a research project. In the second part, students will write a research paper, and present a research paper. Students may petition for job-related substitute course. (3)

CS-714 Capstone Research Project
This is part of two a course sequence in research and writing. The course is in graduate seminar format. Students integrate prior course work and personal experiences into researching an approved topic to produce a project-based paper. (Offered as a full semester course.) Students may petition for job-related substitute course. (3)
audio file standards, such as GIF, TIF, JPEG, WAV and MIDI are discussed. SGML and XML are defined, and role of XML in enabling the communication of data between disparate applications is discussed. Students are required to complete assignments as part of the homework requirements. (3-0-3)

CT-152 Introduction to UNIX
Unix files and operating system. Understanding multi-user and multitasking concepts. Editors, X-windows, Awk, email, Internet commands, shell commands and shell scripts. Projects, which provide practical experience, are completed as part of the homework requirements. (3-0-3)

CT-201 Multimedia Applications
Use online and resident window tools to create, edit and enhance text, audio, and video for multimedia applications, including multimedia Web pages and presentations. Study the philosophy, aesthetics and theory behind the layout, construction and display of multimedia material. Flash projects that include drawing, painting tools, color animation, buttons and actionscript are completed as part of the homework requirements. Prerequisite: CT-102 or equivalent. (3-0-3)

CT-206 Scripting Languages
Introduces students to the use of scripting and the scripting languages of Perl, Python, and Ruby on Rails. The class will cover the use of scripting to solve short problems, automate routine tasks, integrate across pieces of software, and prototype code ideas. The merits of code-complete design versus on-the-fly coding as well as coding and code documentation styles will be discussed. Prerequisites: CS-130 or permission of instructor. (3-0-3)

CT-240 Internetworking with Routers/Switches
Configuring routers and switches to build multiprotocol internetworks. OSI reference model, basic LAN and WAN design, dial access services, TCP/IP protocol suites, IP addressing, subnetting, static and dynamic routing, WAN technologies such as HDLC, PPP, Frame Relay, ATM and ISDN. Prerequisites: NT-150 or professor approval. (2-2-3)

CT-376 Javascript
This course introduces the student to client-side web programming. Students learn javascript. Topics include programming fundamentals using javascript, functions, event handlers, how to create and use javascript objects, how to use the prototype and prototypic libraries for visual effects. Use of google maps from a programmer’s perspective. Debugging of javascript code. Other topics include CSS style sheets, XML, JSON and AJAX. Programming projects are assigned as part of the homework requirements. Prerequisites: CS-130. (2-2-3)

CT-406 Web Programming Languages
This course will explore how to make a dynamic website using five programming languages: Perl, PHP, Java Servlets, Java Server Pages and CF. Students will have access to a Unix server including an Apache Web Server and a MySQL Database. This course can be taken as an elective or as a substitute for CS-325 for degrees where CS-325 is a requirement (CS-325 is no longer offered). Prerequisites: CS-130 and CS-220. Formerly CT-366. (3-0-3)

CT-451 Special Topics
Students research current trends in telecommunication and emerging technologies. Oral presentation required. Prerequisite: Senior status. (3-0-3)

DSM-802 Fundamentals of Doctoral Learning
Students of doctoral level programs are taught the ability to create knowledge through original research in their areas of specialization. This course will orient new doctoral students to learning, researching, and writing, and prepare them for the entire program of study. Students will be introduced to critical thinking skills necessary for doctoral research. Students will be introduced to the standards of ethical research. Students work individually with the dissertation mentor to complete the dissertation proposal and prepare for the competency examination. (3)

DSM-905 Organizational Change & Information Systems
Information systems represent a critical resource to organizations; yet, there are many unknowns about how to successfully design and implement those systems and many firms today continue to struggle with the deployment process. This seminar explores issues associated with the implementation of information systems in organizations - including requirements analysis, project management, outsourcing, and virtual teams - using a variety of theoretical or conceptual lenses such as control and coordination, organizational change, and trust. The emphasis of this course is on understanding information Systems implementation from an organizational perspective. (3)

DSM-910 Analytics and Decision Analytics
Course focuses on the development of descriptive analytics with some parts focused on predictive analytics. Topics include operations research techniques and their application to decision making, such as mathematical optimization, networks modeling, stochastic modeling, and multi-objective modeling. Other topics such as PERT, GPM, computer simulation, decision analysis using decision trees and quantitative value functions, and heuristic methods are covered, as well as use of contemporary computer software for problem solving. In particular, the course will extensively use MS Excel for solving the decision-making problems. Case-study approach to project solving is used. Prerequisite: DSM-802. (3)

DSM-915 Applied Statistics for Analysis
Introduces multivariate regression and random forests for modeling data. Addresses data access, variable selection and model diagnostics. Introduces foundations for visual thinking. Reviews common statistical graphics such as dot plots, box plots, q-q plots. Addresses more advanced methods such as scatterplot matrices enhanced by smoothed or density contours, and search tools for finding graphics with suggestive patterns. Course will introduce R software for analysis. A final project will involve visualization of a real data set. Prerequisite: Undergraduate statistics. (3)

DSM-920 Big Data Warehousing and Analytic Systems
This course will equip the student with the necessary skills to solve complex problems and design solutions using Big Data. The student will be able to gain an understanding of how to design databases to manage large volumes of data from multiple sources, and how that data can be analyzed using modern tools. This course will introduce students to the field of Analytics, gain an understanding of Enterprise Data Warehousing models, be introduced to Data Mining techniques and tools used for mining the data warehouse, and build specific Data Mart models. The student will be introduced to Big Data, the goals of Big Data, the tools available to handle Big Data, and will be expected to develop models to extract data, perform trend analysis, establish patterns, and make projections. Prerequisites: Ability to use Structured Query Language with a basic relational database system; ability to read pseudo code, and understand basic data structures like arrays; and, an understanding of algebra and basic probability and statistics would be helpful, though not required. Prerequisite: DSM-915

DSR-900 Writing the Doctoral Dissertation
Students work individually with the dissertation mentor to complete the dissertation proposal and prepare for the competency examination. Prerequisite: DSR-925. (3)

DSR-909 Writing the Doctoral Dissertation
This course focuses on completion of chapters one and two. (3)

DSR-914 Proposal Writing II
This course focuses on completion of chapters two and three. (3)

DSR-942 Proposal Writing III
This course focuses on submission of proposal to IRB and ARB. (3)

DSR-945 Dissertation Presentation
Learners complete the dissertation milestones developed by the learner and the mentor. This includes an examination of all 5 of the dissertation chapters. Students who are not prepared to defend upon completion of this course must enroll in a course in the DSR-970 series prior to enrolling in DSR-960. (3)
EE-353 Power System Engineering

EE-354 Digital Design II
Continuation of Digital Design I. Students explore large scale digital arithmetic and logic development using VHDL and a current FPGA development board. Students design and build circuits according to design objectives in two parts: students design, compile and verify their circuits using timing simulation on computers; then build and test circuits for upload to an FPGA. Final project involves design, assembly and testing of a VHDL-based system. Prerequisite: EE-304. Offered during spring semester only. (2-2-3)

EE-359 High Frequency Circuit Design
Students are taught to design, build and test microwave amplifiers using S-parameters and Smith Charts in conjunction with modern circuit design and simulation software. Both bipolar and field effect transistors are used to design amplifiers to specifications regarding signal gain, noise figure and intercept point. Students fabricate microstrip circuit boards using an in-house milling machine and then test the completed amplifier in the laboratory. Actual and simulated results are presented. Prerequisite: EE-309. (2-2-3)

EE-362 Microcontroller System Design
Study of a state of the art microcontroller and related families. Evaluation board hardware preparation and checkout. PC to board interfaces. Assembler and C-compiler. Configuration registers for code and program protection. On-chip memories, Seerial peripheral interface and parallel I/O routines. A/D converter, real-time interrupts and timer applications. A series of three group projects are required leading up to a final stand-alone project. Prerequisite: EL-262 or microcomputer, micro-assembly background. (2-2-3)

EE-364 Computer Architecture
Design and architecture of modern computer systems. Component processors, memory and interfaces. Instruction sets and operations. Reduced instruction set computer (RISC) and RISC architecture. Processor design to support RISC instruction set. Evolution to parallel processing and multithreading. Prerequisite: EE-304. Offered during spring semester only. (2-2-3)

EE-382 Robotic Systems
An introduction to the design and control of autonomous robots. Mechanical considerations and review. Interfacing issues and programming. Sensor fusion, perception and environmental detection and navigational ability. Students will develop algorithms and use machine learning techniques to generate programs to control electromechanical systems to perform tasks. Team based projects and laboratories. Prerequisites: EL-262. (2-2-3)

EE-400 Special Projects in Engineering
Application of engineering principles to research into a special project. Projects vary from semester to semester. Students primarily work in a guided study environment with a faculty mentor. Prerequisites: permission of instructor and department chair and at least junior standing. This course may be repeated with different projects. (1-4-3)

EE-404 Large-Scale Digital Design
Analysis and modeling of digital systems, VLSI, VHDL timing, objects and classes. VHDL-based design processes, concurrent and sequential assignements. Variable modes and operators, entities and architectures, behavioral descriptions. Dataflow, synchronous and asynchronous processes, using procedures and sub-functions. Library support packages and generation of test benches. Prerequisite: EE-354. Offered during fall semester only. (2-2-3)

EE-456 Digital Signal Processing
Analysis and modeling of digital systems, VLSI, VHDL timing, objects and classes. VHDL-based design processes, concurrent and sequential assignements. Variable modes and operators, entities and architectures, behavioral descriptions. Dataflow, synchronous and asynchronous processes, using procedures and sub-functions. Library support packages and generation of test benches. Prerequisite: EE-354. Offered during fall semester only. (2-2-3)

EE-452 Advanced Microcontroller System Design
Extension of EE-362. Project course utilizing commercially available microcontroller EVB boards. Fuzzy logic introduction. Programming using fuzzy logic rules and high performance design techniques. Students design, select, build, and generate code for microcontroller-based systems. Prototypes are evaluated and debugged before final assembly. Written report and oral presentation required. Prerequisite: EE-362. Offered spring semester only. (1-4-3)

EE-453 Control I
Introductory concepts. Feedback control systems, noise figure and interpretation of transfer functions. System response for undamped and damped systems. Testing for system stability, coefficient test, Routh-Hurwitz technique. System performance, system types, steady state error and error coefficients. Calculation of controller, System bode plots, crossover frequencies, and phase margins. The course will stress use of a variety of international industrial computer-aided system design software packages. Prerequisite: MA-360 or knowledge of Laplace transforms. (2-2-3)

EE-456 Digital Signal Processing

EE-458 Senior Design Project
Students propose design, create and test a functioning product using engineering standards and realistic constraints. This is a major design experience based on the knowledge and skills acquired in earlier course work. The project includes design reviews as scheduled by the professor, progress reports, and a final project demonstration with oral presentation. Issues such as cost, maintainability, environmental impact, ethical, social, manufacturability and safety must be con-
sidered in developing the final product. For EE, TET, EET, CE and CET programs. CE and CET stu-
dents should see advisor before registering. Pre-
requisites: EN-408 and Senior standing. (1-4-3)

EE-459 Electromagnetic Field Theory
Combination of EE-429. Time-varying electric and
magnetic fields. Boundary conditions. Maxwell’s
equations and applications to wave phenomena.
Relation of classical circuit theory to Maxwell’s
equations. Prerequisite: EE-419. Offered during
spring semester only. (3-0-3)

EE-461 Communications Theory
Fourier analysis. Signal and spectral analysis of
AM and FM systems. Noise representations; power
spectral density and quadrature decomposi-
tion. Signal-to-noise improvement in AM and FM
demodulators. Maximum likelihood digital signal
detection. Signal space representation of modu-
lated signals. Modulated signal detection and bit-
error rate calculations for OOK, BPSK, QPSK, QAM,
M ary PSK and M ary FSK. Prerequisites: EL-261,
MA-360 and MA-345. (3-0-3)

EE-483 Control II
Introduction to state diagrams and state equa-
tions. Solutions of state equations for simple
systems. Root-locus techniques, compensation,
optimization of stability and error. Multiparameter
root locus. Nyquist criterion and time domain
design. System performance indexes: ISE, IAE,
ITAE and ITSE. Modern control engineering; state
variable techniques; minimizing realizable or esti-
mator, observer design and design of optimal
control system. Prerequisites: EE-453. Offered
during spring semester only. (3-0-3)

EE-500 Advanced Signals and Systems
Signal representation using step and impulse
functions. Differential equation description of
linear systems and classical solutions. Laplace
transforms in linear systems. Trigonometric and
complex exponential Fourier series. Fourier
transforms. Parseval’s theorem. State-variable
equations and solutions. The sampling theorem
and the Nyquist criterion. Using Z-transforms to
represent and analyze sampled data systems. (3)

EE-601 Modern Circuit Design and Simulation
A study of the various SPICE based software
tools used by engineers to design and simulate
circuits. Analog, digital and mixed simulation.
Circuit sets selection and modeling use of librar-
ies and customizing components and models. Students
design and calculate theoretical results and
compare results to simulations. Students will be
required to obtain software for purchase. Pre-
requisite: normal undergraduate course in circuit
modeling. Offered during fall semester. (3)

EE-606 Signal Processing
Review of Laplace and Z-transforms. Synthesis
of networks from transfer functions. Complex
variable theory applied to Z-transforms. Filter
design techniques from “brick wall” specifications.
Mixed radix FFT’s. Spectral estimation. Quantiza-
tion theory. Introduction to recursive estimation.
Prerequisite: normal undergraduate course in
signal processing. (3)

EE-607 Electromagnetic Interference and Compatibility
Overview of Electromagnetic Interference with
examples. Conducted and radiated emission. Mutual
Capacitance and Inductance. Coupling
Paths. Crosstalk. Shielding Theory and Applica-
tions. Modeling of circuits in noise applications.
Two-dimensions low frequency. Ferrite beads
and chokes. Open Area Test Sites. Anechoic
chambers. TEM cells. Reverberation chambers.
Frequency and time domain analysis of noise.
Grounding issues and their reduction. Bonding
Electrostatic Discharge. Extremely Fast Transients,
Surge EMI filters. Cable interconnects. Compo-
ponents. Electromagnetic pulses and Lightning.
Offered during spring semester. (3)

EE-614 Large-Scale Integrated Design
Introduction to VLSI and VLSI CAD software tools.
Digital design and logic verification. Layout, timing
analysis and programming, with synthesis, simula-
tion and verification. Applications change from
semester to semester. Subjects include design-
ing ASIC’s, DSP and processor chips. Students
design and verify chip. Offered based on demand.
Prerequisite: Advanced course in digital chip
design equivalent to EE-354. (3)

EE-651 Communications Theory
State-Space Model of Signals. Calculation of bit-
error rate for BPSK, QPSK, M ary PSK, M ary
Orthogonal Signals. Trellis-Code Modulation and
Demodulation (using trellis diagrams). Fading
channels and random phase in analog systems.
Offered during spring semester. Prerequisite: EE-600 or equivalent. (3)

EE-652 Microcontroller System Development
The course covers both the hardware and soft-
ware aspect of the 16-bit Motorola microcontroller.
Overview of onboard chip components and avail-
able instruction sets with emphasis on the newer
and enhanced version. Student is required to
develop a hardware configuration and write and test
modular code. Software development tools will
be employed. High level language compilers will
be discussed. Students are required to purchase
an evaluation board and deliver a final project for
testing. (3)

EE-653 Analog and Digital Control Theory
State Equations, Simulation and Modeling, Con-
trollability and Observability, Specification and
Structures, Feedback System Stability Classical
and Modern Approach, Multivariable Control,
Sampled-Data Digital Control System, Impulse
Samples, Aaliasing, Zero-Order Hold, Z-Transform,
Discrete-Time Systems, Sampled-Data Systems,
Stability by Jury Criterion, Root Locus, Nyquist Cri-
teron, Discretization of Continuous-Time Design.
Prerequisite: EE-600 and EE-601 or equivalent. (3)

EE-656 Image Processing
Two-dimensional Fourier Transforms and Z-Trans-
forms. Two-dimensional convolution. Filtering and
masking. Discrete Cosine transforms, Haddamard
transforms, Karhunen Loeve transforms. Radon
transformations. Contour estimation (Sobel, Snake
algorithm). Motion estimation and compen-
sation. Compression techniques (JPEG, MPEG).
Prerequisites: EE-600. (3)

EE-665 Microwave Circuit Theory and Design
Transmission lines, two port networks scattering
parameters. Measuring scattering parameters.
The Smith Chart and impedance matching.
Impedance matching circuits. Microstrip design.
Microwave amplifiers. Broadband amplifiers.
Applications to broadband circuit design. Prereq-
uisites: EE-601 and EE-607. (3)

EE-708 Master’s Project Research
This course will cover all aspects of proposing and
executing a research and development task, in
response to Broad Agency Announcements. Creat-
ing preliminary response, including quad charts
and white papers. Techniques for providing a
rough order of magnitude (ROM) cost. Preparing
the full final proposal, including abstract, state-
ment of work, schedule, milestones, deliverables,
risk mitigation, preplanned follow-on efforts, pro-
curement, subcontracts, describing the labor mix,
and developing a full cost proposal. Attention will
be given to protection of proprietary information,
protection of intellectual property, and to compli-
ance with Federal Acquisition Regulations (the
FAR). The course will culminate with the execu-
tion of a mock project, with final deliverables,
and final closeout of the project. Examples from
Federal R&D projects in public domain will be
used throughout the course. Offered during fall
semester. (3)

EE-710 Design for Reliability and Manufacturing
Design methodology and standards applied in the
construction and assembly of electronic circuits
for reliability. Redundancy, parallel structure and
majority logic circuits. Materials and component
selection. Vibrational analysis, thermal analysis
and packaging. Classification of hardware for
commercial, military or space applications. MIL-
spec and IPC standards discussed. Normally
offered during summer semester. (3)

EE-720 Designing for Testability
Design for testability. Types of testing, functional
testing, and structural testing. Automatic test pat-
tern generation. Scanning and scan based design
rules. Critical paths. Memory test and diagnost-
cs. Built-in self-testing. ATE equipment, local
and remote testing and limitations. Students will
have access to on-line test work stations. Normally
offered during summer semester. (3)

EE-758 Master’s Project
Students integrate prior work course and personal
experiences into a master’s project. Students
develop a full final proposal, including abstract,
statement of work, schedule, milestones, deliv-
erables as learned in EE-708. Proposal must be
delivered to class and approval of project advi-
sor required. Regular progress reports required.
Final presentation will be live over the Internet.
Offered during spring semester. Prerequisite: EE-708. (3)

EL-100 Introduction to DC/AC Circuits
Basic electrical concepts and laboratory tech-
niques. Current, voltage, resistance and power.
Ohm’s law, series and parallel circuits. Kirchhoff’s
voltage and current laws. Loading effects on meters and supplies. Capacitors and Inductors. Charging and discharging. RC and RL
time constants. Introduction to AC. Sinusoidal
waveforms, phasors and use of the J operator.
Reactivity and admittance. Average values and
RMS. Laboratory emphasis is on the proper use
of standard meters, testing equipment and circuit
breadboarding. Corequisite: MA-114. (2-2-3)

EL-190 DC/AC Circuits and Analysis
Applications of Kirchhoff laws to multiple source
and complex series-parallel circuits. Determin-
ants and matrices. Mesh and nodal analysis.
Network Theorems: Thevenin, Norton, superposi-
tion, maximum power transfer. Review of complex
number manipulation. Application to capacitive
and inductive circuits, impedance. Complex Mesh
EL-200 Electronic Devices and Circuits
Principles and characteristics of semiconductor devices. Devices covered include diodes, Zener diodes, bipolar junction transistors, field-effect transistors, and operational amplifiers. Includes bias networks, operating points, maximum output and input voltage and current gains for each amplifier configuration. Prerequisite: EL-100 or EI-150. (3-2-4)

EL-204 Digital Electronics
Number systems, including binary, octal and hexadecimal bases. Binary arithmetic. Boolean algebra, Karnaugh map simplification. Design of combinational circuits. Decoders, multiplexers, flip-flops and other multi-vibrator circuits. Logic families including TTL, CMOS, ECL and others. Families and their application in computer technology. Prerequisite: EN-001. (2-2-3)

EL-211 Transmission Lines

EL-220 Fabrication and Troubleshooting
Covers the basic methods of circuit construction and troubleshooting, including IC fabrication, wire wrapping, soldering, etching and chassis layout. Identification and removal of components: project oriented: may be used as a technical elective. Prerequisite: EL-100. (1-4-3)

EL-250 Advanced Analog Circuits
Amplifier theory. Analysis of circuits in small signal operation, equivalent circuit models, frequency response and Bode plots. Plotting frequency response. Bode plots. Laboratory emphasis on the use of standard test equipment to verify theory. Prerequisites: EL-100 and Math (MA-114 or MA-114 Placement Test equivalent or MA-261 or MA-261 Placement Test equivalent). (2-2-3)

EL-255 Introduction to Control and Robotics
Open and closed loop control systems compared with examples. Conditions, which determine a robot. Permanent magnet, brushless, series and shunt motors. Stepper motors. Reversing circuits and speed control techniques. Gear trains and effect on speed, acceleration and torque. Robot power supplies, robot arm and gripper. Degrees of freedom and work envelope. Frequency response of control system components. Introduction to Power electronics. Transducers used in robotics. Prerequisite: EL-100 or EI-150. (3-2-4)

EL-261 Introduction to Communication Circuits and Systems

EL-262 Microprocessors and Microassembly
Introduction to microprocessors. Architecture. Fetch and execute cycles. Microprocessor instruction set and assembly language programming. Hardware configuration, pin functions and modes of operation of a typical microprocessor. Basic I/O timing, control and memories. Prerequisite: EL-204. (2-2-3)

EL-301 Advanced Communication Circuits and Systems
A continuation in the study and analysis of communications circuits as they apply to communications systems. Circuits such as voltage controlled oscillators, modulators, mixers, phase-locked loops, frequency synthesizers, passive and active filters are analyzed and mathematically discussed. Study circuits and build test circuits. Students build and test their circuits. Prerequisites: EL-250, EL-262 and MA-261. Offered during fall semester only. (2-2-3)

EL-307 Noise and Shielding
Noise types and specifications. Natural, manmade and intrinsic noise sources. Thermal, shot, contact, popcorn and avalanche noise as related to electronic devices. Reactive network effects on thermal noise. Signal-to-noise ratio, noise figure, noise factor, noise temperature and noise bandwidth. Low noise detection techniques, measurement techniques for noise factor and noise bandwidth. Ground loops and how to eliminate them. Grounding techniques, shielding, digital circuit radiation, electrostatic discharge and electromagnetic pulse. Prerequisites: EL-261. (2-2-3)

EL-400 Special Projects in Technology
This course prepares the student for the Senior Design course. It requires the application of certain basic principles in developing documentation needed for technical communication. Each student must be able to identify a particular problem and devise a proposal for solving it. A series of written assignments should provide a thorough literature review and analysis of relevant issues, expert opinions, and the author’s (student’s) recommendations for solving the problem. Students are also expected to present their work via oral presentations. Prerequisite: EN-102 and senior status (earned 96 or greater credits). (3-0-3)

EN-001 Basic Writing Skills
This course covers the basic skills of written expression, reading comprehension and vocabulary building, which will enable the students to clearly present feelings, ideas and opinions. It includes a review of spelling, punctuation, and word usage sentences. Structure and rules of other basic writing skills. Students will be expected to complete numerous short writing assignments with an emphasis on paragraphs. Study skills are also stressed. This course is required of all students whose test scores and writing samples indicate the need. This course provides three semester credits but does not meet the AAS, BS degree requirements for graduation. Grades given will be Pass or Repeat. (3-0-3)

EN-002 Reading Development
Introduction to the use of critical thinking. The course will focus on teaching students to use active strategies such as graphic organizers, SQ3R, Cornell Note-Taking, text-marking and annotating. The reading will be focused on non-fiction materials to increase knowledge in specialized areas. This course provides three semester credits but does not meet the AAS, BS degree requirements for graduation. Grades given will be Pass or Repeat. (3-0-3)
ENI-101 English Communications I - Intensive
This introductory college-level course focuses on effective oral and written communication skills and the development of analytical abilities through various reading and writing assignments. Students must be able to demonstrate competence in writing mechanics, including grammar, structure and logical content development when writing essays, summaries, and short reports. Rhetorical modes may include description, comparison/contrast, personal experience, definition, illustration and process demonstration. Oral presentation skills are developed throughout the delivery of two speeches on related topics. Prerequisite: acceptance based on placement test scores. (3-0-3)

ENI-LAB English Communications Intensive Lab
Based on placement test scores, students in this lab will focus on specific areas for improvement including pronunciation, grammar, verb formation and usage. Must be taken with EN-001 and ENI 101, and can be taken with EN 101. (0-1-0)

FS-100 Freshman Seminar
Throughout this course students will learn skills to better prepare them for the rigors and challenges of college. Students will learn and practice various proven techniques and tools to help them be successful with college level work. Additionally students will explore the personal characteristics necessary for success, learn about the college culture, and develop a support network. (2-0-1)

HP-252 Critical Issues US History I
This is a survey course designed to give students an overall view of the development of the United States from the time of its founding through the Civil War. This course is directed toward the emergence of American political, economic, and social traditions through critical analysis and student research. Prerequisite: ENI-101. (3-0-3)

HP-253 Critical Issues US History II
This is a survey course designed to give students an overall view of the United States from after the Civil War until recent history. This course is directed toward the emergence of American political, economic, and social traditions through critical analysis and student research. Prerequisite: ENI-101. (3-0-3)

HU-164 Science Fiction
This course will examine science fiction from the early 20th century to the present, with some attention to the cultural and historical issues that shaped its development. Special attention will be placed on the role of science in science fiction. The relationships between literature, film and television and expected decisions or science fiction will also be studied. Prerequisite/Corequisite: EN-101. (3-0-3)

HU-165 History Through Fiction
This course provides a broad survey of a selected historical period and compares/contrasts fictional historical accounts with what is generally regarded as historical fact. Both oral and written presentations are required of students. The selected time period and associated literature is chosen by the professor, and will vary over time. Students will learn to distinguish between historical fact and fiction, as well as apply critical thinking toward identifying the fine lines that often exist between disparate accounts of history. Prerequisite: EN-101. (3-0-3)

HU-175 Ancestral Research
This course offers students a survey of library research methods and tools to do research on their family through the use of electronic resources. Students will learn how to document their finds, conduct oral interviews and utilize governmental records and resources. Students will conduct genealogical research to find their “roots” both in the United States as well as overseas. Students will be required to do oral and written presentations discussing their family research. Assignments will direct students in documenting research, utilizing proper research methods and forms and developing their own “family tree.” Corequisites: EN 001 or ENI 101. (3-0-3)

HU-205 Twenty-First Century Mass Media
A broad survey of contemporary mass media such as film, radio and television with particular attention paid to emerging media such as the Internet, related technological and commercial infrastructures, as well as the globalization of the new media. Corequisite: EN-101. (3-0-3)

HU-210 Game Design and Theory
This course teaches how to design a standalone game that is balanced, playable and has that intangible “fun.” Topics include history of games, player psychology, mathematical game theory, topology, statistics, multiplayer interactions, and art and aesthetics. We also cover the milestone expected to produce a game. Each student will take their concept from idea to creating their choice of a tabletop game or a paper prototype for a future marketable game. (3-0-3)

HU-220 Critical Thinking
This course explores the process of thinking critically and guides students in thinking more clearly, insightfully and effectively. Concrete examples from personal experience and contemporary issues help students develop the abilities to solve problems, analyze arguments and issues, as well as make informed decisions in their academic career and personal lives. Readings, structured writing assignments and ongoing discussions help students develop sophisticated thinking abilities. Prerequisite: EN-102. (3-0-3)

HU-225 Writing for the Internet
This course introduces students to writing for the Internet allowing more effective online communication in such forums as blogs and Websites. Students will learn how to write in a more active voice, bringing more energy and vibrancy to their articles and commentaries. Course material examines the work flow and demands of Internet writing and publishing. Students will learn how to launch their own blog and develop an audience as well learn how to prepare articles for other blogs and web sites. This course is designed for all students, regardless of their communication, writing, or journalism experience. This is not a Web design course. Prerequisite: EN-101. (3-0-3)

HU-310 African American Literature
Introduction to African American Literature will trace the development of an African American literary tradition. Study includes major genres of black writers: plays, poetry and fiction. Prerequisite: EN-101. (3-0-3)

HU-331 Arts and Ideas
This course enables students to study and appreciate various forms of art, such as painting, sculpture, architecture, music, drama, film, and literature through in-class and on-site experiences. This course will examine the relationship between the arts, of philosophy, and of sociopolitical systems and to recognize various ways of viewing reality. Prerequisite: EN-102. (3-0-3)

HU-332 Arts and Ideas: Special Topics
This course has the same general requirements as HU-331, but the orientation of the course will be on alternate traditions to the Western canon. Students will study various forms of art, including painting, sculpture, architecture, music, drama, film, and literature through in-class and on-site experience. Students will gain an appreciation for the arts as they are represented by a particular culture or national identity. The course will concentrate on how the arts are shaped by cultural and social forces that result in distinct philosophies and ideologies. Prerequisite: EN-102. (3-0-3)

HU-364 Science Fiction Literature
This course will examine science fiction and social commentary. Special attention will be placed on critical analysis and discussion on the role of science fiction in determining cultural values and growth and events in modern society. Prerequisite: EN-102. (3-0-3)

HU-365 Mystery Literature
This course will examine the genre of mystery literature from the early 20th century to the present, with some attention to mystery writers prior to this time period who built the foundation of the genre. Special attention will be given to the elements of a mystery story, the characters and plot development of the “who done it” through reading of popular authors as well as classical authors. Also the class will look at the relationships between mystery literature, film and television as literary art forms. (3-0-3)

HU-400 Humanities: Special Topics
Research into humanities. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. Prerequisite: ENI-101. (3)

IAE-201 Introduction to Information Assurance Concepts
This course covers topics related to administration of network security. Topics include a survey of encryption and authentication algorithms; threats to security; operating system security; IP security; user authentication schemes; web security; email security protocols; intrusion detection; firewalls; Virtual Private Networks; network management and security policies and procedures. Laboratory projects are assigned as part of the homework requirements. Corequisites: MA-110 or MA-114 or MA-261 and EN-101. (3-0-3)

IAE-301 Comprehensive Computer and Network Security
Building on IAE-201, this course provides learners with detailed and hands-on knowledge of computer and network security. The course emphasizes current topics such as network security, compliance and operational security, threats and vulnerabilities, application security, access control, as well as cryptography. Additionally, underlying theory and concepts are presented in order to extend learners’ understanding of computer and network security. Weekly laboratory exercises are utilized to reinforce practical, real-world security techniques. Classes are a mixture of lecture, current event discussions, and laboratory exercise review and will prepare learners for the CompTIA
IAE-310 Strategies for Cyber Competition
This course prepares students to participate in national and international cyber competitions. Two competition archetypes, are explored in detail: Capture The Flag (CTF) and Jeopardy. Students will gain practical experience in these competition archetypes, as well as specific competition subtypes, through a rigorous schedule of hands-on challenges, laboratory exercises, and full scale competitions. This course will explore strategies of game play within the competition archetypes, review the skills necessary to compete in cyber competitions, as well as the cognitive science that empowers competitions as learning devices. Individual classes will be a mixture of lecture, laboratory exercises, as well as puzzle solving. The course will conclude with students participating in a real cyber competition. Prerequisites: IAE-201, IAE-301 or permission from Professor.

IAE-311 Mobile Computing Security
Emphasizing wireless computing security, this course addresses how to secure mobile wireless computing devices and applications and wireless network security as it impacts those portable computing devices. Wireless network security is discussed as it pertains to decisions on which network security works best with particular applications loaded into wireless computing devices. The course covers security of CMRS and PCS (Cellular Mobile Radio Service and Personal Communications Service) devices. CMRS and PCS second and fourth generations (2G, 3G and 4G), laptops equipped with Wireless Network Interface Cards (WNICs), Personal Digital Assistants (PDAs), Blue-tooth and Zigie devices and “Radio Frequency Identity (RFID)” devices. Retail store security and proximity payment application security are also discussed. Note: students are required to purchase a mobile device specifically to fulfill course lab requirements. Prerequisite: IAE-301 (2-3-3).

IAE-315 Secure System Administration and Operation
This course introduces students to security settings and requirements of Linux and Windows-based networks and web services. It also introduces students to Linux and Windows-based web services, including methods of configuring, testing the security and the implementing of countermeasures to discovered vulnerabilities. Topics include Linux security settings, IP tables, securing IIS web server, securing Apache web server, access control methods and host auditing and tools. Prerequisites: CT-152 and IAE-301 (3-0-3).

IAE-320 Mobile Device Forensics
Mobile device forensics is a branch of digital forensics relating to recovery of digital evidence or data from a mobile device under forensically sound conditions. The scope of devices can include mobile phones and any digital device that has both internal memory and communication ability, including PDA and GPS devices and tablet computers. This course focuses on the forensic study of mobile devices due to the rapid proliferation of smartphones and applications such as contacts, photos, calendars and notes, SMS and MMS messages, video, email, web browsing information, location information, and social networking. This increased usage has also seen a marked increase in cybercrime involving smart phones. Students will learn how to perform the forensic examination of mobile devices using the most advanced tools available. Note: Students are required to purchase a mobile device specifically to fulfill course lab requirements. Prerequisite: IAE-301, 311 (3).

IAE-321 Applied Wireless Network Security
This course will explore the unique challenges presented by wireless networking, including the management of dual network devices (Bluetooth, 3G, 4G, and WiFi). Students will evaluate emerging business and technical initiatives, such as your own device (BYOD) and securely implement mobile IP networks based on IPv4, IPv6 and the 3GPP. Students will learn penetration testing strategies to effectively execute currently implemented security controls, utilizing cutting edge tools such as BackTrack 5, Vistullmer, Wireshark, and iriSDoDor for network discovery and packet analysis. Additionally students will be exposed to the site survey, network management and analysis capabilities of industry leading software such as Air Magnet, Ekahau and OmniPeek. Students are required to purchase an Afa wireless adapter and acquire a wireless router for this class. Prerequisites: IAE-301, CT-152 (3-0-3).

IAE-325 Secure Data Communications and Cryptography
This course follows the protocol education provided in IAE-301 with a more detailed and practical look at secure transactions and corporations, as well as the protection of data in storage. Within the confines of the ISO OSI model, this course discusses data communication with emphasis on the security available at each layer, secure sockets layer, and both wired and wireless security topics. One-way message digests/hashes and encryption history and protocols are explored in-depth. Topics include virtual private networks, one-way hashes/message digests, digital signatures, secret-key and public-key cryptography protocols and algorithms. Prerequisites: IAE-301 and CT-152 (3-0-3).

IAE-326 Advanced Secure Data Communications
In today’s world it is nearly impossible to not be connected in one way or shape or form to the Internet. Students will be introduced to multiple methods of secure communication using the Internet and how to minimize the impact of being tracked. In addition, students will be introduced to methods, tools, techniques, and tricks on how to remain anonymous while using untrusted mediums such as the Internet. Students will learn through lecture, labs, and real-world exercises. Prerequisite: IAE-301 and IAE-325 (3-0-3).

IAE-351 Intro to Cyber Network Operations
Full spectrum information superiority and dominance is key to influencing operations archetypes, with war or Military Operations Other Than War (MOOTW). This survey of Computer Network Operations (CNO) introduces the concept of how Computer Network Attack (CNA), Computer Network Defense (CND) and Computer Network Exploitation (CNE) are leveraged to collect information, disrupt, deny, degrade or destroy the information within computers and computer networks and or the computers/networks to host them. Strategic and operational considerations will be considered to affect an adversary’s decision cycles with information superiority. Prerequisite: IAE-301 (3-0-3).

IAE-372 Cryptography
Cryptography is indispensable for providing confidentiality of information in computer systems. This course explains the inner workings of cryptographic primitives and how to correctly use them. Students will learn how to reason about the security of cryptographic constructions and how to apply this knowledge to real-world problems. Students will examine many deployed protocols and analyze mistakes in existing systems. The course discusses Public-key techniques, as well as one or more parties generate a shared secret key. Students will cover the relevant number theory and discuss public key encryption and basic key exchange. Prerequisite: IAE-301, MA-114 (3-0-3).

IAE-400 Special Topics in Information Assurance
Research into information assurance subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. Prerequisites: IAE-301, MA-114 (3-0-3).

IAE-421 File System Analysis
This course explores the rudimentary foundations of data structures, encoding, FAT16/12, exFAT, NTFS, EXT2/3/4, and UFS1/2 file systems as well as a look into volume analysis, including multiple disk volumes and volume spanning. This course also discusses the basic fundamentals of hard disk drives and solid state drives, their components and their role in information systems. Prerequisites: MA-111 or MA-114 and IAE-315. (3-0-3).

IAE-440 Secure Access and Identity Management
Students will learn fundamental and advanced IAM (Identity Management) topics, concepts, practices, and best practices. Prerequisites: IAE-315 and IAE-325 (3-0-3).

IAE-450 Malware Analysis/Reverse Engineering
This course introduces students to malware research and analysis. The course will provide students an overview of malware research, intelligence gathering related to malware, and provide students basic skills required when reviewing malware. This course will disassemble malicious programs. Students will explore the tools required for analysis and reverse engineering of malicious code, learn malware defense techniques, how malware functions, and will perform live analysis and reverse engineering exercises. Prerequisite: IAE-402 (3-0-3).

IAE-460 Digital Forensics and the Investigative Process
Students explore forensics and the investigation processes. Students explore current computer forensics tools, conduct live computer forensic analysis, conduct e-mail investigations, recovery of graphics files and data carving, and engage in report writing for high-tech investigations. Prerequisites: IAE-315 and IAE-325 (3-0-3).

IAE-410 Penetration Testing
This course explores the foundational concepts, methods and techniques in preparing and conducting penetration testing. The course introduces students are introduced to various tools as well as unravel complex methods for exploiting client-side, service side and privilege escalation attacks. Most importantly students learn how to construct a final report outlining discovered vulnerabilities, make suggested recommendations to remediate and/ or mitigate those vulnerabilities. Students also learn how to describe the findings wherein non-technical personnel understand the implications of these vulnerabilities in a business sense. Prerequisites: CT-240 and IAE-315. Recommended corequisite: IAE-402. (3-0-3).

IAE-412 File System Analysis
This course explores the rudimentary foundations of data structures, encoding, FAT16/12, exFAT, NTFS, EXT2/3/4, and UFS1/2 file systems as well as a look into volume analysis, including multiple disk volumes and volume spanning. This course also discusses the basic fundamentals of hard disk drives and solid state drives, their components and their role in information systems. Prerequisites: MA-111 or MA-114 and IAE-315. (3-0-3).
and current issues. The course will prepare the students for real-world ISM challenges faced by professionals in industry and government today. Students will take the course with an awareness and understanding of a variety of topics pertaining to ISM, including broad technical aspects, legal and policy issues, implementation scenarios, case studies and industry and government applications of ISM components. Students will be provided hands-on design, implementation and operations of ICM systems in a lab environment. Prerequisite: IAE-301 (3-0-3)  

IAE-458 Senior Design Project  
Student proposes, designs, builds and tests a working software project. Students write a report according to specifications and deliver an oral presentation for review. For this is CIS and MCIT seniors or must have dean approval. Prerequisite: EN-408 and senior standing. (3-0-3)  

IAE-480 Perimeter Protection  
In this Defense-in-Depth course, firewalls and network IDS issues will be discussed. A detailed understanding of firewall configuration and rule sets, load balancing, web farms, wireless access, web security issues and network intrusion detection will be acquired to prepare the student with the basic tools to coordinate the design and implementation of perimeter network defenses for a high-volume, high-access site. Prerequisite: IAE-402 and IAE-406 (3-0-3)  

IAE-500 Intro to Information Assurance  
This course will provide the requisite computer, data confidentiality, Internet and database skills to students embarking on careers in information assurance (IA), at the senior levels. It is designed primarily for professionals who seek concentrated professional education in one or more of the many fields associated with IA. Students who complete this course successfully will be able to master the more technical application and analysis skills demanded by the Master of Science in Information Assurance (MSIA) degree program and the several certificate programs offered in various IA concentrations. Labs, simulations and special problems will be used throughout the course.  

IAE-571 Software Assurance Assessment  
This course covers the fundamentals of establishing a required level of software and system assurance, applying methods and determining measures to assess whether the required level of assurance has been achieved. Topics include assessment methods; defining product measures, process measures and other performance measures; measurement processes and frameworks; performance indicators for business survivability and continuity; and comparing selected measures to determine whether the software/system meets its required level of assurance. These fundamentals are applied to newly developed software and systems as well as during the acquisition of software and services. (3)  

IAE-572 Software Assurance Development  
This course covers the fundamentals of incorporating assurance practices, methods, and technologies into software development and acquisition life-cycle processes and models. With this foundation, the course provides students with rigorous methods for eliciting software and system assurance requirements, using threat identification, characterization, and modeling; assurance risk assessment, and misuse/abuse cases. Students will also learn how to evaluate methods and environments for creating software and systems that meet their functionality and security requirements. (3)  

IAE-573 Software Assurance Management  
This course covers the fundamentals of software and system assurance management, including making the business case for assurance; planning and managing development projects that include assurance practices; compliance with laws, regulations, standards and policies related to assurance; and risk assessment, identification, analysis, mitigation and monitoring for assurance. The focus is on how to manage business and technical requirements. (3)  

IAE-574 Assured Software Analytics  
This course covers methods for assuring the security and functionality of existing software and services, whether legacy, internally developed, or externally acquired, with emphasis on detection of vulnerabilities and malicious content. It also discusses assurance considerations for system architectures, networks and databases in their role as underlying enablers of software operations. Methods for structuring and reverse engineering of existing software are covered, as are techniques for acquiring and assuring software and services through suppliers, service-oriented architectures and cloud computing environments. (3)  

IAE-600 Special Topics in Information Assurance  
Research into information assurance subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academicians. This course may be repeated with different projects. (1-4)  

IAE-605 Master’s Research  
This is part one of a two course sequence in research and writing. In part one, students work to identify a research topic and, as initial research begins, they investigate the requirements for maintaining a research journal, writing a research paper, and presenting a research paper. Students may petition for job-related substitute course. (3)  

IAE-610 Advanced Penetration Testing  
This course explores the foundational concepts, methods and techniques in preparing and conducting penetration tests. Throughout the course you will be introduced to various tools as well as unravel complex methods for exploiting client-side, service and privilege escalation attacks. Most importantly you will learn how to construct a final report outlining discovered vulnerabilities, make suggested recommendations to remediate and/or mitigate those vulnerabilities. You will also learn how to describe the findings in a way that non-technical personnel understand the ramifications of these vulnerabilities in a business sense. Prerequisite: IAE 685 (3)  

IAE-611 Mobile Computing Security  
Emphasizing wireless computing security, this course addresses how to secure mobile wireless computing devices and applications, and wireless network security as it impacts those portable computing devices. Wireless network security is discussed as it pertains to decisions on which network security works best with particular applications loaded into wireless computing devices. The course covers security of CMRS and PCS (Cellular Mobile Radio Service and Personal Communic-  

IAE-620 Mobile Device Forensics  
Mobile device forensics is a branch of digital forensics relating to recovery of digital evidence on smartphones. The course covers the technology and methodologies used. Mobile devices have become powerful computing devices and vehicles for communication and data acquisition. With the rise of mobile computing, the need for mobile computing security devices is increasing. This course will provide students with the skills necessary to conduct wireless network security assessments and implement security measures to protect wireless networks. Students will learn how to construct a mobile device forensics research project and conduct research on current topics in mobile device forensics. Prerequisite: IAE 685 (3)  

IAE-621 Applied Wireless Network Security  
This course provides students with practical, real-world experience with an understanding of wireless fundamentals, wireless network threats, tools to test wireless security and security testing. Specifically, this course addresses the most popular hacking, cracking and wireless security attacks. Network analysis tools and training students to use them to test and secure wireless networks. Current industry best practices for managing wireless networks in a secure environment are addressed. Students need access to a second computer (for hacking) and will be required to purchase and install wireless network equipment to create a home wireless network for the purpose of conducting experiments on various wireless security vulnerabilities and countermeasures. NOTE - students must have access to a computer network they personally own and can modify. Case studies will be used throughout the course. Students are required to purchase an Alfa wireless adapter and acquire a wireless router. Prerequisite: IAE-685 (3)  

IAE-630 SCADA Networks and ICS Security  
Industrial Control Systems (ICS) have been in existence for decades in the United States. Since the mid 1980s, though, these systems have been relatively unknown to the general public and were designed to control our critical infrastructure such as utilities (electricity, nuclear power, and water treatment plants). Until recently, these systems were connected to company networks by privately owned IT networks based on private line technology. Public utility companies have begun to connect ICS networks to public networks such as the Internet as they transition to TCP/IP based networks. This trend is accelerating as the much needed modernization of the nation’s IT networks supporting the critical infrastructure and setting the groundwork for developing the federally mandated Smart Grid. The ICS network transition to public networks has many benefits and risks. The increased risk to the smart grid must be addressed by the USG partnering with private industry. Prerequisite: IAE 685 (3)  

IAE-640 Secure Access and Identity Management  
Students will learn fundamental and advanced ISM (Identity Management) topics, concepts, and current issues. The course will prepare the students for real-world ISM challenges faced by professionals in industry and government today. Students will leave the course with an awareness and understanding of a variety of topics pertaining to ISM, including broad technical aspects, legal and policy issues, implementation scenarios, case studies, and industry and government applica-
tions of IDM components. Prerequisite: IAE 685 (3)

IAE-651 Intro to Cyber Network Operations
Full spectrum information superiority and domi-
nance is key to influencing operations associated
with use in Military Operations Other Than War
(MOOTW). This survey of Computer Network Opera-
tions (CNO) introduces the concept of how Com-
puter Network Attack (CNA), Computer Network
Defense (CND), and Computer Network Exploita-
tion (CNE) are leveraged to collect information,
destroy, deny, disrupt or defend/protect the infra-
structure within computers and computer networks and/or
the computers/networks that host them. Strategic
and operational considerations will be considered
to affect an adversary’s decision cycles with infor-
mation superiority. Prerequisites: IAE-685, (3)

IAE-670 Network Systems Security Concepts
This course explores security terms, definitions,
concepts, and issues that face industries today.
This course also will examine how the concept
of security, and being secure, integrates into the
overall enterprise mission. The importance of
user involvement, security training, ethics, trust,
and informed management will be explored. (3)

IAE-671 Legal Aspects Computer Security
and Information Privacy
This course provides an overview of the legal
rights and liabilities associated with operation
and use of computers and information, includ-
ing the legal and regulatory compliance issues
for computer information security officers. It
discusses the legal statutes, regulations, treaties,
and court cases (in the United States and abroad)
that establish legal rights and responsibilities as
to computer security and information privacy. The
course also helps students to learn how to reduce
their risk of potential legal liability for computer
security or information privacy failures, and how
to enforce their security and privacy rights against
other parties. Case studies and lessons learned
from information security failures are used through-out the course. Prerequisite: IAE-670 or IAE-685 (3)

IAE-672 Cryptography
Cryptography is indispensable for providing con-
fidentiality of information in computer systems.
This course explains the inner workings of cryp-
tographic primitives and how to correctly use
them. Students will learn how to reason about
the security of cryptographic constructions and how
to apply this knowledge to real-world applications.
Students will examine many deployed protocols
and analyze mistakes in existing systems. The
course discusses public-key techniques that let
two or more parties generate a shared secret key.
Students will cover the relevant number theory
and discuss public-key encryption and basic
key-exchange. Prerequisite: IAE 685, CS-620 or
permission (3)

IAE-673 Secure Information Transfer and Storage
This course provides the student a history of
cryptography from Caesar’s cipher to elliptic-curve
cryptography of today. Students study public
and private key algorithms and understand their
functionality, and how they work with network
protocols. One-way hashes and digital signatures
are discussed, and used by the students in sub-
missions to the instructor. Public-key infrastruc-
ture with certificate authorities and web-of-trust
infrastructure methods is addressed. It is recom-
mended that students complete IAE-685 before
taking this course, but this is not a requirement.
Prerequisite: IAE-685, (3)

IAE-674 Security Risk Management
This course begins with an understanding of why
risk management evaluations are useful. The
general methodologies for security risk assess-
ment and security test and evaluation, including
the interviews are discussed and documentation
research necessary, the student is provided practi-
cal lab exercises to provide a hands-on analysis of
a fictitious site. Detection, recovery, and damage
control methods in contingency/disaster recovery
planning research, documentation and training:
methods of and procedures for contingency plan-
ing and security policy formulation and enforce-
ment. Prerequisites: Completion of at least 24
credit hours of IAE coursework. This class is best
completed in the last term. (3)

IAE-675 Computer Forensics and Incident Handling
This course begins with lectures discussing the
laws and rights to privacy by individuals and what
organizations may or may not do. Online ethics
are considered. It then goes on to understand-
ing incident handling and how incident response
teams work, managing trouble tickets, and basic
analysis of events to determine if an incident has
occurred. It concludes with computer forensics
issues and practices, and rules of evidence. Pre-
requisite: IAE-685, (3)

IAE-677 Malicious Software
This course examines malicious software detec-
tion and malicious software defenses including
trapsware and signature based software techniques.
Viruses, worms and Trojan horses, logic bombs,
malicious CGI scripts will be discussed. Students
will review the anatomy of well-known viruses
and worms to understand how they work. Mobile
code issues as they apply to web and applica-
tions technologies and resulting insecurities will
be discussed in detail. Students will then review
the underlying methodologies used by the anti-
malware, detection and and protection software
vendors and freeware offerings to protect
electronic assets from harm or other compromise.
Co-requisite: IAE-685 (3)

IAE-678 Cybersecurity Mitigation
This “Defense-in-Depth” course provides the student
detailed understanding of the need for internal
and external vulnerability assessment. An integral
technical part of any risk management program,
this course goes hand-in-hand with the
more analytical practices in IAE-674. Co-requi-
sites: IAE-685, (3)

IAE-680 Perimeter Protection
In this “Defense-in-Depth” course, firewalls and
network IDS issues are discussed. A detailed
understanding of firewall configuration and
rule sets, load balancing, web farms, wireless
access, web security issues and network intru-
sion detection is explored to prepare the student
with the basic tools to coordinate the design and
implementation of perimeter network defenses
for a high volume, high access site. Prerequisite:
Completion of at least 24 credits hours in IAE
courses. This class is best completed in the
last term. (3)

IAE-682 Internal Protection
This course explores the protections available to
the practitioner through host operating systems
and third party equipment and software, to pro-
tect the inner network from the attacker who has
successfully crossed the perimeter or from the
disgruntled insider. Use of methodologies
including host-based intrusion detection methods,
auditing, and System Security Audits, PC Firewalls, host oper-
ating harder for Linux and Windows 2000, and
Virtual LANS will be reviewed. It is recommended
that students complete IAE-685 before taking this
course, but this is not a requirement. (3)

IAE-684 Complementary Security
This class explores the overarching security archi-
tectures and vectors of information assurance
from a management perspective to allow the
learner to formulate the basis for sound business
decisions. Some topics covered in this course
include: Systems, Networks, Witness systems,
processes, methodologies, documenta-
tion requirements, recovery processes, cer-
tification and accreditation processes as well as
“best practice” implementation, training and con-
tinuous improvement. Discussions in this course
give the student an appreciation for systems, networks, pro-
cesses, methodologies, documentation require-
ments, recovery processes, certification and
accreditation processes and “best practice”
implementation, training and continuous improve-
ment. Discussions in this course will give the cor-
rect acumen of personnel security, physical secu-
rity, and technical operational security as these
principles relate and interface with information
security principles. Defense-in-depth principles
will also be covered for designing proper physical
security programs. (3)

IAE-685 Managing Information Security
This class explores the overarching security archi-
tectures and vectors of information assurance
from a management perspective. The course
will provide a basic understanding of all aspects
including IA management, needs analysis, risk
assessments, policy formulation, security plan-
ing, and integrating technologies. Students will
also gain an appreciation for systems, networks, pro-
cesses, methodologies, documentation require-
ments, recovery processes, certification and
accreditation processes and “best practice”
implementation, training and continuous improve-
ment. Discussions in this course will give the cor-
rect acumen of personnel security, physical secu-
rity, and technical operational security as these
principles relate and interface with information
security principles. Defense-in-depth principles
will also be covered for designing proper physical
security programs. (3)

IAE-686 Healthcare Information Systems Security
This course addresses the healthcare informa-
tion systems security and privacy controls covering healthcare information systems, preventing loss and unauthorized access
to healthcare information within information sys-
tems, and protecting the integrity of healthcare data (data-at-rest, and data-in-transit) within
information systems. The student will gain and
understanding of the mandated regulatory, legal,
and governance requirements covering privacy
and confidentiality of healthcare information. The student will also be able to identify and manage risks and conduct information Risk Assessments pertaining to healthcare information. Prerequisite: IAE 685 by permission. (3)

IAE-692 Mobile Medical Device/Application Security
This course goes into the details of the information security risks accompanying the widespread use of mobile devices and mobile apps in the healthcare community. The student will gain an overall understanding of the inherent security risks associated with patient information medical apps and devices, how to protect healthcare information on mobile devices, including identifying vulnerabilities, associated threats, risks, how to mitigate against those risks, and the regulatory guidelines governing and health and safety risks associated with mobile medical apps and devices, along with the privacy impacts. Prerequisite: IAE 685 (3)

IAE-705 Master’s Thesis
This is part two of a two course sequence in research and writing. The course is in graduate seminar format. Students integrate prior course work and personal experiences into researching an approved topic to produce a project based paper. (Offered as a full semester course.) Students may petition for job-related substitute course. Prerequisite: IAE 605. (3)

IAE-820 Situational Awareness Analysis
This is a course in operational leadership from the long-term perspective to crisis intervention. Class activities will be designed to enhance student awareness of action plan processes leading to effective strategy execution. (3)

IAE-825 Applied Research in Information Assurance
This course prepares students to select topics and conduct successful research in information assurance’s many fields. Topics include research such as the Computer Fraud and Abuse Act, the Electronic Communication Privacy Act and the National Research Act. Special considerations governing research using human subjects will be given in-depth treatment. The productive and legally sufficient use of the Department of Homeland Security’s new Protected Repository for the Defense of Infrastructure against Cyber Threats (PREDICT1) program will be discussed. (3)

IAE-830 IA Research Literature
Learners examine literature and research in the information assurance field. Literature will be examined in the context of both the historical and current environment. Prerequisite: IAE 801. (3)

IAE-835 Information Assurance Strategic Management
Learners examine the objectives, elements and framework of analysis for strategic management of information assurance management. Learners focus on synthesizing information and applying sound judgment. (3)

IAE-837 Contemporary Issues in IA
This course focuses on contemporary issues in the field of information assurance to examine the ways in which science contributes to the study of significant problems in the contemporary world to help individuals and society make informed decisions about these issues. Students will engage in classroom discussion as well as generate scholarly writing suitable for publication. (3)

IAE-845 Pedagogy and Information Assurance
Learners are introduced to the fundamentals of teaching information assurance. Learners gain experience in course and syllabus development. The development and integration of online labs as an academic component is explored. Learners examine the professional development and training that supports IA. (3)

IAE-860 Advanced Mixed Methods Research
This course builds on the knowledge acquired in IAE-810 and IAE-825. Students will examine research designs in detail, devise methods to conceptualize data collection and measurement instrumentation, as well as examine how to analyze collected data both qualitatively as well as quantitatively. Prerequisite: IAE-825. (3)

IAE-865 Special Topics in Human Resource Management
Learners examine human resource theories and practices in the context of the complex environment of information assurance. (3)

IAE-871 Software Assurance Assessment
This course covers the fundamentals of establishing a required level of assurance and system assurance, applying methods and determining measures to assess whether the required level of assurance has been achieved. Topics include assessment methods; defining product measures, process measures and other performance indicators; measurement processes and frameworks; performance indicators for business survivability and continuity; and comparing selected measures to determine whether the software/system meets its required level of assurance. (3)

IAE-873 Software Assurance Management
This course covers the fundamentals of software and system assurance management, including making the business case for assurance; planning and managing development projects that include assurance practices; compliance with laws, regulations, standards and policies related to assurance; and risk assessment, identification, analysis, mitigation and monitoring for assurance. The focus is on how to manage business and technical requirements. (3)

IAE-874 Assured Software Analytics
This course covers methods for assuring the security and functionality of existing software and services, whether legacy, internally developed, or externally acquired, with emphasis on detection of vulnerabilities and malicious content. It also discusses assurance considerations for system architectures, networks and databases in their role as underlying enablers of software operations. Methods for strengthening and reverse engineering of existing software are covered, as are techniques for acquiring and assuring software and services through suppliers, service-oriented architectures and cloud computing environments. (3)

IAE-875 IA Implementation
Learner focus is on deployment of information assurance technologies in the organization. Relevant literature and real world deployment is examined. (3)

IAE-880 Special Topics in Information Assurance
This course provides students the opportunity to examine in-depth issues relevant to information assurance. This course may result in a publishable paper in the IA field. (3)

IAE-881 Special Topics II in Information Assurance
This course provides students the opportunity to examine in-depth issues relevant to information assurance. This course may result in a publishable paper in the IA field. (3)

IAE-882 Special Topics III in Information Assurance
This course provides students the opportunity to examine in-depth issues relevant to information assurance. This course may result in a publishable paper in the IA field. (3)

IAE-883 Special Topics IV in Information Assurance
This course provides students the opportunity to examine in-depth issues relevant to information assurance. This course may result in a publishable paper in the IA field. (3)

IAE-884 Special Topics V in Information Assurance
This course provides students the opportunity to examine in-depth issues relevant to information assurance. Students must request a faculty member who is a topic specific expert to facilitate the course. This course may result in a publishable paper in the IA field. (3)

IAE-885 Software Assurance Assessment
This course covers methods for assuring the security and functionality of existing software and services, whether legacy, internally developed, or externally acquired, with emphasis on detection of vulnerabilities and malicious content. It also discusses assurance considerations for system architectures, networks and databases in their role as underlying enablers of software operations. Methods for strengthening and reverse engineering of existing software are covered, as are techniques for acquiring and assuring software and services through suppliers, service-oriented architectures and cloud computing environments. (3)

IAE-705 Master’s Thesis
This is part two of a two course sequence in research and writing. The course is in graduate seminar format. Students integrate prior course work and personal experiences into researching an approved topic to produce a project based paper. (Offered as a full semester course.) Students may petition for job-related substitute course. Prerequisite: IAE 605. (3)

IE-701 Principles of Design Engineering Computer Networks
Networking and the Internet have introduced us to a new set of devices and protocols that link personal computers to servers, and servers to servers. This course explores all the hardware and software that drives local and Internet computing. Special emphasis on connectivity and throughput is explored. (3)
IE-703 Thin and Fat Client Deployment with SOA
Client/Server has been extended to multi-tiered environments, distributed communications via CORBA/COM/DDOM, service-oriented architecture (SOA) and Cloud computing models. To examine this shift and to understand the technologies involved, this course focuses on how these models are used to enable thin-and-fat clients as well as Web-based clients on desktops, servers and PDAs. This class will examine the mechanisms employed to bring legacy as well as modern computing to the information economy. (3)

IE-705 Comparison of Operating Systems and Web Servers
This course explores the operating software underlying Internet and intranet computing. The similarities and differences between operating systems and web servers are investigated with a view to choosing the best technology and optimization practices. Topics include NT, 2000 Server, Advanced Server, Windows CE, Unix and versions, Linux, IIS, Apache, third party, and public domain. (3)

IE-707 Network Architecture Convergence Using Wireless
This course investigates the techniques used by successful network engineers to create converged network architectures and provide optimum information access to their users. The course will provide an in-depth study of the current and contemplated mobile technologies that can facilitate network convergence. Students will test these mobile technologies and their applications via the virtual laboratory concept using GpWnet, the most advanced network modeling software currently available. Technical information on specific equipment and software will be provided as instruction-supplemental to the textbook, and case studies will be used throughout the course. (3)

IE-709 Comparison of Object-Oriented and Scripting Languages
For the first time in two decades, software developers now have to be proficient in multiple programming languages to deploy thin client or fat client applications and Internet based applications. Choosing the right set of languages has a dramatic impact on application performance and e-commerce. This course is designed to compare and contrast the various language tools for crafting Internet-based and Web-based applications. (3)

IE-712 Design of Cloud Networks and Services
This course examines Internet security concerning two key network design issues: information security and information privacy. Students learn and understand the technical tools to protect information from external compromise, internal and external threats, various network security technologies and protection systems, apply network design techniques capable of providing information security to local and wide-area networks, general information encryption techniques and protocols including symmetric and asymmetric cryptographic methodologies, one-way hashes and digital signatures, secure sockets layer and Internet Protocol Security (IPSEC), learn to evaluate and create corporate policies regarding privacy, the adoption of cloud computing and information network security. Prerequisite: IE-701 or department permission (3).

IE-713 Multimedia and Web Casting
The Internet and increased bandwidth management technologies has brought us a new way to communicate with each other in either full duplex, half-duplex, or simplex modalities. Dot Com companies present us with radio stations, on demand streaming audio and video, and live casting of audio and video. To understand the integration, deployment, and optimization of these technologies, this course compares technical aspects, market positioning, and strengths, and weaknesses of various media products in the market. (3)

IE-715 Identifying and Integrating Component Collaboration Technologies
Software and hardware companies have utilized a component approach to product development in order to address the requirement that Internet and Intranet communications applications operate in an on-demand and mode. This is the technical underpinning of the “any where, any time” mantra of the Internet. However, these components do not integrate easily. This course identifies the various component technologies, standards, and issues with integration to provide on-demand communication capabilities. (3)

IE-717 Invention and the Use Intellectual Property
The Internet’s ability to share ideas between millions of people instantaneously, and the ability of Internet users to improve upon those ideas and share them with everyone on the Internet instantaneously, has challenged intellectual property’s status quo. This course examines the legal and regulatory limits of an business’s ability to exploit intellectual value in the new paradigm. In addition, the latest changes to intellectual property law and regulation as a result of Internet commerce will be examined. (3)

IE-719 Capstone Course
The capstone course is in graduate seminar format. Students will integrate the prior course work and personal experiences into a major paper on a project. (3)

IE-720 SCADA Networks and Industrial Control Systems
Industrial Control Systems (ICS) have been in existence for decades in the United States. These systems are relatively unknown to the general public and were designed to control our critical infrastructure such as utilities (electricity, nuclear power, and water treatment plants). Until recently, these systems were connected to company networks by privately owned IT networks based on proprietary line technology. Public utility companies have begun to connect ICS networks to public networks such as the Internet as they transition to TCP/IP based networks. This trend is accomplishing the much needed modernization of the nation’s IT networks supporting the critical infrastructure and setting the groundwork for developing the federally mandated Smart Grid. The ICS network transition to public networks has many benefits and risks. SCADA software runs chemical plants and factories, transmission systems and electric power plants. Prerequisite: IE 701 (3)

MA-005 Basic Mathematics
Designed for students needing math skills for MA-110, MA-112 and MA-114. This course include operations on signed numbers and fractions, products and factoring, exponents and roots, graphs, and solutions of first degree and quadratic equations. Credits from this course are not applicable toward a degree. (3-0-3)

MA-006 Basic Business Math
This course is designed for students needing math skills for MA-110. Topics include operations on signed numbers and fractions, percentages, products, compounding and quadratic equations. (3-0-3)

MA-110 Business Mathematics I
A general introduction to the mathematics used in the U.S. business. Focus is on developing the mathematical and critical thinking skills needed to solve math problems encountered in typical business situations. This course will help prepare the student for courses in Statistics and Accounting. Topics include 1) the essentials of business mathematics; and 2) accounting mathematics. Prerequisite: score on placement test. (3-0-3)

MA-111 Business Mathematics II
A continued introduction to the mathematics used in U.S. business. Builds on the mathematical and critical thinking skills developed in MA 110 to address the topics of 1) retail mathematics and 2) introductory financial mathematics. This course will help prepare the student for courses in Marketing and Finance. (3-0-3)

MA-112 Intermediate Algebra
Designed for students needing mathematical skills and concepts for MA-114 and MA-216. In this course students are introduced to equations and inequalities and learn the language of algebra and related functions, including polynomial, rational, exponential and logarithmic functions. Other topics include solving equations, inequalities and systems of linear equations; performing operations with real numbers, complex numbers and functions; constructing and analyzing graphs of functions; and using mathematical modeling to solve application problems. Prerequisite: MA-005 or acceptance based on placement test scores. (3-0-3)

MA-114 Algebra and Trigonometry
Designed for students needing mathematical skills and concepts for MA-216; topics in this course are as follows. Algebra: basic operations on real and complex numbers, exponents and radicals. Determinates. Solution of linear, fractional, quadratic and system equations. Trigonometry: definition and identities, angular measurements, solving triangles, vectors, graphs and logarithms. Prerequisite: MA-112 or acceptance based on placement test score. (4-0-4)

MA-124 Discrete Mathematics
Logic sets and sequences; algorithms, divisibility and matrices; proof, induction and recursion; counting methods and probability; relations, closure and equivalence relations, graphs and trees; Boolean algebra. Prerequisite: MA-112, MA-114 or acceptance based on placement test score. Fall evening only, Spring-daytime only. (3-0-3)

MA-128 Introduction to Statistics
Probability: definitions, theorems, permutations and combinations; Binomial, hypergeometric, Poisson and normal distributions. Sampling distribution and central limit theorem, estimation and hypothesis testing. Prerequisite:MA-110 or MA-111. Fall-daytime only, Spring evening only. (3-0-3)

MA-230 Introduction to MATLAB
Intended for students with little or no experience with the Software. Introduction to MATLAB is a short course covering its basic operations and features. In addition, we will work through applications in engineering, physics and mathematics, provide a grounding for developing tools for your own projects. Topics include Import/export data, Create and manipulate variables, Program and run scripts (M-files) Use graphics tools to
**MA-262 Calculus II**

Methods of integration: completing the square, substitution, partial fractions, integration by parts, trigonometric integrals, power series, parametric equations. Partial derivatives, directional derivatives. Introduction to multiple integrals. Prerequisite: MA-261. Fall—daytime only; Spring—daytime only. (4-0-4)

**MA-263 Calculus III**


**MA-300 Mathematical Methods for Engineering**

This course provides a basic understanding of MATLAB software for engineering, such as the basic matrix, matrix manipulation, college algebra and trigonometric concepts. In addition MATLAB techniques for solving problems by means of calculus and differential equations are introduced. Successful completion of this course will enable students to begin the study of more advanced topics such as the statics and dynamics classes taken by most engineering majors. Prerequisites: MA-261 and MA-262. (3)

**MA-325 Mathematics of Cryptography**

This course gives an introduction to the mathematics of cryptography. A survey of cryptography from Roman times up to today's current techniques. Cryptographic content for the course includes classical ciphers and their decryption shift, affine and Vigenere ciphers; key exchange protocols (main example: Diffie-Hellman); public key ciphers (main example: RSA); block ciphers, modes of operation, hash functions and digital signatures. Mathematical formulations of security goals will be discussed as a method for determining weaknesses in designs. Prerequisites: MA-124 and CS-130 or CS-150. (3-0-3)

**MA-340 Ordinary Differential Equations**

Methods of solving first order equations with applications to mechanics and rate problems. Solutions of second order equations by underdetermined coefficients and variations of parameters. Applications to circuits. Introduction to systems of equations and operational and numerical methods. Prerequisite: MA-262. (3-0-3)

**MA-345 Probability and Statistics Engineers**


**MA-355 Numerical Analysis**

Number systems, floating-point arithmetic and error analysis. Taylor, interpolating and mini-max polynomials. Integration and differentiation. Methods of solving equations, systems of linear equations. Prerequisite: MA-262, and CT-115 or CS-130. (2-2-3)

**MA-360 Laplace and Fourier Analysis**

Definition of transform: Laplace transform of algebraic, exponential, trigonometric and hyperbolic functions; basic theorems including shifting, initial and final-value theorems; unit step, periodic and delta functions; methods of finding transforms of differential equations by transform methods. Fourier series and coefficients; expansion of functions in Fourier series; complex Fourier coefficients; Parseval's Theorem; Fourier transform and its properties. Prerequisite: MA-340. (3-0-3)

**MBA-501 Professional Writing Practicum**

This course is designed to provide masters level students with the necessary writing skills to be successful writers in a professional environment. (3)

**MBA-600 Fundamentals of Professional Management**

A bridge course designed for students without a degree in business, this course addresses foundations of accounting, finance, statistics, and economics. Students are provided a broad overview of each of these topics for later application in the MBA program. This course is waived for students with an undergraduate degree in business management or business administration. (3)

**MBA-601 Special Topics in Business Administration**

Research into business administration subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor. Applied to the business decision-making process in the presence of risk and uncertainty. (1-4)

**MBA-615 Financial Management**

Provides an understanding of the business decision framework in the context of the economic environment in which decisions are made. Covers topics in capital investment policy, financing and capital structures, dividend policy, financial statement analysis, forecasting, and working capital management. It is preferable to complete MBA 620 before MBA 615. Prerequisite: MBA 600 or undergraduate degree in business. (3)

**MBA-620 Managerial Accounting**

The course examines the use of accounting data in corporate planning and control. The aim is student proficiency in the analysis and design of control systems in order to make decisions that allow management attention. It be focused on long term strategic issues. Covers internal and external auditing systems, financial reporting, and tax planning. Prerequisite: MBA-600 or undergraduate degree in business. (3)

**MBA-625 Organizational Behavior**

Analyzes the elements of organizational behavior. Theory and research in behavior science are explored. Topics include motivation, group dynamics, power, communication, ethics, conflict resolution, stress management, workforce diversity, and leadership. Students are encouraged to develop skills in applying theories to common managerial problems. Students will apply ethical decision-making processes to learn in class to business matters involving conflicts of interest, work requirements, work conditions, and dealing with work environments. Prerequisite: MBA-646 or equivalent. (3)

**MBA-630 Marketing Process and Strategy**

Explains key marketing concepts and their significance in domestic and international activities. Analyzes marketing problems and efforts regarding the organization’s product and services, pricing activities, channel selection, and promotion strategies. Emphasis is on development and implementation of marketing plans and programs. (3)

**MBA-635 Operations Management**

This course provides an analysis of the role of operations management in a global environment. Focus is on the interaction of production and operations management with other functional systems in the organization. Incorporates quantitative and qualitative tools to support the decision-making process. (3)

**MBA-640 Managerial Economics**

Application of relevant economic theory to business problems. Examines general principles that can be applied to the business decision-making process in the presence of risk and uncertainty. Analysis of demand, costs, productivity, pricing policies, market structure, and government policies toward business within various marketing structures. Prerequisite: undergraduate degree in business. (3)

**MBA-646 Project Management**

This course provides an overview of the theory and practice of managing a project in an organizational setting. Fundamentals concepts are covered to provide a solid understanding and foundation of managing each phase of the project life cycle, adhering to organizational and cost constraints, setting goals for stakeholders, and utilizing best practices to complete the project on time and within budget. (3)

**MBA-647 Methods of IT Project Management**

Methods of IT Project Management focuses on IT project management and is built around the Project Management Body of Knowledge (PMBOK). You will learn how IT projects differ from other kinds of projects and how the methods and techniques of project management must be modified/adapted for IT projects. In addition, you will gain an increased understanding of what managers do (or should be doing) and why managers ask you to do the things that they do. The course presents methods, tools, and techniques that can be used to effectively manage IT projects, both large and small. Prerequisite MBA 646 or equivalent. (3)

**MBA-648 Project Management/Competitive Advantage**

Project Management takes decision-making and a business-oriented approach to the management of projects which is reinforced throughout the course with current examples of project management in action. Project management is central to operations within the context of a variety of successful organizations, whether publicly held, private or not-for-profit. Prerequisite: MBA-646 or equivalent. (3)

**MBA-650 Strategic Management**

Examines the objectives, elements and framework of analysis for strategic management. Case studies will be used as the primary tool of learning and analysis. Working well with others, synthesizing information, applying sound business judgment, and communicating crisply are key skills for this class. This class should be taken as the last core class prior to the capstone project. (3)

**MBA-657 Transformational Leadership and Innovation**

Leadership is the process of influencing others to achieve results and this course examines leadership concepts applied to managing people, organizations and strategic processes. Leadership perspectives and philosophies of organizations and their development, functions and systems are examined. Finally, students will examine how they
can provide innovative leadership based on both leadership theory and practice. Students will be expected to apply the various leadership skills and techniques to address challenges and opportunities that face them through their term project. (3)

MBA-658 Legal, Political and Ethical
As the comprehensive business law course, areas of law critical to the success of managers and entrepreneurs are examined. Topics include contract issues, torts and product liability, business crimes, intellectual property, the law and structure of business organizations, employment, and bankruptcy. These issues are also explored in the context of rapidly changing technology and business practices. (3)

MBA-659 Leadership and Managing Human Capital
This course examines the concept of leading an increasingly diverse and global workforce. Emphasis is placed on creating a work environment adaptable to the new challenges of the 21st century. This course is based on the understanding that human capital is critical to creating competitive advantage. Course material is examined from a system's perspective. Theory and practice will be explored by comparing and contrasting effective use of leadership in both the private and public sectors. (3)

MBA-660 Special Projects in MBA
Research into business administration and related subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects to a maximum of 9 credits. (3 credits)

BA-665 Entrepreneurship
Course focuses on all aspects of starting a new business. Emphasis is on the critical role of recognizing and creating opportunities. Topics include attributes of entrepreneurs and entrepeneurial careers, evaluating opportunities, writing business plans, and financing the venture. (3)

MBA-700 Capstone Project
Students complete a research project in the field of major concentration. The research is supervised by a faculty member and must be defended by the student in an oral examination. Internships under the supervision of an academic advisor are an option. This course is to be taken last or next to last as the student applies accumulated knowledge of both core and concentration classes to this effort. (3)

MBA-701 Federal Acquisitions and Contracting
This course covers the fundamentals of Federal acquisitions and contracting and will provide a comprehensive understanding of the acquisition environment. Students will develop professional skills for making business decisions and advising other acquisition team members to successfully meet mission needs. Participating in small group simulation exercises will prepare students to provide contracting support within the overarching business relationships of government and industry. Prerequisite: MBA-646 or equivalent. (3)

MBA-702 Mergers and Acquisitions
This course surveys the drivers of success in mergers and acquisitions (M & A) and develops your skills in the design and evaluation of these transactions. This course will be taken by a student in an oral examination. Internships are an option. This course is to be taken last or next to last as the student applies accumulated knowledge of both core and concentration classes to this effort. (3)

MBA-703 Software Acquisitions
This course covers the acquisition of open systems and commercial off-the-shelf (COTS) products, an increasingly vital element of corporate and government software development. Properly managed software acquisition offers potential for significant time and cost savings over a system's lifetime. The transaction from proprietary, custom-built systems to systems based on standards and commercial products is not easy, however. Management and their staff must understand the risks and opportunities associated with this acquisition approach. (3)

NT-100 Computer Architecture and Construction
Basic introduction to the design and construction of a current model PC including operating systems and some diagnostic software. Students build, configure, test and troubleshoot PCs in the laboratory. This material can be used as a basis for studying for the CompTIA A+ exam. (1-4-3)

NT-150 Computer Networking
This course is a continuation of NT-100 with major emphasis on local network equipment, network software and addressing schemes. Students build, configure, test and troubleshoot a network in the laboratory. Routers and switches are included. This material can be used as a basis for studying for the CompTIA Network+ exam. (1-4-3)

NT-250 Microsoft Infrastructure and Design
This course will address the design processes for Microsoft infrastructure technologies and services. These technologies incorporate Windows server, workstation, and active directory to name a few. Students will implement VPN’s, firewalls, IDS’s, PKI, and AAA servers to protect the infrastructure will be discussed. Students will be challenged in a lab environment with unique

infrastructure technology scenarios to design and implement to both meet customer requirements and satisfy security policies to protect sensitive customer data. Prerequisite: NT-100, 150 or Permission (4)

NT-350 Virtualized Networks and Data Centers
Cloud computing services allow users to lease computing resources from large scale data centers operated by service providers. Topics include cloud services, users can deploy a wide variety of applications dynamically and on-demand. Most cloud service providers use machine virtualization to provide flexible and cost-effective resource sharing. Organizations must take the proper steps to transition to virtualized services by first consolidating their server farms, then virtualize infrastructure such as servers and workstations and databases. This course will use intensive hands on approach to teach students to plan, design and build such a virtualized infrastructure to meet the needs of the organization on a cost effective, efficient and secure manner. Prerequisite: NT 100, 150, 250 or Permission (4)

P-301 Fiber-Optic Communications
Lightwave propagation in fiber optics, including modal conditions, numerical aperture, attenuation and signal distortion in step-index and graded-index fibers. Connectors, splices and analysis of coupling losses. Operating principles and characteristics of optical sources and detectors. Transmitter and receiver circuits for analog and digital communication. Design consideration for practical optical communication links using power budget and rise-time analysis. Discussion and comparison of latest multiplexing and coupling techniques used in optical networks. Contains labs. Prerequisites: EL-261 and MA-261. (2-2-3)

PH-201 General Physics I

PH-202 General Physics II
Non-calculus based physics intended for credit in engineering technology courses. Use PH-262 for electrical, computer and software engineering courses. Light and sound: wave motion, nature of light, reflection and mirrors, refraction, prisms, dispersion lenses; simple harmonic motion; sound transmission, resonance, interference. Doppler Effect, Electricity and magnetism: Static electricity, electric fields, magnetic fields, electric potential, capacitance; electricity in motion: magnetic induction; electromagnetic induction; Alternating currents. Prerequisite: PH-201. Fall - daytime only; spring - evening only. (2-2-3)

PH-253 Energy and the Environment
This course covers fundamentals of energy generation (conversion), current diversity of energy resources from fossil fuels to renewable and alternative sources, and environmental impact of the generation and use of energy. Topics include the availability, economics and environmental consequences of energy generation, distribution and consumption from oil, coal, gas, hydrogen, nuclear, wind, solar, geothermal, hydro, biomass and other alternative sources currently under development and study by the scientific and engineering communities. Efficient use of energy in the domestic, transportation and industrial sectors will be discussed. This course may be used as a general, technical, science or engineering elective. Prerequisite: PH-201. (3-0-3)

PH-261 Engineering Physics I
Calculus-based physics. Displacement, velocity and acceleration, equations of motion, Newton’s laws of motion and their applications, gravitation, work and energy, impulse and momentum, conservation laws, rotational motion, rotational dynamics, elasticity, electricity, periodic motion. Prerequisite: MA-261. Corequisite: MA-262. Fall-only; evening only; spring-only. (3-2-4)

PH-262 Engineering Physics II
Calculus-based physics. A continuation of PH-261. Topics include wave motion, vibration and sound, electricity and magnetism, Coulomb’s Law, electrical fields, induction. Prerequisite: PH-261. Fall-only; daytime only; spring-only. (3-2-4)

PH-263 Engineering Physics III
Calculus based. Introduction to light, lens and diffraction. Photon and their interaction with matter. Wave-particle duality. Basic quantum discoveries leading the Bohr atom and atomic spectra. Interaction of electrons and photons with matter with special emphasis on the design of detectors and electronic devices that use quantum effects. Prerequisite: PH-262. (3-2-4)

PH-400 Einstein’s Theory of Relativity
Introduction to Einstein’s Special and General Theory of Relativity. Topics covered: the physics of Lorentz contraction, time dilation, the “twin paradox” and energy, mass equivalence in Special Relativity; mass in Relativity, Schwarzschild metric,
Black Holes and Cosmology, behavior of light and applications to Global Positioning Systems. Pre-requisites: PH-263 and MA-340 or permission of instructor. (3-0-3)

PH-463 Quantum Physics
Fundamentals of quantum physics: wave – particle duality, the Heisenberg uncertainty principle, Schrödinger’s wave equation and solutions, WKBl approximation, and time independent perturbation theory methods. Interaction of matter with radiation. Application to atomic and molecular spectra, lasers, and quantum computing. Prerequisites: MA-262 Calculus II and PH-262 Engineering Physics II, or permission of instructor. (3-0-3)

PHL-813 Professional Ethics
This course examines the role of ethics in society. Cultural diversity, legal behaviors and the impact of moral behaviors on private and public organizations are presented in case studies. The various roles and impacts of unethical behaviors by system developers, users, managers, executives and consultants will be analyzed and the positive and negative impacts discussed as they pertain to the overall trustworthiness. (3)

PHL-900 Management Theory in a Global Economy
This course provides an overview of seminal management theories and their relevance, applicability, and divergence from current business practice. The focus of the course is on understanding the application of management theories in the context of organizational sustainability in a global economy. (3)

RSC-811 Professional Research Theory and Practice
This course is designed to provide doctoral learners the necessary writing skills to be successful at the doctoral level. (3)

RSC-812 Professional Research Theory and Practice II
Students will examine the research process in the context of quantitative and qualitative methods. Students will develop a purpose statement, problem statement, and research question. Prerequisite: IAE-830. (3)

RSC-813 Professional Ethics and Leadership
This course examines the role of ethics. Cultural diversity, legal behaviors and the impacts of moral behaviors on business, corporations and agencies are presented in case studies. The various roles and impacts of unethical behaviors by system users, managers, executives and consultants will be analyzed and the positive and negative impacts discussed as they pertain to the overall trustworthiness. IRB requirements as it relates to research and human subjects will be examined in this course. Prerequisite: RSC-801 or RSC-802. (3)

RSC-815 Problem Solving and Decision Making Using Quantitative Methods
The objective of this course is to provide students with the necessary knowledge to design and implement quantitative data analysis as part of scholarly research. The focus is on crafting research questions, hypotheses and proper data collection schemes. Students will explore a range of data analysis techniques useful for testing hypothesis and answering research questions. Research topics include: survey design, correlational design, casual-comparative design and experimental designs. Statistics topics include: types of data, parametric versus non-parametric classes of tests, descriptive statistics and inferential statistics. Prior experience with statistics is not required. (3)

SM-513 Systems Management and Organization
Basic concepts applied to managing large-scale systems. Perspectives and philosophies of organization, functions and processes of systems management and organizational leadership. (3)

SM-517 Psychological Factors in Systems Management
Human characteristics and their bearing on systems management. Critical review of theory and research on personality, motivation, values, stress, leadership skills and power bases. (3)

SM-518 Principles of Systems
Systems theories, methodologies, thinking and practice; and soft systems approach; multidisciplinary approaches to organizational problem solving, feedback loops and system change. Prerequisite: SM-513. (3)

SE-351 Software Testing
Covers the techniques and concepts required for software testing. Topics covered include software testing at the unit, module, subsystem and system levels; coverage criteria, manual and automated techniques for test validation and data generation; formal testing processes and standards (with an emphasis on CMMI); rational tools suite; inspections; black box vs. white box testing; functional testing; and testability analysis. Prerequisites: SE-301 and CS-220 or permission of the instructor. (2-2-3)

SM-516 Senior Design Project
Student proposes, designs, builds, and tests a working software project. Students write a report according to specifications and deliver an oral presentation for review. For SE, WD, CS, CE and CET programs. CE and CET students should see advisor before registering. Prerequisites are EN-408 and senior standing. (3-0-3)

SM-519 Systems Management and Organization
Covers the techniques and concepts required for software testing. Topics covered include software testing at the unit, module, subsystem and system levels; coverage criteria, manual and automated techniques for test validation and data generation; formal testing processes and standards (with an emphasis on CMMI); rational tools suite; inspections; black box vs. white box testing; functional testing; and testability analysis. Prerequisites: SE-301 and CS-220 or permission of the instructor. (2-2-3)
tion systems in government and industry. The overall approach is to examine the technology and roles of information systems within the organization, focusing on how information systems are designed and how they operate. Knowledge of computer concepts will be provided to students new to this field. Prerequisite: SM-513. (3)

SM-567 Business Decision Support Systems
This course is designed to develop skills and proficiency in information systems which use telecommunications facilities, computer networks, data communications, distributed processing, interactive systems, and the planning, design, and analysis of telecommunications-based information systems for systems management. This course was formerly entitled “Telecommunications and Computer Networks.” Prerequisite: SM-563. (3)

SM-569 Decision Support and Expert Systems
This course helps the student understand techniques, terminology, principles, concepts and methodologies for using computers in decision making in business, aerospace, and government. The overall approach examines the nature and process of decision making, using a framework of Decision Support Systems (DSS) and Expert Systems and explores specific computer applications in a variety of management decision situations applying learned techniques in a project. Prerequisite: SM-567. (3)

SM-570 Business Analytics
Introduces students to the key business, computational, and data competencies needed by business analysts to fulfill the information needs of decision makers at all levels of an organization. Business analytics (BA) refers to the skills, technologies, applications and practices for continuous iterative exploration and investigation of past business performance to gain insight and drive business planning. Analytics can also be used as input for human decisions or it may drive fully automated decision support (ADS) tools. The course will provide usable information for the students on how “big data” can be used to help decision makers improve organizational competitiveness. BA makes extensive use of large data sets, statistical and quantitative analysis, explanatory and predictive modeling, and fact-based management to drive decision making. Students also gain experience with different software tools used for data analysis and reporting. In the course students will focus on developing new insights and understanding of business performance based on data and statistical methods. Course deliverables will include in-depth case analyses, exams, and a course project and presentation to the class. Prerequisite: SM-569. (3)

SM-587 Law and Regulation of E-Commerce
The course is an examination of the complex political, legal and regulatory compliance issues influencing electronic commerce. This course will attempt to make sense of the status quo ante of electronic law and regulation to enable students to conduct business online. The future landscape, based upon developments in technology, applications, proposed legislation and administrative rule making, is discussed. (3)

SM-600 Special Topics in Systems Management
Research into systems management subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. This course may be repeated with different projects. (1-4)

SM-615 Applied Statistics and Visualization
Introduces multivariate regression and random forests for modeling data. Addresses data access, variable selection and model diagnostics. Introduces foundations for visual thinking. Reviews common statistical graphics such as dot plots, box plots, q-q plots. Addresses more advanced methods such as scatterplot matrices enhanced by smoothed or density contours, and search tools for finding graphics with suggestive patterns. Course will introduce R software for analysis. A final project will involve visualization of a real data set. Prerequisite: Undergraduate statistics. (3)

SM-620 Big Data Warehousing and Analytic Systems
This course will equip the student with the necessary skills to solve complex problems and design solutions using Big Data. The student will be able to gain an understanding of how to design databases to manage large volumes of data from multiple sources, and how that data can be analyzed and translated into meaningful results. The student will be introduced to the field of Analytics, gain an understanding of Enterprise Data Warehousing models, be introduced to Data Mining techniques and tools used for mining the data warehouse, and build specific Data Marts. The student will be introduced to predictive analysis, and will be expected to develop models to extract data, perform trend analysis, establish patterns, and make projections. Prerequisite: Ability to use Structured Query Language with a basic relational database system; ability to read pseudocode; and understand basic data structures like arrays; and, an understanding of algebra and basic probability and statistics would be helpful, though not required.

SP-358 Internship Program
This is an elective course intended to provide students an alternate educational experience in industry and government that complements and strengthens their classroom education. Internship positions must be related to the students major and be creative and analytical in nature, for a minimum of eight weeks. The intern is under the supervision or mentorship of an experienced professional. Prerequisites: junior or senior status. Cumulative GPA 2.8+ and 3.0+ in major. Approval by the dean of academics required. (3-0-3)

SP-359 Internship Program II
This is the second of two elective courses intended to provide students an alternate educational experience in industry and government that complements and strengthens their classroom education. Prerequisites: junior or senior status. Cumulative GPA 2.8+ and 3.0+ in major. Approval by the dean of academics required. (3-0-3)

SP-400 Special Topics in Business and Technology
Students are provided the opportunity to examine topics of special interest in the field of business, management and technology. The student works in a guided study format with a mentor. Permission is required from the instructor and the dean of academics. This course may be repeated with different projects. (3-0-3)

SS-171 Introduction to Psychology
This course is a fundamental study of human behavior exploring such topics as learning and cognition, memory, intelligence, motivation and emotion, consciousness, personality, and abnormal behavior. A discussion of the scientific character of psychology and the research methodologically employed in the discipline will be included. Prerequisite or Corequisite: EN-001 or EN-101. (3-0-3)

SS-175 Introduction to Sociology
A survey of the basic concepts and principles of sociology, culture, human nature, personality and the self, socialization, society, group behavior, norms and deviance, and institutions. The topic of social problems will be addressed by an in-depth examination of a contemporary issue. A primary text and newspapers, magazines and journals will be used for this unit in addition to the textbook. Prerequisite: EN-101. (3-0-3)

SS-181 Human Development
This course provides a comprehensive and integrated review of human development from a psychological perspective. The lifespan model provides a coherent time-line approach for students to study, observe, and reflect on personal life developments as well as how relationships with individuals, families, and communities are integral to our development as humans. Prerequisite or Corequisite: EN-101. (3-0-3)

SS-272 Group Dynamics
Focuses on interpersonal relations and skills development; cross-cultural relations and communication; organizational climate and culture and their relationship to and impact on individuals and groups; personality traits and team building; and characteristics and functions of groups in high-tech organizations both in the United States and abroad. Corequisite: EN-102. (3-0-3)

SS-275 History of Modern Culture
This course offers students a review and survey of world history and how it affected culture from 1946 to present through the use of the Internet. Students will learn the important historical events during this time period and how they impacted society, culture and politics. Students will learn major historical events, their geographical location and their world impact. Students will select a subject and throughout the semester be able to discuss their subject as it relates to the time period covered. Students will be required to do oral and written presentations covering 1946 to modern times. Corequisite: EN-101. (3-0-3)

SS-301 History of Technology
This is a survey course designed to give students an overall view of the development and effect of technology on American economic trends, social trends and cultural traditions through critical analysis. The focus is on the early twentieth century to the present day. Prerequisite: EN-102. (3-0-3)

SS-351 Ethics
This course is designed to help students improve their ability to make ethical decisions. This is done by providing a framework that enables the student to identify, analyze, and resolve ethical issues that arise when making decisions. Case analysis is a primary tool of this course. Prerequisite: EN-102. (3-0-3)

SS-400 Social Science: Special Topics
Research into social sciences. Student primarily works in a guided study format with a mentor. Permission required from the instructor and the dean of academics. (3)

TC-110 Introduction to Telecommunications
Telecommunications defined and its effects on our daily lives. Structure of the telecommunications industry, Brief history, Basic terminology, Type of analog and digital communications systems. Data communications and networking, Introduction to local area networks, and wide area networks.
Microwave and cellular systems, Satellite systems, Internet and its structure, World Wide Web, website technology and terminology. (2-2-3)

**TC-312 Voice Over IP**
This course offers students a hands-on approach for learning how Voice Over IP works, how it’s planned and how it’s implemented. The students will be expected to complete a series of labs on equipment and simulators to build shared data and voice networks. Students will work with specialized high performance networking equipment such as phones and switches that primarily support three functions. Students will configure VLAN networks to support the VOIP infrastructure. The commercial software such as Cisco Communication Manager Express (CME) and Cisco Unified Communication Manager (CUCM) will be used. Prerequisite: CT-240 or equivalent or permission of instructor. (2-2-3)

**TC-319 Network Infrastructure Security**
This course focuses on how to secure network infrastructures through hands on labs, since many attacks are geared to degrade, compromise and even disable network infrastructures. Some of the tasks covered will be the securing of network switches and routers, their configurations and secure deployment, encryption of traffic and deployment of VPN. In addition, the labs will help students be competent in configuring firewalls such as ASA routers. Prerequisite CT-240. (1-3-3)

**TC-359 Networking Modeling and Design**
A continuation of TC-309 where students are expected to design model, simulate and analyze networks to meet real-world situations. Networks are designed and tested for traffic handling capabilities and robustness. Alternate network solutions are proposed and tested. Virtual simulation software is used throughout course. Prerequisites: CT-240 and MA-128 (1-3-3)

**TC-400 Special Projects in Telecommunications**
Guided study. This course is a project course in which students research a problem in the field of telecommunications under the guidance of a professor or member of the academic staff. Students are required to produce a final written and oral presentation of their effort. Prerequisite: Permission of instructor. (0-6-3)

**TC-401 Advanced Topics in Telecommunications**
Layered protocol models. Ethernet, TCP/IP with mathematical throughput analysis. SMTP, POP, HTTP analyzed using Ethereal. Number theory, encryption and authentication. The RSA algorithm. Routing algorithms (RIP, OSPF). Optimal capacity assignment. Laboratory exercises performed using actual constructed networks (Windows/Linux) and virtual networks (in VMWare). Prerequisites: CT-152 and MA-128 or equivalent, (2-2-3)

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BS, MBA, Capital College  

Dan Hickey  
Adjunct Professor  
BS, State University of New York  
MA, Webster University  

George Hoffman  
Adjunct Professor  
BA, Clemson University  
MS, Capital College  

Warren Holt  
Adjunct Professor  
BS, Park University  

Katherine V. Hubbard  
Adjunct Professor  
BA, University of Arizona  
MSM, University of Maryland  

Daniel G. Jablonski  
Adjunct Professor  
BS, MS, Massachusetts Institute of Technology  
PhD, University of Cambridge  

Larry Jamison  
Adjunct Professor  
BA, Southern Illinois University  
MS, Webster University  
MS, Capital College  

Mark P. Johnson  
AS, Prince George's Community College  
BS, Capitol College  

Ilya Kerzhner  
Adjunct Professor  
MS, PhD, Ural State University  

Jason Kilmer  
Adjunct Professor  
BA, Elmira College  
MS, Texas A&M University  

Janny D. Klein  
Adjunct Professor  
BS, University of Phoenix  
MS, Capital College  

Juanita Kolipliai  
Adjunct Professor  
MA, University of Kansas  

Warren Drew Lerner  
Adjunct Professor  
BS, University of Maryland  
MS, Florida Institute of Technology  
DSc, Capitol College  

Darryl J. Lesesne  
Adjunct Professor  
BA, Howard University  
MS, University of Maryland  

Ray A. Letteer  
Adjunct Professor  
BS, University of Maryland  
MS, Capital College  
DSc, Capitol College  

Priscilla A. Lewis  
Adjunct Professor  
BA, University of Maryland  
MS, Capital College  

William P. Littleton  
Adjunct Professor  
BS, Capital College  
MS, Capital College  

Rishabh Yogendra Maharaja  
Adjunct Professor  
BS, Capital College  
MS, Capital College  

Ronald Martin  
Adjunct Professor  
MS, Frostburg State University  

Andrew A. Mehri  
Professor  
AAS, Montgomery County Community College  
BS, MS, Capitol College  

Kenneth L. Mayer  
Adjunct Professor  
BA, Brown University  
MS, PhD, University of Texas at Austin  

Adam N. Meyer  
Adjunct Professor  
BS, American Military University  
MS, Capitol College  

Anthony G. Miller  
Adjunct Professor  
BS, Clarion University of Pennsylvania  
MBA, Capitol College  

David M. Monahan  
Adjunct Professor  
MS, Capitol College  
MS, North Carolina State University  

Sandra D. Moore  
Adjunct Professor  
BA, University of Arizona  
BS, Utica College-Syracuse University  
MS, Utica College  

Scott A. Moser  
Adjunct Professor  
AAS, BS, Capitol College  
MA, Hood College  
PhD, Clemson University  

Mark B. Moss  
Adjunct Professor  
BS, Massachusetts Institute of Technology  
MS, Stanford University  

Heather Marie Myles  
Adjunct Professor  
BA, Oakwood College  
MS, Columbia University  

Shari Myles  
Adjunct Professor  
BA, Oakwood University  
MPS, Georgetown University  

Vincent J. Nestler  
Adjunct Professor  
BA, State University of New York, New Paltz  
MA, Columbia University  
PhD, Idaho State University  

Mark Opeka  
Adjunct Professor  
BS, University of Maryland  
MS, University of Maryland  
PhD, University of Maryland  

Pamela J. Opeka  
Assistant Professor  
BS, Indiana University of Pennsylvania  
MEd, University of Maryland, College Park  

Charles R. Parsons  
Adjunct Professor  
BS, Rice University  
PhD, University of Texas, Austin  

Jason Michael Pittman  
Assistant Professor  
BS, Malone College  
MS, DSc, Capitol College  

Lauren E. Player  
Adjunct Professor  
BS, Radford University  
MA, Towson University  

Jeffrey Pullen  
Adjunct Professor  
MBA, DeVry University  
MS, Strayer University  
MS, University of Maryland  

Claude A. Rankin  
Chair, Business and Humanities  
Associate Professor  
BA, George Washington University  
MA, University of Maryland, College Park  

Calvin Reed  
Adjunct Professor  
BA, Michigan State University, Lansing  
MS, Capitol College  

Thomas Reid Rivenburgh  
Adjunct Professor  
BS, Capitol College  
BS, MS, Embry Riddle Aeronautical University
Calendar

Fall Semester 2015

Undergraduate Classes

Semester-long Classes

Aug. 10-14  Registration for part-time students
Aug. 12-14  Orientation, registration and residence hall check-in for new students
Aug. 14    Final day of registration
Dec. 7-11  Final examinations
Dec. 11    Library closes
Dec. 16    University closes at 5 p.m.
Dec. 17-Jan. 3  Winter recess – university closed

Learning Center closes
All library materials are due
Last day for cooperative education work
Last day to withdraw

Aug. 15  Residence hall check-in for returning students
Aug. 17  Classes begin
Last day for 100% refund
First tuition installment due
Library opens
Cooperative education work period begins

Aug. 24  Electronics, physics and chemistry labs open
Aug. 31  Last day for 75% refund
Last day to add a course
Sept. 7  Labor Day – university closed
(Online classes will meet asynchronously.)

Sept. 8    Last day for 75% refund
First 50% tuition installment due
Oct. 28   Registration for spring semester begins

Sept. 14    Last day for 50% refund
Sept. 21   Last day for 25% refund
Final 50% tuition installment due
Oct. 26    Last day for 75% refund
Last day to add a course
Nov. 2     Last day for 50% refund
Nov. 9     Last day for 25% refund
Last day to drop or audit course
Nov. 16    Final 50% tuition installment due
Nov. 25    University closes at 5 p.m.
(Online classes will meet asynchronously.)

Dec. 4     Last day to withdraw
Dec. 11    Classes end
Dec. 16    University closes at 5 p.m. Dec.
Dec. 17-Jan. 3  Winter recess – university closed

Dec. 7-11  Final examinations
Dec. 11    Library closes
Dec. 16    University closes at 5 p.m.
Dec. 17-Jan. 3  Winter recess – university closed

Fall – Term I

Aug. 21    Final day of registration
Aug. 24    Classes begin
Last day for 100% refund
First 50% tuition installment due
Aug. 31    Last day for 75% refund
First 50% tuition installment due
Sept. 7    Labor Day – university closed
(Online classes will meet asynchronously.)

Sept. 8    Last day for 75% refund
First 50% tuition installment due
Oct. 28   Registration for spring semester begins

Sept. 14    Last day for 50% refund
Sept. 21   Last day for 25% refund
Final 50% tuition installment due
Oct. 26    Last day for 75% refund
Last day to add a course
Nov. 2     Last day for 50% refund
Nov. 9     Last day for 25% refund
Last day to drop or audit course
Nov. 16    Final 50% tuition installment due
Nov. 25    University closes at 5 p.m.
(Online classes will meet asynchronously.)

Dec. 4     Last day to withdraw
Dec. 11    Classes end
Dec. 16    University closes at 5 p.m.
Dec. 17-Jan. 3  Winter recess – university closed

Fall – Term II

Oct. 16    Final day of registration
Oct. 19    Classes begin
Last day for 100% refund
First 50% tuition installment due
Oct. 28   Registration for spring semester begins

Oct. 26    Last day for 75% refund
Last day to add a course
Nov. 2     Last day for 50% refund
Nov. 9     Last day for 25% refund
Last day to drop or audit course
Nov. 16    Final 50% tuition installment due
Nov. 25    University closes at 5 p.m.
(Online classes will meet asynchronously.)

Dec. 4     Last day to withdraw
Dec. 11    Classes end
Dec. 16    University closes at 5 p.m.
Dec. 17-Jan. 3  Winter recess – university closed

Second tuition installments due
Sept. 2    Final 50% tuition installment due
Nov. 25    University closes at 5 p.m.
(Online classes will meet asynchronously.)

Graduate Classes

Semester-long Classes

Aug. 21    Final day of registration
Aug. 24    Classes begin
Last day for 100% refund
First 50% tuition installment due
Aug. 31    Last day for 75% refund
First 50% tuition installment due
Sept. 7    Labor Day – university closed
(Online classes will meet asynchronously.)

Sept. 8    Last day for 75% refund
First 50% tuition installment due
Oct. 28   Registration for spring semester begins

Sept. 14    Last day for 50% refund
Sept. 21   Last day for 25% refund
Final 50% tuition installment due
Oct. 26    Last day for 75% refund
Last day to add a course
Nov. 2     Last day for 50% refund
Nov. 9     Last day for 25% refund
Last day to drop or audit course
Nov. 16    Final 50% tuition installment due
Nov. 25    University closes at 5 p.m.
(Online classes will meet asynchronously.)

Dec. 4     Last day to withdraw
Dec. 11    Classes end
Dec. 16    University closes at 5 p.m. Dec.
Dec. 17-Jan. 3  Winter recess – university closed

Dec. 7-11  Final examinations
Dec. 11    Library closes
Dec. 16    University closes at 5 p.m.
Dec. 17-Jan. 3  Winter recess – university closed

Dec. 24    Thankgiving recess – university closed
Dec. 29    Thanksgiving – university closed
(Online classes will meet asynchronously.)

Nov. 26-29  Thanksgiving recess – university closed
Dec. 26-29  Thanksgiving – university closed
(Online classes will meet asynchronously.)

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.
### Spring Semester 2016

#### Undergraduate Classes

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration for part-time students</td>
<td>Jan. 4-8</td>
</tr>
<tr>
<td>University opens</td>
<td>Jan. 4</td>
</tr>
<tr>
<td>Residence hall check-in for new students</td>
<td>Jan. 7</td>
</tr>
<tr>
<td>Final day of registration</td>
<td>Jan. 8</td>
</tr>
<tr>
<td>Graduation applications due for</td>
<td></td>
</tr>
<tr>
<td>Orientation and registration for</td>
<td></td>
</tr>
<tr>
<td>new students</td>
<td></td>
</tr>
<tr>
<td>Residence hall check-in for</td>
<td>Jan. 9</td>
</tr>
<tr>
<td>returning students</td>
<td></td>
</tr>
<tr>
<td>Classes begin</td>
<td>Jan. 11</td>
</tr>
<tr>
<td>First tuition installments due</td>
<td></td>
</tr>
<tr>
<td>Library opens</td>
<td></td>
</tr>
<tr>
<td>Co-op work period begins</td>
<td>Jan. 18</td>
</tr>
<tr>
<td>Martin Luther King Jr. Day –</td>
<td></td>
</tr>
<tr>
<td>university closed</td>
<td></td>
</tr>
<tr>
<td>Electronics, physics and chemistry</td>
<td>Jan. 19</td>
</tr>
<tr>
<td>labs open</td>
<td></td>
</tr>
<tr>
<td>Learning Center opens</td>
<td></td>
</tr>
<tr>
<td>Last day for 75% refund</td>
<td>Jan. 25</td>
</tr>
<tr>
<td>Last day to drop course without</td>
<td></td>
</tr>
<tr>
<td>Second tuition installments due</td>
<td>Feb. 1</td>
</tr>
<tr>
<td>Financial Aid Disbursement Week/</td>
<td>Feb. 8-15</td>
</tr>
<tr>
<td>Pell Census</td>
<td></td>
</tr>
</tbody>
</table>

#### Spring -- Term 1

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>University opens</td>
<td>Jan. 4</td>
</tr>
<tr>
<td>Final day of registration</td>
<td>Jan. 5</td>
</tr>
<tr>
<td>Classes begin</td>
<td></td>
</tr>
<tr>
<td>Last day for 100% refund</td>
<td></td>
</tr>
<tr>
<td>First 50% tuition installment due</td>
<td></td>
</tr>
<tr>
<td>Graduation applications due for</td>
<td></td>
</tr>
<tr>
<td>Class of 2016</td>
<td></td>
</tr>
<tr>
<td>Martin Luther King Day – university closed</td>
<td>Jan. 18</td>
</tr>
<tr>
<td>(Online courses will meet asynchronously.)</td>
<td></td>
</tr>
<tr>
<td>Last day for 75% refund</td>
<td></td>
</tr>
<tr>
<td>Last day to add a course</td>
<td></td>
</tr>
<tr>
<td>Final 50% tuition installment due</td>
<td></td>
</tr>
<tr>
<td>Registration for summer session begins</td>
<td>Mar. 7</td>
</tr>
<tr>
<td>Last day to drop or audit course</td>
<td></td>
</tr>
<tr>
<td>Pre-registration for fall semester begins</td>
<td>Mar. 15</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Last day to withdraw</td>
<td>Apr. 18</td>
</tr>
<tr>
<td>Classes end</td>
<td>Apr. 25</td>
</tr>
<tr>
<td>Commencement</td>
<td>May 14</td>
</tr>
</tbody>
</table>

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.

### Graduate Classes

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>University opens</td>
<td>Jan. 4</td>
</tr>
<tr>
<td>Classes begin</td>
<td>Jan. 5</td>
</tr>
<tr>
<td>Last day for 100% refund</td>
<td></td>
</tr>
<tr>
<td>First 50% tuition installment due</td>
<td></td>
</tr>
<tr>
<td>Graduation applications due for</td>
<td></td>
</tr>
<tr>
<td>Class of 2016</td>
<td></td>
</tr>
<tr>
<td>Martin Luther King Day – university closed</td>
<td>Jan. 18</td>
</tr>
<tr>
<td>(Online courses will meet asynchronously.)</td>
<td></td>
</tr>
<tr>
<td>Last day for 75% refund</td>
<td></td>
</tr>
<tr>
<td>Last day to add a course</td>
<td></td>
</tr>
<tr>
<td>Final 50% tuition installment due</td>
<td>Mar. 7</td>
</tr>
<tr>
<td>Registration for summer session begins</td>
<td>Mar. 15</td>
</tr>
<tr>
<td>Last day to drop or audit course</td>
<td>Mar. 22</td>
</tr>
<tr>
<td>Final 50% tuition installment due</td>
<td>Apr. 11</td>
</tr>
<tr>
<td>Pre-registration for fall semester begins</td>
<td></td>
</tr>
<tr>
<td>Last day to withdraw</td>
<td>Apr. 18</td>
</tr>
<tr>
<td>Classes end</td>
<td>Apr. 25</td>
</tr>
<tr>
<td>Commencement</td>
<td>May 14</td>
</tr>
</tbody>
</table>

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.
### Summer Session 2016

#### Undergraduate Classes

**Session-long Classes**

- **May 13**
  - Final day of registration
  - August graduates notify Office of Registration and Records
  - Cooperative education work period begins

- **May 16**
  - Classes begin
  - Last day for 100% refund for 8- and 11-week courses
  - First tuition installments due
  - Library opens

- **May 23**
  - Last day for 75% refund for 8-week courses
  - Electronics, physics and chemistry labs open
  - Last day to add a course

- **May 30**
  - Memorial Day – university closed

- **May 31**
  - Second tuition installments due for 8-week courses
  - Last day for 50% refund for 8-week courses
  - Last day for 75% refund for 11-week courses

- **June 6**
  - Last day for 25% refund for 8-week courses
  - Last day to drop 8-week course without W
  - Last day for 50% refund for 11-week courses

- **June 7**
  - Last day to drop 8-week course with W or audit 8-week course

- **June 13**
  - Last day for 25% refund for 11-week courses
  - Last day to drop 11-week course without W

**Cooperative education work period begins**

- **May 16**
  - Classes begin
- **May 19**
  - Last day for 50% refund
- **May 26**
  - Last day for 25% refund
- **May 30**
  - Memorial Day – university closed
- **June 13**
  - Last day to drop 11-week course without W
  - Second tuition installments due for 11-week courses

### Graduate Classes

**Semester-long Classes**

- **Apr. 26**
  - Final day of registration

- **Apr. 27**
  - Classes begin
  - Last day for 100% refund
  - First 50% tuition installment due

- **May 12**
  - Last day for 75% refund
  - Last day to add a course

- **May 14**
  - Commencement

- **May 19**
  - Last day for 50% refund

- **May 26**
  - Last day for 25% refund
  - Final 50% tuition installment due

- **May 30**
  - Memorial Day – university closed
  - (Online classes will meet asynchronously)

- **July 4**
  - Independence Day – university closed
  - (Online classes will meet asynchronously)

- **July 6**
  - Last day to drop or audit course

- **July 11**
  - Final tuition installment due for 11-week courses

- **July 26**
  - Second tuition installments due for 11-week courses

- **July 31**
  - Last day to withdraw

**Summer – Term I**

- **Apr. 26**
  - Final day of registration

- **Apr. 27**
  - Classes begin
  - Last day for 100% refund
  - First 50% tuition installment due

- **May 5**
  - Last day for 75% refund
  - Last day to add a course

- **May 12**
  - Last day for 50% refund

- **May 19**
  - Last day for 25% refund
  - Last day to drop or audit course

- **May 30**
  - Memorial Day – university closed
  - (Online classes will meet asynchronously)

- **June 15**
  - Last day to withdraw

- **June 21**
  - Classes end

**Summer – Term II**

- **June 21**
  - Final day of registration

- **June 22**
  - Classes begin
  - Last day for 100% refund
  - First 50% tuition installment due

- **July 1**
  - Last day for 75% refund
  - Last day to add a course

- **July 4**
  - Independence Day – university closed
  - (Online classes will meet asynchronously)

- **July 8**
  - Last day for 50% refund

- **July 15**
  - Last day for 25% refund
  - Last day to drop or audit course

- **July 22**
  - Final 50% tuition installment due

- **Aug. 10**
  - Last day to withdraw

- **Aug. 16**
  - Classes end

---

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.
## Fall Semester 2016

### Undergraduate Classes

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 15–19</td>
<td>Registration for part-time students</td>
</tr>
<tr>
<td>Aug. 17–19</td>
<td>Orientation, registration and residence hall check-in for new students</td>
</tr>
<tr>
<td>Aug. 19</td>
<td>Final day of registration, December graduates notify Office of Registration and Records</td>
</tr>
<tr>
<td>Aug. 20</td>
<td>Residence hall check-in for returning students</td>
</tr>
<tr>
<td>Aug. 22</td>
<td>Classes begin</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>Electronics, physics and chemistry labs open</td>
</tr>
<tr>
<td>Sept. 5</td>
<td>Labor Day – university closed</td>
</tr>
<tr>
<td>Sept. 6</td>
<td>Last day for 75% refund</td>
</tr>
<tr>
<td>Sept. 12</td>
<td>Last day to add a course</td>
</tr>
<tr>
<td>Sept. 19</td>
<td>Last day for 50% refund</td>
</tr>
<tr>
<td>Sept. 19</td>
<td>Last day to drop without a W</td>
</tr>
<tr>
<td>Sept. 20</td>
<td>Last day to drop or audit course</td>
</tr>
<tr>
<td>Oct. 21</td>
<td>Classes end</td>
</tr>
<tr>
<td>Nov. 23</td>
<td>University closes at 5 p.m.</td>
</tr>
<tr>
<td>Nov. 23</td>
<td>(Online classes will meet asynchronously.)</td>
</tr>
<tr>
<td>Nov. 24–27</td>
<td>Thanksgiving recess – university closed</td>
</tr>
<tr>
<td>Dec. 9</td>
<td>Last day to withdraw</td>
</tr>
<tr>
<td>Dec. 16</td>
<td>Classes end</td>
</tr>
<tr>
<td>Dec. 22-Jan. 2</td>
<td>University closes at 5 p.m.</td>
</tr>
<tr>
<td></td>
<td>Winter recess – university closed</td>
</tr>
</tbody>
</table>

### Graduate Classes

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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</thead>
<tbody>
<tr>
<td>Aug. 26</td>
<td>Final day of registration</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>Classes begin</td>
</tr>
<tr>
<td>Aug. 29</td>
<td>Last day for 100% refund</td>
</tr>
<tr>
<td>Sept. 5</td>
<td>Labor Day – university closed</td>
</tr>
<tr>
<td>Sept. 5</td>
<td>College closed</td>
</tr>
<tr>
<td>Sept. 6</td>
<td>Last day for 75% refund</td>
</tr>
<tr>
<td>Sept. 6</td>
<td>Last day to add a course</td>
</tr>
<tr>
<td>Sept. 12</td>
<td>Last day for 75% refund</td>
</tr>
<tr>
<td>Sept. 19</td>
<td>Last day for 25% refund</td>
</tr>
<tr>
<td>Sept. 26</td>
<td>Final 50% tuition installment due</td>
</tr>
<tr>
<td>Oct. 21</td>
<td>Classes end</td>
</tr>
<tr>
<td>Nov. 7</td>
<td>Registration for spring semester begins</td>
</tr>
<tr>
<td>Nov. 7</td>
<td>Last day to add a course</td>
</tr>
<tr>
<td>Nov. 14</td>
<td>Last day for 25% refund</td>
</tr>
<tr>
<td>Nov. 23</td>
<td>Final 50% tuition installment due</td>
</tr>
<tr>
<td>Nov. 24–27</td>
<td>Thanksgiving recess – university closed</td>
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<td>Dec. 9</td>
<td>Last day to withdraw</td>
</tr>
<tr>
<td>Dec. 16</td>
<td>Classes end</td>
</tr>
<tr>
<td>Dec. 21</td>
<td>University closes at 5 p.m.</td>
</tr>
<tr>
<td>Dec. 22-Jan. 2</td>
<td>Winter recess – university closed</td>
</tr>
</tbody>
</table>

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.
## Spring Semester 2017

### Undergraduate Classes

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 3-6</td>
<td>Registration for part-time students</td>
</tr>
<tr>
<td>Jan. 3</td>
<td>University opens</td>
</tr>
<tr>
<td>Jan. 6</td>
<td>Residence hall check-in for new students</td>
</tr>
<tr>
<td></td>
<td>Orientation and registration for new students</td>
</tr>
<tr>
<td></td>
<td>Final day of registration</td>
</tr>
<tr>
<td></td>
<td>Graduation applications due for Class of 2017</td>
</tr>
<tr>
<td>Jan. 7</td>
<td>Residence hall check-in for returning students</td>
</tr>
<tr>
<td>Jan. 9</td>
<td>Classes begin</td>
</tr>
<tr>
<td></td>
<td>Last day for 100% refund</td>
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<tr>
<td></td>
<td>Library opens</td>
</tr>
<tr>
<td></td>
<td>Co-op work period begins</td>
</tr>
<tr>
<td>Jan. 16</td>
<td>Martin Luther King Jr. Day – university closed</td>
</tr>
<tr>
<td>Jan. 17</td>
<td>Electronics, physics and chemistry labs open</td>
</tr>
<tr>
<td></td>
<td>Learning Center opens</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>Last day to add a course</td>
</tr>
<tr>
<td>Jan. 30</td>
<td>Last day for 50% refund</td>
</tr>
<tr>
<td>Feb. 6</td>
<td>Last day for 25% refund</td>
</tr>
<tr>
<td></td>
<td>Last day to drop course without W</td>
</tr>
<tr>
<td></td>
<td>Second tuition installments due</td>
</tr>
<tr>
<td>Feb. 6-13</td>
<td>Financial Aid Disbursement Week/ Pell Census</td>
</tr>
<tr>
<td>Mar. 3</td>
<td>Final tuition installment due</td>
</tr>
<tr>
<td>Mar. 13-17</td>
<td>Spring recess (service offices open)</td>
</tr>
<tr>
<td>Mar. 20</td>
<td>Classes resume</td>
</tr>
<tr>
<td>Apr. 5</td>
<td>Last day to drop course with W or change to audit</td>
</tr>
<tr>
<td>Apr. 12</td>
<td>Registration for summer semester begins for continuing students</td>
</tr>
<tr>
<td>Apr. 12</td>
<td>Pre-registration for fall semester begins for continuing students</td>
</tr>
<tr>
<td>May 1</td>
<td>Last day to withdraw</td>
</tr>
<tr>
<td></td>
<td>Electronics, physics and chemistry labs close</td>
</tr>
<tr>
<td></td>
<td>Learning Center closes</td>
</tr>
<tr>
<td></td>
<td>All library materials are due</td>
</tr>
<tr>
<td>Mar. 8</td>
<td>Last day for cooperative education work</td>
</tr>
<tr>
<td>Mar. 15</td>
<td>Final tuition installment due</td>
</tr>
<tr>
<td>Apr. 12</td>
<td>Last day to drop or audit course</td>
</tr>
<tr>
<td>Apr. 25</td>
<td>Class end</td>
</tr>
<tr>
<td>May 13</td>
<td>Commencement</td>
</tr>
</tbody>
</table>

### Graduate Classes

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 3</td>
<td>University opens</td>
</tr>
<tr>
<td>Mar. 4</td>
<td>Classes begin</td>
</tr>
<tr>
<td></td>
<td>Last day for 100% refund</td>
</tr>
<tr>
<td></td>
<td>First 50% tuition installment due</td>
</tr>
<tr>
<td></td>
<td>Graduation applications due for Class of 2017</td>
</tr>
<tr>
<td>Jan. 16</td>
<td>Martin Luther King Day – university closed. (Online courses will meet asynchronously.)</td>
</tr>
<tr>
<td>Jan. 11</td>
<td>Last day for 75% refund</td>
</tr>
<tr>
<td>Jan. 16</td>
<td>Martin Luther King Day – university closed. (Online courses will meet asynchronously.)</td>
</tr>
<tr>
<td>Jan. 18</td>
<td>Last day for 50% refund</td>
</tr>
<tr>
<td>Jan. 25</td>
<td>Last day for 25% refund</td>
</tr>
<tr>
<td>Feb. 1</td>
<td>Final 50% tuition installment due</td>
</tr>
<tr>
<td>Mar. 8</td>
<td>Registration for summer session begins</td>
</tr>
<tr>
<td>Mar. 15</td>
<td>Last day to drop or audit course</td>
</tr>
<tr>
<td>Apr. 12</td>
<td>Pre-registration for fall semester begins</td>
</tr>
<tr>
<td>Apr. 25</td>
<td>Class end</td>
</tr>
<tr>
<td>May 13</td>
<td>Commencement</td>
</tr>
</tbody>
</table>

### Spring – Term 1

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 2-8</td>
<td>Final examinations</td>
</tr>
<tr>
<td>Mar. 8</td>
<td>Library closes</td>
</tr>
<tr>
<td>May 9</td>
<td>Residence halls close at 7 p.m.</td>
</tr>
<tr>
<td>Mar. 15</td>
<td>Last day to drop or audit course</td>
</tr>
<tr>
<td>Apr. 18</td>
<td>Last day to withdraw</td>
</tr>
<tr>
<td>Apr. 25</td>
<td>Class end</td>
</tr>
<tr>
<td>May 13</td>
<td>Commencement</td>
</tr>
</tbody>
</table>

### Spring – Term II

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 28</td>
<td>Final day of registration</td>
</tr>
<tr>
<td>Mar. 1</td>
<td>Classes begin</td>
</tr>
<tr>
<td></td>
<td>Last day for 100% refund</td>
</tr>
<tr>
<td>Mar. 8</td>
<td>First 50% tuition installment due</td>
</tr>
<tr>
<td>Mar. 15</td>
<td>Last day for 50% refund</td>
</tr>
<tr>
<td>Mar. 22</td>
<td>Last day for 25% refund</td>
</tr>
<tr>
<td>Mar. 29</td>
<td>Final 50% tuition installment due</td>
</tr>
<tr>
<td>Apr. 12</td>
<td>Pre-registration for fall semester begins</td>
</tr>
<tr>
<td>April 18</td>
<td>Last day to withdraw</td>
</tr>
<tr>
<td>April 25</td>
<td>Classes end</td>
</tr>
<tr>
<td>May 13</td>
<td>Commencement</td>
</tr>
</tbody>
</table>

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated calendar.
Summer Session 2017
Undergraduate Classes
Session-long Classes
May 12 Final day of registration
August graduates notify Office
of Registration and Records
Cooperative education work
period begins
May 15 Classes begin
Last day for 100% refund for
8- and 11-week courses
First tuition installments due
Library opens
May 22 Last day for 75% refund for
8-week courses
Electronics, physics and chemistry
labs open
Last day to add a course
May 29 Memorial Day – university closed
May 30 Second tuition installments due
for 8-week courses
First 50% tuition installment due
Last day to drop or audit course
June 6 Last day for 25% refund for
11-week courses
Last day to drop 8-week course
without W
Last day to drop 8-week course
with W or audit 8-week course
June 7 Last day to drop 8-week course
with W or audit 8-week course
June 12 Last day for 25% refund for
11-week courses
Last day to drop 11-week course
without W
Second tuition installments due for
11-week courses

June 12-19 Financial Aid Disbursement Week/
Pell Census
June 26 Final tuition installment due for
8-week courses
July 3 Last day to withdraw from 8-week
courses
Last day to drop 11-week course
with W or audit 11-week course
Classes for 8-week courses
Independence Day – university
closed
July 4 Final exams for 8-week courses
July 5-11 Final exams for 8-week courses
July 10 Final tuition installment due for
11-week courses
Classes end for 11-week courses
Electronics, physics and chemistry
labs close
All library materials are due
Last day to withdraw from 11-week
courses
July 25 July 26-Aug. 1 Final exams for 11-week courses

Refer to Capitol Technology University’s online calendar at www.CapTechU.edu for an updated
calendar.
Map and Directions

Directions from Washington, DC and points south of Laurel, MD:
Take the Baltimore/Washington Parkway (Exit 22, north off I-95) to the Beltville Powder Mill Road exit. Turn left on Powder Mill Road and take the first right onto Springfield Road. Follow Springfield Road one mile. Capitol Technology University is on the right.

Directions from Baltimore, MD and points north of Laurel, MD:
Take the Baltimore/Washington Parkway (Exit 7, south off I-695) to the Beltville Powder Mill Road exit. Turn right on Powder Mill Road and take the first right onto Springfield Road. Follow Springfield Road one mile. Capitol Technology University is on the right.