# CAPITOL COLLEGE

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2011–2012 catalog

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# CAPITOL COLLEGE

## 2011-2012 Catalog

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# General Information

## Directory

### Capitol College

11301 Springfield Road
Laurel, MD 20708-9758

**Main Telephone Numbers**

301-369-2800
888-522-7486

**Admissions**

| | |
|---|---|
| Washington, DC | 301-953-3200 |
| In-State | 800-950-1992 |
| Out-of-State | 888-522-7486 |
| Fax | 301-953-1442 |

Undergraduate Admissions Email
admissions@capitol-college.edu
Graduate Admissions Email
gradadmit@capitol-college.edu

**Website**

www.capitol-college.edu

**Office Hours**

The following offices are open Monday through Friday, 8:30 a.m.- 5 p.m. (EST).

Executive Suite
- President
- Vice President for Academic Affairs
- Vice President for Advancement
- Vice President for Finance and Administration
- Vice President for Planning and Assessment

Office of the Deans
- Dean of Business and Information Sciences
- Dean of Engineering and Computer Science
- Critical Infrastructures and Cyber Protection Center

Administration and Human Resources
Advancement and Alumni Services
Career Services*
Marketing and Communications

*Evening appointments are available.

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 college website.

The college 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 college are listed in the student handbook and on the college website.

## Accreditation

Capitol College is authorized by the state of Maryland (Maryland Higher Education Commission, 839 Bestgate Road, Suite 400, Annapolis, MD 21401, 410-260-4500) to confer bachelor of science (BS) degrees in astronautical engineering, business administration, computer engineering, computer science, electrical engineering, information assurance, management of information technology, software engineering and software and Internet applications. The college 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 information technology are fully accredited by the International Assembly for Collegiate Business Education (IACBE, PO Box 25217, Overland Park, KS 66225).

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

The college is authorized by the state of Maryland to confer a doctor of science (DSc) in information assurance.

The college 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 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 College is approved for veterans' education by the Maryland Higher Education Commission.

## Equal Opportunities

Capitol College 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, sex, handicap, religion, national or ethnic origin in admission, treatment of students or employment.

## Changes in Catalog Information

Capitol College reserves the right to make changes in policies, procedures, degree requirements, schedules, course offerings and other college standards or announcements to meet circumstances that may arise after publication.

The provisions of this publication are not to be regarded as an irrevocable contract between the student and Capitol College. The college reserves the right to change any provision or requirement in any college publication without notice at any time during the student's term of attendance.

Capitol College 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 college, the student fails to meet the college's requirements satisfactorily. The college 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 College regarding student records comply fully with the Family Educational

Rights and Privacy Act of 1974. This federal law establishes the rights of students to inspect and review their records, to have the privacy of their educational records maintained and to provide guidelines for the correction of inaccurate or misleading data.

Educational records are defined as records, files, documents, and other materials containing information related to a student that are maintained by Capitol College. Included in this category are records maintained by faculty advisors, Office of Admissions, Office of Financial Aid, Business Office, Office of Career Services, Office of the Student Life and Office of Registration and Records.

Students who wish to gain access to a particular record should contact the office responsible for maintaining that record. Under college policy, records will be produced within a maximum period of three weeks, although in most instances the student will be shown the record upon request.

Certain documents, including financial records of parents and records being withheld for unpaid financial obligations, are not available to students. Students may waive access to their academic, employment and financial aid records.

Students discovering an error in their records should bring it to the attention of the official in charge of the record. Disagreements will be resolved by the appropriate Executive Council member.

Access to individual academic and financial records is denied to parents of students over the age of 18, unless the student signs a consent form. College personnel with a need to know may have access to student records.

The college may disclose directory information (name, address, date and place of birth, telephone number, attendance dates, previous institutions attended, class, major field of study, awards, honors and degrees) without the student's consent.

Students may restrict the release of directory information, except to school officials with legitimate educational interests. To do so, a student must make the request in writing to the Office of Registration and Records. Once filed, this request becomes a permanent part of the student's record until the student instructs the college, in writing, to have the request removed.

Students have the right to receive copies of their Capitol College academic and financial records. Reproduction of academic transcripts costs $5 per copy. There is no charge for copies of financial aid transcripts.

Alleged failure by the college to comply with the Family Educational Rights and Privacy Act may be directed, in writing, to the Family Educational Rights and Privacy Act office by the student. Questions about this act may be referred to the appropriate Executive Council member.

## The Capitol College Commitment

Capitol College guarantees its qualified bachelor's degree graduates placement in the field of engineering, engineering technology, computer sciences, information technology or business with a competitive salary within 90 days of graduation, or Capitol College will provide up to 36 additional undergraduate credits tuition free while students continue their job search.

The Capitol College Commitment is a written job guarantee between the student and Capitol College. The commitment is open to all full-time undergraduate students (U.S. citizens or permanent residents).

Contact the Office of Career Services for more information.

# Locations

## Laurel Campus

Capitol College 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/A-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 Space Operations Institute and the Cyber Battle 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 College Seal

Aut viam inveniam aut faciam (Latin). Either find a way or make one.

## Mission

The mission of Capitol College is to provide a practical education in engineering, computer science, information technology and business that prepares individuals for professional careers and affords them the opportunity to thrive in a changing world.

## Vision

Capitol will be esteemed as a premier provider of higher education, career enhancement, and service to our communities and professions, in engineering, information sciences, and business. Academic programs will be grounded in our centers of excellence in: space and related engineering and sciences; information technology development and application; and cyber protection – all through practices of innovation and leadership. Graduates will have perspectives and skills to compete and collaborate in the global environment. A Capitol education will be affordable and offer access by diverse populations to quality learning outcomes for success as workforce professionals and citizens. Through industry and government partnerships, along with outstanding technology, facilities, and student support, Capitol will be a preferred organization in which to learn and work.

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

## Learning Goals

Capitol College 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 life long learning, ethical practice and participation in professions and communities.

## The Educational Philosophy of the Academic Programs

Four principles define the educational philosophy of Capitol College. 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

**Academic Quality**

The college will support the faculty and students as they pursue academic excellence in practical education by integrating learning with applied learning opportunities and practical research applications.

**Student Success**

The college will support faculty, staff and alumni as they develop an environment that encourages student success by engaging students not only in academic learning but also in co-curricular activities that enhance student success.

**College Advancement**

The college will support the staff of the college as they work to strengthen resources, reputation and relationships to advance the college.

**Financial Resources**

The college will enhance its financial resources by increasing current revenue sources, aligning costs with strategic initiatives, and identifying new revenue sources.

**Foundation**

The college will support the faculty, staff and students by providing the foundation for their work through technology infrastructure, personnel systems and facilities planning.

# History

Since its start more than 80 years ago, Capitol College 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 College has equipped its alumni with the knowledge and skills to evolve with the advanced sophistication of technology.

Capitol College 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 AAS 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.

In 1980 the college found its home in Laurel, Maryland. Within three years, Capitol purchased the 52-acre former site of the Beltsville Speedway, built new academic facilities and opened its doors. Enrollment swelled and the college added two more engineering technology degrees. 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 the late 1980s, Capitol's leadership again recognized the transformation in the institution. The technical-based curriculum 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. The college began several outreach efforts and business partnerships, such as the NASA PREP summer program for minority students and the Maryland Distance Learning Network. As the 20th century drew to a close, the college 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 the college. The academic center hosts an expanded computer science department, the Space Operations Institute, and the BRAC-funded Cyber Battle Lab.

Today Capitol is the only independent college 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 college 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.

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

# The Centers of Excellence

Capitol College 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 College established the Critical Infrastructures and Cyber Protection Center to address the technical and managerial needs of the nation's professional workforce in the areas of critical infrastructure protection and homeland security. A wide array of specialty courses offers training and professional development opportunities to hose in and seeking to join the workforce. The current catalog of courses is expanding to include certificate bearing programs in information assurance, cyber intelligence and cyber counter intelligence, critical infrastructures protection, homeland security and defense, and cyber forensics. Participants earn continuing professional education units (CPEs) along with a certificate or document of completion reflecting their participation. The CICPC program inventory also includes a suite of offerings that satisfy requirements of Department of Defense Directive 8570.1.

Programs are delivered online in real-time, with class sessions that are recorded for later playback, enabling program participants the ability to review the course material as their schedule permits. Customized programs can be arranged and delivered on-site or online, including delivery in alternative time zones. All CICPC programs are taught by subject matter experts from government and industry, many of whom also serve as faculty in our MS in information assurance degree program.

## 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 college 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 was established at Capitol College in 2002 with a grant from the National Aeronautics and Space Administration. It is a consortium of NASA, industry, government and education partners.

SOI combines the infrastructure necessary to manage satellite operations with an educational program that prepares students for careers in all aspects of space mission operations. SOI builds upon Capitol's established engineering foundation and works closely with NASA to understand the aerospace industry's changing skills requirements.

Full-time students enrolled in one of Capitol's engineering disciplines may apply for NASA and industry sponsored co-op positions. SOI co-op students work in one of our NASA Satellite control centers or development labs to gain practical experience that supplements their academic learning.

SOI is currently responsible for the Tropical Rainforest Measurement Mission (TRMM) satellite that is operated from the Goddard Space Flight Center. SOI is also responsible for redesigning the TRMM ground control system in Capitol's William G. McGowan Academic Center. SOI management is continually searching for new opportunities with NASA and private industry to expand training and learning opportunities for students including: research and development projects; ground system design, build and test; systems security and security management.

## 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, colleges or 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 College to engage students of all ages.

Working at the local, regional, and national levels, the Center will:

- assist the Capitol College 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 fields and continue to expand their interest in these fields as possible career choices;
- 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 college's academic offerings are strengthened by relationships with government agencies, professional societies and private industry.

## Anti-Terrorism Advisory Council

Capitol College is a member of the Maryland Anti-Terrorism Advisory Council. The Council works to combat terrorism in Maryland through four components: intelligence and information sharing; aggressive investigation and prosecution; emergency preparedness and response; and training. Membership includes federal, State and local agencies working in law enforcement, public health, and emergency planning and response, as well as the military, intelligence, and private sectors.

## CyberWATCH

Capitol College is a member of CyberWATCH, an Advanced Technological Education Center funded by a grant from the National Science Foundation. CyberWATCH, founded in 2005, is comprised of 64 member institutions (40 community colleges and 24 colleges/universities) and was established to address cyber security and information assurance education, including curriculum development, faculty professional development,

student development, career pathways, and public awareness.

## Graduate School, USDA

Capitol College and the Graduate School, USDA jointly offer online, noncredit courses in network security designed to meet the training needs of federal employees.

## InfraGard Maryland Members Alliance, Inc.

Capitol College is a sponsor of the InfraGard Maryland Members Alliance, a partnership between the Federal Bureau of Investigation and the private sector. Membership is comprised of individuals from industry, government, and academe who are dedicated to sharing information and intelligence to prevent hostile acts against the United States.

## Institute of Electrical and Electronics Engineers

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

## National Defense University

Capitol College is a partner with the National Defense University i-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 College graduate coursework.

## National Security Agency and Department of Homeland Security

The National Security Agency and the Department of Homeland Security initially designated Capitol College as a National Center of Academic Excellence in Information Assurance Education (CAEIAE) 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 College 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 Admin, and Security Management. For more information on these certificates see the Post-baccalaureate Certificates section of the college catalog.

## Maryland Community College Partner Institutions

Capitol College 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 Capitol College.

# Online Learning

Capitol College offers all graduate degrees and certificates entirely online. In addition, 3rd and 4th year courses leading to a BS in Business Administration, Information Assurance, or Management of Information Technology are available online for undergraduate degree completion at-a-distance. Students enrolled in Capitol's online programs meet in virtual classrooms, allowing them to complete courses from a distance. The curricula are supported by a web-based application that enables live delivery of interactive classes, and a course management system for the delivery of course materials, homework and discussion threads.

Online students participate in real-time class sessions each term or semester. Live audio lectures are transmitted over the Internet using Voice over Internet Protocol (VoIP). During the live lectures, students view lecture slides while listening to their professor speak in real-time. Student interactivity is encouraged and is made possible through chat and audio discussions. Similar to a traditional classroom, students can raise their hands using interface icons, and ask questions using a PC microphone or headset. Outside of the live classroom, the knowledge exchange continues as students download and view asynchronous 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. The asynchronous sessions supplement topics discussed during the live lecture.

To participate in Capitol's online courses, students must have access to a PC with the following minimum requirements:

- Pentium IV (350 MHz or more) with 128 MB RAM and 40 MB free space
- Microsoft 2000, XP, Vista, Mac OSX, (Windows XP (SP2) recommended)
- Internet Explorer 5.x, 6.x, , Firefox 1.0+ or Netscape 7.x (Internet Explorer 7.x recommended)
- Internet connection with a 56K modem or faster (Broadband connection recommended)
- A full-duplex sound card (SoundBlaster compatible) with headset or microphone and speakers

For technical assistance visit our support website at support.capitol-college.edu or email ask@capitol-college.edu. Phone support is available 9:30 a.m. to 10 p.m. Monday-Thursday and 9:30 a.m. to 5 p.m. Friday and Saturday at 888-522-7486 ext. 2011.

# 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 college regulations and curriculum requirements.

## Registration Procedures

Detailed registration information is provided before the beginning of each semester. Registration dates are listed in the college calendar beginning on page 110 and online. Students must be in good financial standing with the college 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 (both 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 college calendar beginning on page 110 and online.

## Cross Divisional Registration

Students pursuing an undergraduate degree who wish to enroll in graduate courses must meet with the dean responsible for the course and receive approval from the dean prior to registration. This includes concurrent undergraduate students taking graduate level coursework to meet graduate degree requirements and students substituting graduate courses for undergraduate degree requirements. Courses taken at the graduate level to satisfy undergraduate degree requirements will not be counted toward the graduate level should the student choose to pursue a graduate degree. Course substitutions will be necessary for completing graduate credit requirements. Students interested in cross divisional registration should submit the appropriate paperwork to the Office of Registration and Records.

## Audited Courses

Students who register to audit a course are charged the same tuition as those who register for credit. The grade of X is awarded at the end of the semester and is not used in computing the cumulative grade point average. Half-time, financial aid students that change to audit will have part or all of their aid returned to the federal government. Students receiving VA benefits will not receive payment for audited courses. Any student receiving financial aid contemplating an audit should contact the Office of Financial Aid. Once registered for audit, students are not permitted to change to credit after the first two weeks of the semester. The last day to change from credit to audit is listed in the college calendar beginning on page 110 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 appropriate academic dean 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 appropriate academic dean 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 or online. The academic dean must approve all changes of degree programs. Students who change their degree program are required to meet all requirements of the new programs 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 Regis-

tration 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 College. 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 their academic dean 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 75% refund. The second course drop period occurs following the period for 75% 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 classes for the semester (zero credits), he/she is considered withdrawing from the college 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 college calendar on page 110 and online.

## Withdrawal from the College

Students who want to withdraw from the college 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 College at the time of the withdrawal do not need to reapply to the college. 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 college may affect financial aid awards. Anyone receiving financial aid or VA benefits must see a financial aid administrator before withdrawing. Consult the college calendar on page 110 for specific withdrawal dates.

## Readmission

Students who withdraw from the college are eligible for readmission at any time, unless they have been in violation of the college's academic regulations, or have been dismissed for disciplinary reasons. Students who have been admitted to the college and interrupt their attendance for more than one academic year (three consecutive semesters) must resubmit an application 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 balances must be made with the Business Office before readmission is approved.

## Leave of Absence

Doctoral students may request a leave of absence by completing the "Request for Leave of Absence" form on the myCapitol

portal (Doctoral Student tab). When requesting a leave of absence, 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.

### Course Cancellation

The college 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 appropriate academic dean.

### Completion of English Courses

Students seeking bachelor's degrees at Capitol College 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 dean of business and information management before registering.

### Class Attendance

Each professor establishes regulations regarding class attendance at Capitol College. Regular class and laboratory attendance is necessary to achieve maximum success in college 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 college 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 Capitol College website.

Capitol College 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 college calendar beginning on page 110 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 College 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:

| Grade | Standard | Quality Points |
|---|---|---|
| A | Excellent | 4 |
| B | Good | 3 |
| C | Average* | 2 |

| | | |
|---|---|---|
| D | Below average** | 1 |
| F | Failing | 0 |
| I | Incomplete | 0 |
| NG | No grade | 0 |
| P | Pass | 0 |
| R | Repeat | 0 |
| S | Satisfactory | 0 |
| U | Unsatisfactory | 0 |
| V | Validation credit | 0 |
| W | Withdrawn (officially) | 0 |
| X | Audit | 0 |
| T | Transfer credit | 0 |

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

**Grades of D will not apply toward graduate program requirements.

## Grade Point Average

At the end of each semester, averages are computed for each student's record to indicate the general level of his or her academic standing. The first is the scholarship level for the semester. The second is the cumulative grade point average, indicating the scholarship level for all work taken at the college to date.

In cases where a student retakes a course, only the highest grade is used in computing the CGPA. The previous grade remains on record as information only. To graduate, undergraduate students must have a minimum 2.0 CGPA and a 2.0 GPA in their degree program. Graduate students must have a minimum 3.0 CGPA and a 3.0 GPA in their current degree program.

## Incomplete Grades

An incomplete (I) grade will not be given except in the case of a true emergency that can be documented by medical records, death certificates, etc. Even if a true emergency exists, a student will not be allowed an extension (an I grade) unless that student has been attending classes and has kept up with the work before the emergency.

When an I grade is submitted, the professor will complete an incomplete grade form in the Office of Registration and Records explaining the reasons for the I grade and listing the student's grades in the course. The student must then complete the work by the end of the fourth week of the next term, or the I will be converted to an F (unless the professor has specified that the I be converted to a C or D). After six months, the Academic Affairs Council must approve changes in grades.

## No Grade Mark

When it is not appropriate to award a grade, a mark of NG will be given. NG grades are not calculated in the student's term or CGPA.

## Grade Reports

Grade reports are available at http://mycapitol.capitol-college.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 resolve the issue in a satisfactory manner, the student may write a letter clearly explaining the situation to the appropriate academic dean. If the academic dean and student are unable to resolve the issue in a satisfactory manner, the student may appeal in writing to the vice president for academic affairs. The vice president will review the situation and may seek the advice of the Academic Affairs Council. The decision of the vice president is final and no further review will be granted. All appeals must be filed by the fourth week of the next term.

## Grade Changes

Occasionally, a grade must be changed as errors do occur. However, grade changes will not be accepted later than six months after a term has ended; therefore, if a student truly feels that a mistake has been made, he or she must investigate as soon as possible after the grade is issued. (see Grade Appeal above)

## Dean's List for Full-time Students

Full-time undergraduate students who have GPAs of 3.5 or higher, and no failing grades for the semester, qualify for the dean's list. Dean's list designation is included on the student's permanent record.

### Dean's List for Part-time Students

Part-time undergraduate students taking at least six semester credits, who have GPAs of 3.5 or higher and no failing grades for the semester, qualify for the dean's list for part-time students. Dean's list designation is included on the student's permanent record.

# Academic Performance

### Academic Standing

Students seeking a bachelor's or associate degree are in good academic standing if they have a cumulative grade point average of at least 2.0 in their degree program and are not on academic suspension. Students seeking a master's degree are in good academic standing if they have a CGPA of at least 3.0 and are not on academic suspension.

### 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 departmental dean 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 college if their GPA and CGPA are not brought up to good academic standing (see above).

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 and if obtained, the class must be repeated the next semester as an independent study or the student must move to a different cohort group. If a B or higher is not obtained on the third attempt, the student will be academically dismissed.

### 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 college until it is demonstrated to the faculty that they can achieve and maintain good academic standing at the college level.

Undergraduate students whose cumulative GPA has been below 2.0 for three consecutive semesters will be suspended from the college for one academic semester after which they may return to the college.

Students suspended from the college are not relieved of their financial obligations.

Upon return, students will remain on probation and must achieve and maintain good academic standing or be suspended from the college until it is demonstrated to the faculty that they can achieve and maintain good academic standing at the college level. To demonstrate to the faculty that a student can achieve and maintain good academic standing at the college level, he or she must complete at least six academic courses (a minimum of 18 credits) with grades of a C or better at another accredited college or university. Before a student is readmitted to Capitol College, the director of admissions will review his or her file.

### Academic Dismissal

After a second suspension, undergraduate students who have been readmitted to Capitol College 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 College. 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 college for at least one year after the effective date of dismissal.

Students dismissed from the college 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 academic dean 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.

### Disciplinary Dismissal

The continued enrollment of any student is dependent upon proper conduct. Failure to comply with the college's regulations, or conduct deemed by the faculty as inconsistent with general good order, is regarded as sufficient cause for irreversible dismissal. The college reserves the right to terminate a student's enrollment at any time for cause. Students dismissed from the college are not relieved of their financial obligations.

## Matriculation

### Classification of Undergraduate Students

| | |
|---|---|
| Freshman | 29 semester credits or fewer |
| Sophomore | 30-65 semester credits |
| Junior | 66-95 semester credits |
| Senior | 96 semester credits or more |

### Residency Requirements

A minimum of 30 semester credits, including 15 semester credits in the student's degree program, must be completed at Capitol College in order to receive an associate degree. A minimum of 40 semester credits, including 20 semester credits in the student's degree program, must be completed at Capitol College in order to receive a bachelor's degree. An exception is made for undergraduate active duty military. The residency requirement is 25% of the degree requirements for campus based programs and 30% for online programs.

For all BS degrees, at least 39 credits must be 300-level or above to qualify for graduation.

Students who want to take College Level Examination Program (CLEP) examinations must do so during the first two semesters of study at Capitol College. Students who want to take courses at another institution for possible transfer after enrolling at Capitol College must receive prior written permission from the appropriate academic dean. Transfer credit approval forms are available at the Office of Registration and Records and online.

Graduate degrees must be completed in their entirety at Capitol College, with the exception of students transferring courses in accordance with the transfer credit policy on page 18 of this catalog.

Students pursuing a Capitol College certificate must complete all required coursework through Capitol College.

## Enrollment Status

### Undergraduate

1-11 credits is considered part time
12-18 credits is considered full time

### Graduate

1-8 credits is considered part time
9 or more credits is considered full time
For federal and Veterans' benefits enrollment requirements, see page 29.

## Graduation Requirements

Capitol College conducts the annual commencement ceremony at the Laurel campus in May. Transcripts always reflect the exact semester the degree program is completed. The "date degree conferred" information on transcripts and diplomas is the month and year of the next commencement ceremony, except for students completing their degree requirements during the summer in August.

### Undergraduate Requirements

Undergraduate students must have satisfactorily completed the curriculum requirements for their degree program with a CGPA and degree program GPA of at least 2.0 and must have satisfied the Capitol College residency requirements as listed.

Undergraduate students who complete all degree requirements by the end of the summer session are permitted to take part in the commencement ceremonies as degree candidates. If a student is not enrolled for the summer by April 15, permission to participate as a degree candidate will not be granted.

Undergraduate students must file an application for graduation with the Office of Registration and Records no later than six months before the semester of completion. The student's file is reviewed and forwarded to the appropriate academic dean 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, 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.

### Graduate Requirements

Graduate students must have a minimum 3.0 CGPA. Grades of D will not apply towards graduate program requirements. Graduate students must submit an application for graduation no later than the end of January to be considered and included in the May commencement ceremony. The graduation fee, due by April 15, cannot be waived. The form, available online and in the Office of Records and Registration, is required so that orders for diplomas and commencement regalia can be placed before commencement. Diplomas will be released only after graduation fees are paid.

Graduate students who complete all degree requirements by the end of the summer (term I, term II or in summer semester classes) are permitted to take part in commencement ceremonies as degree candidates. If a student is not enrolled for the summer by April 15, permission to participate as a degree candidate will not be granted.

### Time Limit for Degree Completion

Graduate students are required to maintain satisfactory progress toward the completion of degree requirements, which must be accomplished within seven years. The seven-year period begins when the oldest course applied to the degree was completed. This includes any transfer credits from other institutions.

Doctoral students are required to maintain satisfactory progress toward the completion of course requirements, which must be accomplished within five years. Students then have an additional two years to complete their dissertation.

### Graduation Clearance

In the final weeks of their last semester of study, students should check with the Business Office, the Office of Financial Aid, the Office of Residence Life and the Puente Library to be certain that they have no outstanding obligations. Diplomas and transcripts will not be issued for students who have outstanding library books or fines, outstanding balances in the Business Office, or for financial aid recipients who have not had exit interviews with the Office of Financial Aid.

## 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 - 3.89 | magna cum laude |
| 3.5 - 3.749 | cum laude |

**Graduate and Doctoral**

| | |
|---|---|
| 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 graduate student is completing more than one degree, the CGPA within their degree program 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 College. Membership is based on demonstrated service to the college 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 College 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 the Alpha Chi Recorder; leadership through National Council membership; financial assistance through National Benedict Fellowships, Nolle Scholarships and several regional scholarships; and participation in local chapter projects and activities.

**Tau Alpha Pi National Honor Society**

The Kappa Alpha Chapter represents the Tau Alpha Pi National Honor Society at Capitol College. Membership requirements include successful completion of at least 55 semester credit hours and at least 24 semester credit hours at Capitol College, enrollment in one of the degree programs, a CGPA of at least 3.5 for two consecutive semesters and a willingness to lead and serve in capacities beneficial to the college community. Members are elected for life. The chapter holds dinner meetings to recognize new members and encourages alumni participation.

**Eta Kappa Nu National Honor Society**

The Kappa Mu Chapter of Eta Kappa Nu at Capitol College is a national honor society for electrical engineers. HKN was founded in 1904 and enjoys a membership of over 175,000, representing 198 chapters. This prestigious organization is the only honor society solely devoted to electrical engineering. A successful candidate possesses proven character, perseverance and the ability to excel. This organization extends membership to the top juniors and seniors in the fall and spring semesters. Officers are elected in the fall.

**Sigma Delta Beta**

The purposes of Sigma Beta Delta are to encourage and recognize scholarship and achievement among students of business, management and administration, and to encourage and promote personal and professional improvement and a life distinguished by honorable service to humankind. Membership in Sigma Beta Delta is the highest national recognition a business student can receive at a college or university with a Sigma Beta Delta chapter. To be eligible for membership, a business student must rank in the upper 20 percent of the junior, senior or master's class and be invited to membership by the faculty officers.

# 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 College, 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 matricu-

late at Capitol College, they must meet the academic standards for their degree program.

Capitol College will consider credit for transfer from coursework completed at a regionally accredited institution, ABET-accredited program, or, in special cases, other qualified institutions acceptable to the standards of Capitol College. Capitol College 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 College 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 College 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 College 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 16.

Capitol College 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)

There is no maximum amount of credits that can be transferred from a four-year accredited institution as long as residency requirements are met.

### Military Credits

Capitol College 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 College Office of Registration and Records.

### Two-year Programs

No junior- or senior-level courses in technical areas, such as computers, electronics or telecommunications, will transfer from two-year programs. Capitol College may grant a waiver for upper-level courses, but these must be replaced with other upper-level courses in the same subject area. Contact the assistant director of registration and records in the Office of Registration and Records for specific course transfer information from community colleges.

### Industrial Courses

Capitol College 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 and Certification Exams

Capitol College will not accept continuing education units (CEU) for transfer. Students may obtain credit by taking validation exams. Results from a certification exam, including Microsoft and Cisco, may not be used for transfer.

### CLEP Tests

Students who want to take CLEP exams must do so during their first two semesters of study at the college. The official results of all CLEP exams must be submitted to the Office of Registration and Records no later than two semesters before completion.

### Work/Life Experience and Validation Credit

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 appropriate academic dean 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 quality points are awarded with validation credit.

**Waived/Substituted Courses**

In some circumstances, transfer credits may count toward a waived or substituted course. If a Capitol College 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 appropriate academic dean.

**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 departments. Once the student is enrolled at Capitol College, 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 College 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 College, all remaining credits must be completed at Capitol College.

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 and will be removed from the student's transcript. 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 2011-2012 academic year beginning fall 2011 and continuing through summer 2012. Tuition rates are subject to change without notice.

## Undergraduate Tuition

**Engineering, Computer and Technology Degree Programs**

| | |
|---|---|
| Full-time tuition, per semester (12-18 credits) | 10,200 |
| Full-time credits above 18 (per credit) | 850 |
| Part-time 1-11 credits (per credit) | 654 |
| Audited courses (per credit) | 654 |
| Southern Maryland Higher Education Center (per credit) | 537 |

**Business and Management Degree Programs**

| | |
|---|---|
| On-campus and Online (per credit) | 354 |
| Independent Study (per credit) | 426 |
| Southern Maryland Higher Education Center (per credit) | 354 |
| 3-credit course, plus fees | 1,062 |

## Graduate Tuition

**Master's Programs**

| | |
|---|---|
| Online (per credit) | 554 |
| Independent study (per credit) | 684 |
| Southern Maryland Higher Education Center (per credit) | 554 |
| Online 3-credit course, plus fees | 1,707 |

**Doctoral Program**

| | |
|---|---|
| Per credit | 721 |
| 3-credit course | 2,163 |

## 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 |
| Returned check | 40 |
| Check stop payment request | 40 |

**Undergraduate On-campus Student Services, per semester**

| | |
|---|---|
| Resident students | 60 |
| Full-time commuter students (12+ credits) | 36 |
| Part-time commuter students (1-11 credits) | 10 |

**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 |
| Graduate (per credit) | 15 |

**Academic Services**

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

**Graduation** (non-refundable)

| | |
|---|---|
| AAS degree programs | 75 |
| BS, MS, MBA degree programs | 150 |
| DSc degree program | 200 |

| | |
|---|---|
| **Validation exam** | 250 |
| **Doctorate entrance exam** | 100 |
| **Business and Management Degree Subscription Fee** (per academic year) | 16 |

**Campus Residence Halls**

| | |
|---|---|
| Single room (per semester) | 2,845 |
| Double room (per semester) | 2,456 |
| Triple room (per semester) | 1,931 |
| Room reservation deposit, continuing students | 50 |
| Security deposit (refundable)* | 200 |

**Off-Campus College Housing**

| | |
|---|---|
| Single room (per semester) | 2,950 |

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

## Full-time Student Tuition Lock

Capitol College 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 eli-

gible 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 110 for due dates.)
- Remain in good academic standing. (See page 15 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 24)
- VA Benefits (see page 29)
- 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 end of the fourth week of classes and one-third on or before the end of the eighth week. Students taking 8-week classes may also 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 college. 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.

## Master's Program Payment Options

- Full payment at time of registration
- Deferred payment plan
- Financial aid (see page 24)
- VA Benefits (see page 29)
- Employer reimbursement
- Employer sponsorship

## Doctorate Program Payment Options

- Full payment prior to start of classes
- Financial aid (see page 24)
- VA Benefits (see page 29)
- Employer sponsorship

### Master's Programs Deferred Payment Plan

Masters students are required to pay 50 percent of tuition upon registration. If tuition is not paid in full at the start of classes, students will be automatically enrolled in the deferred payment plan and assessed a $30 deferment fee. The remaining balance is due four weeks after classes begin. Nonpayment of tuition could result in cancellation of student registration.

### Graduate Employer Sponsorship

Graduate students (masters and doctorate) 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.

### Graduate Employer Tuition Reimbursement

Graduate students (masters and doctorate) who are reimbursed by an employer must submit authorization forms to the Business Office at the time of registration along with one third (1/3) of the tuition cost. Balance is due ten (10) days after classes end. Students who do not pay within the ten days will be subject to deferment fees and required to follow the standard payment options in the future.

## Financial Aid

All students who receive financial aid are required to pay the remaining balance in full or follow the appropriate deferred payment plan. If funds have not been received by the college from a particular financial aid source, that amount will not be credited to the student's account and cannot be provided to the student, even if notification of the award has been received.

## Book Vouchers

All students receiving financial aid in excess of tuition, fees and on-campus housing charges may be considered for a book voucher. The Business Office must receive all financial aid proceeds, including federal and private loans, for students to receive a book voucher.

## Obligation for Payment

Tuition and fees for all students become an obligation in accordance with the provisions of the refund schedule in this section. Failure to pay any debt when due to the college is considered sufficient cause to bar the student from classes or examinations or to withhold diploma, scholastic certificate or transcript of record. Students with outstanding accounts will be sent to collections. Collection or litigation expenses associated with this account are the responsibility of the student. Students whose accounts are past due one semester will be notified that their accounts are in jeopardy of being referred to a collection agency.

## 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 College.

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 110 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
25% Student drops during the fourth week of classes
0% Student drops after the fourth 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 College 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 = the 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:

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 and the student 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 to him/her, the institution would owe the student a post-withdrawal disbursement that must be paid within 120 days of the student's withdrawal.

Refunds are allocated in the following order:

- Unsubsidized Direct Stafford Loans (other than PLUS loans)
- Subsidized Direct Stafford Loans
- Federal Perkins Loans
- Direct PLUS Loans
- Federal Pell Grants for which a return of funds is required
- Academic Competitiveness Grant
- National SMART Grant
- Federal Supplemental Opportunity Grants for which a return of funds is required

According to federal regulation, a financial aid student who receives all Fs during a period of enrollment is considered not to have attended any of his or her classes; therefore, all financial aid received for that period of enrollment must be returned to the Department of Education. Financial aid will not have to be returned to the federal government if at least one of the student's professors verifies that the student has been in class and really earns the failing grade. The return of financial aid does not relieve the student of financial obligations.

# Financial Aid

Capitol College understands that paying for college is a major hurdle for parents and students. To help families meet tuition and living expenses, the college 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 may only repeat a course twice and must demonstrate satisfactory progress toward degree completion.

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

## 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 College on the FAFSA, School Code 001436 so the FAFSA information will be electronically forwarded to the college. 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 by the return date. Failure to return a signed copy of the award letter will result in cancellation of the financial aid award.

## 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 24.

## 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 SAP policy is separate from the College'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.

### 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 or 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 College website. Additionally, for an undergraduate the time frame cannot exceed 150% of the published length of the program measured in academic years or credit hours attempted, as determined by the College. For instance, if the published length of your academic program is 120 credit hours, the maximum period must not exceed 180 (120 x 1.5) attempted hours.

To be in compliance, you must complete your credit hours as listed at right.

Not meeting these standards 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 meet with the College advisor to develop a success plan and to receive approval for courses the student wishes to register for during the warning period.

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.

**Undergraduate Credit Hours**

| **Half-time Students** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| Credits (5.5 credits per semester) | 11 | 12 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| **Three-quarter-time Students** | | | | | | | | | | | | |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **X** | **X** | **X** |
| Credits (7.5 credits per semester) | 15 | 28 | 44 | 59 | 73 | 88 | 103 | 117 | 132 | X | X | X |
| **Full-time Students** | | | | | | | | | | | | |
| **Year** | **1** | **2** | **3** | **4** | **5** | **6** | **X** | **X** | **X** | **X** | **X** | **X** |
| Credits (11 credits per semester) | 22 | 44 | 66 | 88 | 110 | 132 | X | X | X | X | X | X |

## 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 their 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 17.

## 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 College'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 College 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 College 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 college. 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 College Board of Trustees, this scholarship is the highest offered by the college 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 college Board of Trustees members.

#### Capitol College Scholarship

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

### Corporate and Foundation Scholarships

A number of corporations and foundations have invested funds with the college 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 considered 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, no later than March 1 before the academic year they want to be considered for a corporate and foundation scholarship. Applications can be obtained in the Office of Financial Aid. 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 available 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.

#### Academic Competitiveness Grant

These federal grants are awarded to Pell Grant eligible U.S. citizens who have completed a rigorous secondary school program of study. A first-year student , must have com-

pleted a secondary school after January 1, 2006 and a second-year student must have completed secondary school after January 1, 2005, and have at least a 3.0 grade point average as of the end of the first academic year of undergraduate study.

#### National Science and Mathematics Access to Retain Talent Grant (National SMART Grant)

An eligible student must receive a Pell Grant during the same award year; be a U.S. citizen; be a full-time student in his or her third or fourth academic year of undergraduate degree study; be pursuing a major in physical, life, or computer sciences, mathematics, technology, engineering or critical foreign language; and have at least a 3.0 grade point average as of the end of the second award year and continue to maintain a 3.0 grade point average. Eligibility will be reviewed at the beginning of each award period (e.g. semester).

#### 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, Part-time Grant and Professional Scholarship Program) are awarded to full-time eligible students who filed their FAFSA after the state's March 1 deadline. Funds are limited.

## 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. Loans are obtained from lenders selected by applicants. 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 the college website.

#### 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 College 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 College that while class is in session during fall and spring, students cannot work more than 20 hours each week.

### Capitol College Work-Study

Students not awarded Federal Work-Study can consider employment under the Capitol College Work-Study Program. Funding for this program is provided by various campus departments. Admitted students can contact the Office of Financial Aid 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, Jay-

cees, 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.

**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 Financial Aid.

**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 College student handbook contains additional information about financial aid at Capitol College.

## Student Complaints

A student who wishes to file a complaint against the College should contact the Maryland Higher Education Commission, 839 Bestgate Road, Suite 400, Annapolis, MD 21401, 410-260-4500 and/or the College'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
- Electrical Engineering
- Electronics Engineering Technology
- Information Assurance
- Management of Information Technology
- Software Engineering
- Software and Internet Applications
- Telecommunications Engineering Technology

## Associate in Applied Science (AAS) Degrees

- Computer Engineering Technology
- Electronics Engineering Technology
- Telecommunications Engineering Technology

### Programs of Study

Capitol College's programs of study for associate in applied science and bachelor of science degrees are outlined beginning on page 35.

### Undergraduate Certificates

**Lower Division**

- Financial Management
- Object-Oriented Programming
- Operations Management
- Programming and Data Management
- Web Programming

**Upper Division**

- Computer and Network Security
- Personnel Management
- Software Engineering
- Space Missions and Operations Specialist
- Website Development

Requirements for undergraduate certificates are outlined beginning on page 50.

# 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 College 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. 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 college website.

3. Forward the official high school transcripts to the Office of Admissions.

4. Submit SAT or American College Test (ACT) scores to the Office of Admissions.

**Admissions Requirements**

All applicants receive a comprehensive evaluation of their previous school records. Admissions decisions are based on the applicant's course preparation, high school grade point average (GPA), class rank and standardized test scores. Scholarship consideration is given based on GPA test scores, along with the admissions essay, letters of recommendation and a personal interview.

High school course preparation should include a minimum of four units of English, three units of mathematics (including plane geometry and Algebra II), two units of lab science and two units of social sciences.

Students whose GPA, course preparation and/or test scores do not meet the general admissions requirements may be further considered if they submit an admissions essay, letters of recommendation, placement tests and visit the campus for a personal interview.

The minimum GPA required for admission to Capitol College is 2.2 on a 4.0 scale. The

minimum SAT score is 800 composite. The minimum ACT score is 17 composite.

#### Engineering Applicants

Applicants to the engineering programs must have an additional unit of mathematics or entry into college calculus, an additional unit of laboratory science (physics or chemistry), an overall high school GPA of at least 2.8, and a minimum SAT score of 900 with at least a 500 on the Math section (or an ACT score of at least 19).

Engineering applicants who do not meet these additional criteria, but meet the general admissions criteria, will be accepted into an engineering technology program for their freshman year. After successful completion of the freshman year, students may transfer into the engineering program with academic dean approval.

#### Tuition Deposit

Upon acceptance, all full-time applicants are required to pay a nonrefundable $200 tuition deposit or $200 housing deposit to the college. The tuition deposit is credited to the applicant's first-semester tuition. The housing deposit is held until graduation, or permanent move to off-campus housing.

## Full-Time Transfer Students

A full-time transfer student is defined as any applicant who is eligible to transfer 15 or more semester credits from an accredited higher education institution to Capitol College and will attend 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. 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 college 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 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 18 of this catalog.

### Admissions Requirements

Full-time transfer applicants who have successfully completed an associate or bachelor's degree are generally accepted into Capitol College 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), 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 College on a part-time basis. A part-time student may carry 1-11 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 college 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 18 of this catalog.

### Admissions Requirements

Part-time applicants who have successfully completed an associate or bachelor's degree are generally accepted into Capitol College 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 College 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 college 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 College 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 30 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 College, has not attended Capitol College in at least one full academic year and wants to resume study. Students who were at any time in violation of the college'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 College'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 fulfilled 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@capitol-college.edu.

### Certificate Students

An undergraduate certificate student is any student pursuing one or more of Capitol College'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 college 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 College. 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 college 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 College, non-degree students must complete the admissions procedure for degree-seeking status, or receive approval for continued non-degree status from the appropriate academic dean.

## 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 on a student visa. Eligibility requirements, listed below, must be met for acceptance. International students are not eligible for institutional scholarships or federal 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 $150 nonrefundable admissions processing fee with the application. (Applications remain on file for one academic year.)

3. Verify that you meet the academic and financial requirements stated below.

**Academic Requirements**

Submit certified transcripts (with English translations) of secondary school and/or college records, or examination results when periodic grades are not used for measurement purposes. The college may require that you have your transcripts evaluated by a recognized credential evaluation service.

Applicants should have two years of college preparatory mathematics, such as algebra, geometry and trigonometry.

English proficiency for direct admission into a degree program:

TOEFL paper-based test score of 500 or computer-based test score of 173, or proof of completing a specified level of proficiency at an English language school, or satisfactory completion of English courses at an accredited university or college within the United States.

**Financial Requirements**

International students must submit evidence of sufficient financial resources for living and educational expenses. Support documents must be dated within the last six months. Proof of financial support can be in one of the following forms:

A letter of sponsorship or scholarship from a government agency or corporation. This letter of sponsorship must be an original and outline specific billing procedures.

Complete the declaration and certification of finances form. This form must be accompanied by supporting bank statements or employment verification. Include signatures or original letters of support from each sponsor.

Students who have not provided valid evidence of sponsorship from a government agency or corporation must make a tuition deposit of $500 prior to formal acceptance and issuance of I-20.

Applicants can expect an answer from the college three to five weeks after receipt of all necessary documents. All international students must join the college health insurance program, unless adequate coverage is proven.

# Astronautical Engineering

The astronautical engineering (AE) program is structured to prepare students for engineering careers in the space industry, primarily with NASA Goddard Space Flight Center. Students learn to work as mission specialists with an engineering understanding of the spacecraft, terrestrial systems and space-based platforms required to support a mission; create software applications that can be integrated into space operations to support missions; and design electrical and electronic systems for space mission applications. AE majors study the fundamentals of space operations and technology, flight dynamics maneuvering and propulsions systems and spacecraft design, as well as earth science and NASA missions devoted to the study of the planet. 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, test and deliver a space operations or hardware project that meets specifications.

## Course Requirements

**Bachelor of Science** **130/131 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Computer Sciences | | 4 Credits |
| CS-130 | Computer Science Fundamentals I | 4 |
| Engineering | | 45 Credits |
| AE-150 | Introduction to Space | 3 |
| AE-311 | Spacecraft Systems | 3 |
| AE-351 | Orbital Mechanics | 3 |
| AE-361 | Remote Sensing | 3 |
| AE-401 | Computational Dynamics | 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 |
| EE-463 | Control II | 3 |
| Astronautical 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 |
| 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-261 | Calculus I | 4 |
| MA-262 | Calculus II | 4 |
| MA-263 | Calculus III | 4 |
| MA-300 | Mathematical Methods | 3 |
| MA-340 | Ordinary Differential Equations | 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 | | 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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 | Legal Environment of Business | 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 |
| Business Fundamentals | | 18 Credits |
| BUS-174 | Introduction to Business and Management | 3 |
| BUS-279 | Introduction to Leadership | 3 |
| BUS-283 | Managerial Accounting | 3 |
| BUS-372 | Financial Management | 3 |
| BUS-375 | Human Resource Management | 3 |
| BUS-454 | International Business | 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 | | 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/History/Philosophy electives (2)* | | 6 |
| Social Sciences electives (2)* | | 6 |
| Information Technology | | 15 Credits |
| CT-101 | Computer Applications | 3 |
| 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 | | 12 Credits |
| BUS-400 | Research Methods | 3 |
| MA-110 | Business Math | 3 |
| MA-128 | Introduction to Statistics | 3 |
| Science elective | | 3 |

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

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to analyze and determine the needs of a system and apply engineering principles to create hardware and software solutions. The main objective of the program is to produce practical design engineers. CE majors study digital systems, computer organization and architecture, software design and testing, operating systems and programming languages, micro-controller 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** **130/131 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Computers and Programming | | 16 Credits |
| CS-130 | Computer Science Fundamentals I | 4 |
| CS-220 | Database Management | 3 |
| CS-230 | Computer Science Fundamentals II | 3 |
| CS-418 | Operating Systems | 3 |
| CT-152 | Introduction to Unix | 3 |
| Engineering | | 36 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 (4)* | | 12 |
| 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 Science elective (2)* | | 6 |
| Mathematics and Sciences | | 34 Credits |
| CH-120 | Chemistry | 3 |
| MA-124 | Discrete Mathematics | 3 |
| MA-261 | Calculus I | 4 |
| MA-262 | Calculus II | 4 |
| MA-300 | Mathematical Methods | 3 |
| MA-340 | Ordinary Differential Equations | 3 |
| MA-345 | Probability and Statistics for Engineers | 3 |
| PH-261 | Engineering Physics I | 4 |
| PH-262 | Engineering Physics II | 4 |
| Physics or science elective | | 3 |
| Technical Courses | | 17 Credits |
| EE-159 | Circuit Theory | 4 |
| EL-200 | Electronic Devices and Circuits | 4 |
| EL-204 | Digital Electronics | 3 |
| EL-262 | Microprocessors and Microassembly | 3 |
| IAE-201 | Intro to Information Assurance | 3 |

* See appropriate department for approved list.

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to work in a wide range of technical jobs in the information technology industry. The main objective of the program is to produce technologists who support industry in areas ranging from telecommunications and manufacturing to computer 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. 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

**64/65 Credits**

| *Course* | | *Credits* |
|---|---|---|
| English Communications | | 6 Credits |
| EN-101 | English Communications I | 3 |
| EN-102 | English Communications II | 3 |
| Humanities and Social Sciences | | 7 Credits |
| FS-100 | Freshman Seminar | 1 |
| History/Humanities/Philosophy elective (1)* | | 3 |
| Social Sciences elective (1)* | | 3 |
| Mathematics and Sciences | | 20 Credits |
| MA-114 | Algebra and Trigonometry | 4 |
| MA-124 | Discrete Mathematics | 3 |
| MA-128 | Introduction to Statistics | 3 |
| MA-261 | Calculus I | 4 |
| PH-201 | General Physics I | 3 |
| PH-202 | General Physics II | 3 |
| Technical Courses | | 32 Credits |
| CS-130 | Computer Science Fundamentals I | 4 |
| CS-230 | Computer Science Fundamentals II | 3 |
| CT-115 | Introduction to Programming | 3 |
| CT-152 | Introduction to Unix | 3 |
| EL-100 | Introductory DC/AC Circuits | 3 |
| EL-200 | Electronic Devices and Circuits | 4 |
| EL-204 | Digital Electronics | 3 |
| EL-262 | Microprocessors/Microassembly | 3 |
| IAE-201 | Intro to Information Assurance | 3 |
| TC-110 | Introduction to Telecommunications | 3 |

**Bachelor of Science 131/132 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 |
| Humanities and Social Sciences | | 12 Credits |
| HU-331 or HU-332 Arts and Ideas | | 3 |
| SS-351 | Ethics | 3 |
| History/Humanities/Philosophy elective (1)* | | 3 |
| Social Science elective (1)* | | 3 |
| Mathematics and Sciences | | 13 Credits |
| CH-120 | Chemistry | 3 |
| MA-262 | Calculus II | 4 |
| MA-300 | Mathematical Methods | 3 |
| Math or Science elective (1)* | | 3 |
| Technical Courses | | 39 Credits |
| CS-220 | Database Management | 3 |
| CS-418 | Operating Systems | 3 |
| CT-240 | Network Routers and Switches | 3 |
| EE-304 | Digital Design I | 3 |
| EE-354 | Digital Design II | 3 |
| EE-362 | Microcontroller System Design | 3 |
| EL-452 | Automated Test Systems | 3 |
| SE-458 | Senior Project | 3 |
| TC-309 | Network Sim & Modeling | 3 |
| Technical elective (1) | | 3 |
| Technical elective (1) (2xx or above) | | 3 |
| Technical electives (2) (3xx or above) | | 6 |

* See appropriate department for approved list.

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to work in a wide variety of careers in the computer field, from software programming to system design to network security and administration. The main objective of the program is to encourage critical thinking and thoughtful ethical behavior and to foster professional programming practices and promote sound planning and design techniques. CS majors study programming languages, computational science, algorithms and complexity, the architecture and organization of computers, software engineering, human-computer interaction, intelligent systems, information management, and the social and professional issues associated with the practice of computer science. All students complete a capstone course in which they propose, design, build, test and deliver a computer-based system.

## Course Requirements

**Bachelor of Science 127/128 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 | | 46 Credits |
| CS-130 | Computer Science Fundamentals I | 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-320 | Database Administration | 3 |
| CS-351 | Assembly Language | 3 |
| CS-405 | Introduction to Software Design with UML | 3 |
| CS-407 | Database Systems Implementation | 3 |
| CS-418 | Operating Systems | 3 |
| CT-115 | Introduction to Programming* | 3 |
| CT-152 | Introduction to Unix | 3 |
| SE-321 | Human Computer Interaction | 3 |
| SE-458 | Senior Project | 3 |
| Computer Science Electives | | 12 Credits |
| Computer Science electives (4)** | | 12 |
| Humanities and Social Sciences | | 22 Credits |
| FS-100 | Freshman Seminar | 1 |
| HU-331 or HU-332 | Arts and Ideas | 3 |
| SS-272 | Group Dynamics | 3 |
| SS-351 | Ethics | 3 |
| History/Humanities/Philosophy elective (2)*** | | 6 |
| Social Science elective (1)*** | | 3 |
| Social Science/Management elective (1)*** | | 3 |
| 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 |

* Students who validate CT-115 or who place into Calculus I may replace this course with any technical course not already required for the CS degree.
**Students who do not test into Calculus I may use MA-114 here. CT-240 is recommended for students interested in additional networking courses. CT-102 and CS-356 are recommended for students interested in constructing websites with dynamic webpages. CS-432 is recommended for students interested in taking CS-513 in the MSCS program.
***See appropriate department for approved list.

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students start in the program with basic circuit theory with 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, analyze and deliver a working prototype circuit to meet engineering standards and realistic constraints.

## Course Requirements

**Bachelor of Science** **135/136 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Electrical Engineering | | 48 Credits |
| EE-304 | Digital Design I | 3 |
| EE-309 | Circuit Design and Simulation | 3 |
| EE-359 | High Frequency Circuit Design | 3 |
| EE-362 | Microcontroller System Design | 3 |
| EE-406 | Signals and Systems | 3 |
| EE-409 | Network Analysis and Synthesis | 3 |
| EE-419 | Electrostatics | 3 |
| EE-453 | Control I | 3 |
| EE-456 | Digital Signal Processing | 3 |
| EE-458 | Senior Project | 3 |
| EE-459 | Electromagnetic Field Theory | 3 |
| EE-461 | Communications Theory | 3 |
| EE-463 | Control II | 3 |
| Computer elective (1)* | | 3 |
| 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 |
| 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 Science electives (2)* | | 6 |
| Mathematics and Sciences | | 39 Credits |
| CH-120 | Chemistry | 3 |
| MA-261 | Calculus I | 4 |
| MA-262 | Calculus II | 4 |
| MA-263 | Calculus III | 4 |
| MA-300 | Mathematical Methods | 3 |
| 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 | 4 |
| EL-204 | Digital Electronics | 3 |
| 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to work in a wide range of practical electronics jobs and conduct design and theory work in the electronics field. 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. 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. 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 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 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

**65/66 Credits**

| *Course* | | *Credits* |
|---|---|---|
| English Communications | | 6 Credits |
| EN-101 | English Communications I | 3 |
| EN-102 | English Communications II | 3 |
| Humanities and Social Sciences | | 7 Credits |
| FS-100 | Freshman Seminar | 1 |
| Humanities elective (1)* | | 3 |
| Social Science elective (1)* | | 3 |
| Mathematics and Sciences | | 18 Credits |
| MA-114 | Algebra and Trigonometry | 4 |
| MA-261 | Calculus I | 4 |
| MA-262 | Calculus II ** | 4 |
| PH-201 | General Physics I | 3 |
| PH-202 | General Physics II | 3 |
| Technical Courses | | 35 Credits |
| CT-115 | Introduction to Programming*** | 3 |
| 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.
*** Students with some computer background should take CS-130.

**Bachelor of Science 134/135 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 | | 12 Credits |
| CH-120 | Chemistry | 3 |
| MA-300 | Mathematical Methods | 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 |
| EL-452 | Automated Test Systems | 3 |
| OP-301 | Fiber Optic Communications | 3 |
| Technical elective (1)** | | 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# Information Assurance

The Capitol College Bachelor of Science in Information Assurance (BSIA) Program is designed to meet current and anticipated needs for highly-skilled information assurance 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 BSIA 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, BSIA students complete courses by the end of their sophomore year that prepare them to pass industry certification exams to include A+, Network+, and Security+. By attaining a combination of the BSIA degree and one or more of the industry certifications, graduates of Capitol College 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 | | 25 Credits |
| CS-130 | Computer Science Fundamentals I | 4 |
| CS-220 | Database Management | 3 |
| CS-230 | Computer Science Fundamentals II | 3 |
| CS-320 | Database Administration | 3 |
| CT-115 | Introduction to Programming | 3 |
| CT-152 | Introduction to Unix | 3 |
| NT-100 | Computer Architecture & Construction | 3 |
| SE-458 | Senior Project | 3 |
| Information Assurance Courses | | 24 Credits |
| IAE-201 | Introduction to Information Assurance Concepts | 3 |
| IAE-301 | Comprehensive Computer and Network Security I* | 3 |
| IAE-302 | Comprehensive Computer and Network Security II* | 3 |
| IAE-315 | Secure System Administration and Operation* | 3 |
| IAE-325 | Secure Data Communications and Cryptography* | 3 |
| IAE-402 | Introduction to Incident Handling and Malicious Code* | 3 |
| IAE-406 | Digital Forensics* | 3 |
| IAE-410 | Design and Testing* | 3 |
| Mathematics and Sciences | | 17 Credits |
| MA-114 | Algebra and Trigonometry | 4 |
| MA-124 | Discrete Mathematics | 3 |
| MA-128 | Introduction to Statistics | 3 |
| MA-261 | Calculus I | 4 |
| Science elective (1)** | | 3 |
| Telecommunications and Networking | | 9 Credits |
| CT-240 | Internetworking with Routers and Switches | 3 |
| TC-110 | Introduction to Telecommunications | 3 |
| NT-150 | Computer Networking | 3 |
| Management | | 6 Credits |
| BUS-174 | Introduction to Business and Management | 3 |
| BUS-301 | Project Management | 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 |
| Humanities and Social Sciences | | 18-19 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 |
| General Electives | | 19-21 Credits |

* Offered online only.
** See appropriate department for approved list.

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# Management of Information Technology

The management of information technology (MIT) program prepares students for positions in the information technology 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. MIT 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 |
| CT-101 | Computer Applications | 3 |
| CT-102 | Introduction to Internet Applications | 3 |
| CT-115 | Introduction to Programming | 3 |
| CT-152 | Introduction to Unix | 3 |
| IAE-201 | Introduction to Information Assurance Concepts | 3 |
| IAE-301 | Comprehensive Computer and Network Security I* | 3 |
| IAE-302 | Comprehensive Computer and Network Security II* | 3 |
| IAE-402 | Introduction to Incident Handling and Malicious Code* | 3 |
| TC-110 | Introduction to Telecommunications | 3 |
| General 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 |
| 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 | | 9 Credits |
| MA-110 | College Math w/Business Apps | 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to analyze and determine the needs of a system and apply engineering principles to create software and hardware solutions. The main objective of the program is to produce practical design engineers. 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 132/133 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Computers and Software | | 37 Credits |
| CS-130 | Computer Science Fundamentals I | 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-405 | Introduction to Software Design with Unified Model Language | 3 |
| CS-418 | Operating Systems | 3 |
| CS-432 | Computer Graphics | 3 |
| CT-115 | Introduction to Programming | 3 |
| CT-152 | Introduction to Unix | 3 |
| IAE-201 | Intro to Information Assurance | 3 |
| SE-458 | Senior Design Project | 3 |
| Engineering | | 21 Credits |
| EE-304 | Digital Design I | 3 |
| EE-362 | Microcontroller System Design | 3 |
| EE-364 | Computer Architecture | 3 |
| SE-321 | Human Computer Interaction | 3 |
| Software 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 |
| General Electives | | 6 Credits |
| General electives (2)** | | 6 |
| 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 | | 35 Credits |
| CH-120 | Chemistry | 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 |
| MA-300 | Mathematical Methods | 3 |
| PH-261 | Engineering Physics I | 4 |
| PH-262 | Engineering Physics II | 4 |
| Physics or Science elective (1)* | | 3 |
| Technical Courses | | 6 Credits |
| EL-204 | Digital Electronics | 3 |
| EL-262 | Microprocessors and Microassembly | 3 |

* 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# Software and Internet Applications

The software and Internet applications (SIA) program is structured to prepare students to be Internet specialists. Students are trained in computer and web programming as well as networking and server administration so that they understand and can effectively respond to the entire spectrum of Internet issues. The main objective of the program is to produce well-rounded Internet experts with a strong foundation in computer technology and networking. SIA majors study web pages, websites, computer graphics, Unix/Linux, website security, network security, firewalls, XML, CGI programming, database management, C++, and Java with options for specialization in areas such as data communications and networking, computer programming, digital electronics, management, Cisco or Microsoft certifications, and/or liberal studies. All students complete a capstone course in which they propose, design, test and deliver a web-based project.

## Course Requirements

**Bachelor of Science 124/125 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Computers | | 46 Credits |
| CS-130 | Computer Science Fundamentals I | 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-115 | Introduction to Programming* | 3 |
| CT-152 | Introduction to Unix | 3 |
| CT-201 | Multimedia Applications | 3 |
| CT-376 | Javascript | 3 |
| CT-406 | Web Programming Languages | 3 |
| IAE-201 | Intro to Information Assurance | 3 |
| IAE-301 | Comprehensive Network Security I | 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 | | 15 Credits |
| General electives (5)** | | 15 |
| 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-110 | College Math with Business Applications*** | 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 |
| Technical/Science/Business Electives | | 12 Credits |
| Technical/Science/Business electives (4) (300-level or above)** | | 12 |

* Students who validate CT-115 or place into Calculus I may replace this course with any technical course not already required for the SIA degree.
** See appropriate department for approved list.
*** Students planning to go on to a master's degree program should take MA-114 instead of MA-110. They should also take MA-261, MA-262 and MA-340 as electives.
**** The Option must consist of four related courses: four telecommunications, four management, four math courses, etc. Students should consult with an advisor before selecting courses for the Option. Poorly selected options may make it difficult to fill the twelve credits of Technical/Science/Business electives with 300-level or above courses.

All bachelor of science degrees require a minimum of 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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. Students are trained to work in a wide range of telecommunications and computer networking jobs on both the technical and the design sides. 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. 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. 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 Credits 64/65**

| *Course* | | *Credits* |
|---|---|---|
| English Communications | | 6 Credits |
| EN-101 | English Communications I | 3 |
| EN-102 | English Communications II | 3 |
| Humanities and Social Sciences | | 7 Credits |
| FS-100 | Freshman Seminar | 1 |
| Humanities elective (1)* | | 3 |
| Social Sciences or MIT elective (1)* | | 3 |
| Mathematics and Sciences | | 17 Credits |
| MA-114 | Algebra and Trigonometry | 4 |
| MA-128 | Introduction to Statistics | 3 |
| MA-261 | Calculus I | 4 |
| PH-201 | General Physics I | 3 |
| PH-202 | General Physics II | 3 |
| Technical Courses | | 35 Credits |
| CS-130 | Computer Science Fundamentals | 4 |
| CT-115 | Introduction to Programming** | 3 |
| CT-152 | Introduction to Unix | 3 |
| CT-240 | Internetworking with Routers and Switches | 3 |
| EL-100 | Introductory DC/AC Circuits | 3 |
| EL-200 | Electronic Devices and Circuits | 4 |
| EL-204 | Digital Electronics | 3 |
| IAE-201 | Introduction to Information Assurance Concepts | 3 |
| NT-100 | Computer Architecture and Construction | 3 |
| NT-150 | Computer Networking | 3 |
| TC-110 | Introduction to Telecommunications | 3 |

* See appropriate department for approved list.
** Students with some computer background should take CS-130.

**Bachelor of Science 128/129 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 | | 10 Credits |
| CH-120 | Chemistry | 3 |
| MA-262 | Calculus II | 4 |
| MA-340 | Ordinary Differential Equations | 3 |
| Technical Courses | | 21 Credits |
| EL-261 | Introduction to Communications Circuits and Systems | 3 |
| EL-307 | Noise and Shielding | 3 |
| OP-301 | Fiber Optic Communications | 3 |
| TC-309 | Network Simulation | 3 |
| TC-359 | Network Modeling and Design | 3 |
| TC-458 | Senior Design Project | 3 |
| Technical elective (1)** | | 3 |

Option I or II

Students must select one of the following options. Consult an academic advisor for guidance.

| Option I | |
|---|---|
| Data Communications and Networking | 12 Credits |
| IAE-301 Computer/Ntwk Sec I | 3 |
| IAE-302 Computer/Ntwk Sec II | 3 |
| IAE-315 Secure Systems Admin | 3 |
| 300/400 level technical elective | 3 |

| Option II | |
|---|---|
| Advanced Option (online) | 12 credits |
| IAE-301 Computer/Ntwk Sec I | 3 |
| IAE-302 Computer/Ntwk Sec II | 3 |
| IAE-670 Network Systems Sec Concepts | 3 |
| IAE-611 Wireless Security | 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 39 credits at the 300-level or above. For descriptions of required courses, see courses beginning on page 67.

# 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 College.

For descriptions of required courses, see courses beginning on page 67.

## 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 | Introduction to Information Assurance Concepts | 3 |
| IAE-301 | Computer/Ntwk Sec I | 3 |
| IAE-302 | Computer/Ntwk Sec II | 3 |

## Financial Management
**(12 credits)**

This lower-level certificate provides students with a background in accounting and finance administration in the framework of resource management and wealth maximization. Students learn the fundamentals of business and accounting in a project-oriented environment with emphasis on the use of accounting information to plan and redirect allocations to support business decisions. The financial management course helps to reinforce the concepts of finances administration by focusing on capital management, fixed-asset investment, long-term finance, mergers, leasing and multinational finance.

*Required Courses*

| | | |
|---|---|---|
| BUS-174 | Introduction to Business and Management | 3 |
| BUS-270 | Financial Accounting I | 3 |
| BUS-283 | Managerial Accounting | 3 |
| BUS-372 | Financial Management | 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-230 | Computer Science Fundamentals II | 3 |
| CT-115 | Introduction to Programming: Java | 3 |
| CS-225 | Intermediate Java Programming | 3 |

## Operations Management
**(12 credits)**

This lower-level certificate provides students with a foundation in business and management with a concentrated emphasis on productivity in a world economy. Students learn the fundamentals of business and management in a project-oriented environment. The production and operations management course stresses the decisions that managers make in increasing productivity by considering the strategies, techniques and problems in meeting customer needs, in forecasting and scheduling, and in quality management.

*Required Courses*

| | | |
|---|---|---|
| BUS-174 | Introduction to Business and Management | 3 |
| BUS-270 | Financial Accounting I | 3 |
| BUS-301 | Project Management | 3 |
| BUS-384 | Production and Operations Management | 3 |

## Personnel Management
**(12 credits)**

This upper-level certificate provides students with a foundation in the development of employer-employee relations in both the private and public sectors in order to facilitate organization productivity. Students learn the fundamentals of business and management in a project-oriented environment with an emphasis on human business interaction. Courses in the principles of management and personnel management focus on the aspects of supervision and human resource management, with concentration on administration, recruiting and selection, evaluation and training. A course in group dynamics focuses on organizational climate and culture and their relationship to and impact on individuals and groups in high-tech organizations.

*Required Courses*

| | | |
|---|---|---|
| BUS-174 | Introduction to Business and Management | 3 |
| BUS-279 | Introduction to Leadership | 3 |
| BUS-375 | Human Resource Management | 3 |
| SS-272 | Group Dynamics | 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-310 | Computer Algorithms | 3 |
| CS-225 | Intermediate Java Programming | 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-230 | 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 math through differential equations with basic engineering physics.

*Required Courses*

| | | |
|---|---|---|
| AE-150 | Introduction to Space | 3 |
| AE-250 | Ground Systems Engineering | 3 |
| AE-311 | Spacecraft 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 Science (DSc) Degree

- Information Assurance

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
- Electrical Engineering
- Information Assurance
- Internet Engineering
- Information and Telecommunications Systems Management

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

- Client/Server and Wireless Devices
- Component Technologies and Online Collaboration
- Information Assurance Administration
- Information Technology
- Network Protection
- Security Management

# Doctorate 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 | Application Deadline |
|---|---|
| Fall | July 1 (classes start late Aug.) |
| Spring | 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.

### Tuition Deposit

Upon acceptance, doctoral students are required to pay a non-refundable $250 tuition deposit to the college. This deposit holds the students' position in their cohort and is credited to the students' first course tuition.

# 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 a completed 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.

## Provisional Acceptance Status

Students who have not met the 3.0 undergraduate 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.
- A current resume
- Personal essay describing your vision for achieving your career goals in the field of astronautical engineering.

Students who do no 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)**

Applicants who possess an undergraduate degree in business are waived from completing MBA-600 "Fundamentals of Professional Management." All other MBA-students must complete it. MBA-600 provides a broad foundation in accounting, finance, economics and statistics.

**Computer Science**

- Bachelor of science in computer science or related field preferred, but not required
- Proficiency in computer topics including object oriented programming, multiple

languages, algorithm development, operating systems, databases, software architecture, distributed programming and other advanced work
- Fluency in mathematics: Calculus I, Calculus II and Linear Algebra

**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 BSET or 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 Assurance**

Courses are written to accommodate students with backgrounds in computer information systems, computer networking, telecommunications, information technology, network security, or computer science. Students are expected to have a working knowledge of servers, routers, hubs, switches, TCP-IP, etc. CCNA, Security+, SSCP, or CISSP certifications provide an excellent foundation for preparation, but are not required.

**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 Science in Information Assurance

The Doctor of Science in information Assurance 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** **51-54 Credits**

| *Course* | | *Credits* |
|---|---|---|
| First Year/First Semester -- Term One/Two | | |
| RSC-801 | Fundamentals of Doctoral Learning | 3 |
| RSC-601 | Professional Writing Practicum | 3 |
| First Year/Second Semester -- Term One/Two | | |
| RSC-810 | Professional Research Theory and Practice, Part 1 | 3 |
| RSC-813 | Professional Ethics and Leadership | 3 |
| First Year/Third Semester -- Term One/Two | | |
| RSC-815 | Problem Solving and Decision Making Using Quantitative Methods | 3 |
| RSC-820 | Situation Awareness Analysis and Action Plan Processes (Residency Course, 3-day weekend) | 3 |
| | Elective #1 | 3 |
| Second Year/First Semester -- Term One/Two | | |
| | Elective #2 | 3 |
| RSC-825 | Applied Research in Information Assurance | 3 |
| Second Year/Second Semester -- Term One/Two | | |
| RSC-812 | Professional Research Theory and Practice, Part 2 | 3 |
| RSC-900 | Writing the Doctoral Dissertation | 3 |
| Second Year/Third Semester -- Term One/Two | | |
| | Elective #3 | 3 |
| RSC-925 | Dissertation Preparation I (Residency Course, 3-day weekend) | 3 |
| | Elective #4 | 3 |
| Third Year/First Semester -- Term One/Two | | |
| | Elective #5 | 3 |
| | Elective #6 | 3 |
| Third Year/Second Semester -- Term One/Two | | |
| RSC-935 | Dissertation Preparation II | 3 |
| DSR-950 | Dissertation Presentation and Oral Defense (Residency Course, 3-day weekend) | 3 |
| Electives | | 18 Credits |
| IAE-830 | Information Assurance Research Literature | 3 |
| IAE-835 | Information Assurance Strategic Management | 3 |
| IAE-840 | Information Assurance Consulting | 3 |
| IAE-845 | Pedagogy and Information Assurance | 3 |
| IAE-850 | Business Continuity Planning | 3 |
| IAE-855 | Information Assurance Requirements for Compliance | 3 |
| IAE-857 | Information Assurance and the System Life Cycle | 3 |
| IAE-860 | Advanced Mixed Methods Research | 3 |
| IAE-865 | Special Topics in Human Resource Management | 3 |
| IAE-870 | Executive Awareness in Information Assurance | 3 |
| IAE-875 | Information Assurance Implementation | 3 |
| IAE-880 | Special Topics in Information Assurance | 3 |

For descriptions of required courses, see courses beginning on page 67.

# 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 your 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, information technology, or technology management law 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 | | 24-27 Credits |
| MBA-600 | Fundamentals of Professional Mgmt | 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 | | 3 Credits |
| MBA-700 | Capstone Project | 3 |
| MBA-Electives | | 9 Credits |

Complete a 9-credit specialization option, or with permission, choose any three graduate-level courses from the college inventory.

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 Law & Policy

This specialization focuses on regulatory compliance, to include transacting 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 67.

# Master of Science in Astronautical Engineering

The astronautical engineering (AE) degree is structured to focus on satellite design and operations, systems engineering, and remote sensing. 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. In addition, AE majors may study the earth's global environment to learn more about the long-term implications of environmental changes on society. 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

**Master of Science** **30 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Core Courses | | 18 Credits |
| AE-611 | Space Systems Engineering | 3 |
| AE-652 | Orbital Mechanics II | 3 |
| AE-654 | Spacecraft Propulsion | 3 |
| AE-655 | Spacecraft Sensors | 3 |
| AE-712 | Principles of Space Navigation | 3 |
| EE-600 | Mathematical Modeling and Analysis | 3 |
| Elective Courses | | 6 Credits |
| Choose any two below. | | |
| AE-602 | Spacecraft Mission Architecture and Management | 3 |
| AE-621 | Satellite Ground Systems Operation | 3 |
| AE-661 | Remote Sensing II | 3 |
| AE-662 | Atomic and Molecular Spectroscopy | 3 |
| AE-701 | Project Management | 3 |
| AE-711 | Space Mission Analysis and Design | 3 |
| AE-720 | Space Mission Design | 3 |
| CS-507 | Database Systems Implementation | 3 |
| CS-511 | Numerical Methods | 3 |
| CS-513 | Gaming Theory – Real-time 3D Graphics | 3 |
| Capstone Courses | | 6 Credits |
| AE-708 | Master's Project Research | 3 |
| AE-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 67.

# 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

**Master of Science** **30 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Core Courses | | 12 Credits |
| CS-504 | Theory of Computation | 3 |
| CS-512 | Computer Language Design | 3 |
| CS-701 | Designing Intelligent Systems | 3 |
| CS-705 | Multithreaded and Distributed Programming | 3 |
| Elective Courses | | 12 Credits |
| Choose any four below. | | |
| CS-507 | Database Systems Implementation | 3 |
| CS-511 | Numerical Methods | 3 |
| CS-513 | Gaming Theory – Real-time 3D Graphics | 3 |
| IAE-670 | Network Systems Security Concepts | 3 |
| IAE-673 | Secure Information Transfer and Storage | 3 |
| IAE-677 | Malicious Software | 3 |
| IAE-682 | Internal Protection | 3 |
| IAE-684 | Complimentary Security | 3 |
| IE-705 | Comparison of Operating Systems and Web Servers | 3 |
| IE-707 | Network Architecture Convergence Using Wireless Technology | 3 |
| IE-713 | Multimedia and Web Casting | 3 |
| IE-719 | Capstone Course | 3 |
| Capstone Courses | | 6 Credits |
| CS-712 | Research Methods | 3 |
| CS-714 | Capstone Research Project | 3 |

Courses are offered only online in 16-week formats. For descriptions of required courses, see courses beginning on page 67.

# 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 of 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 college 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 |
| EE-710 | Designing for Reliability and Manufacturability | 3 |
| EE-720 | Designing for Testability | 3 |
| Electives Courses | | 6 Credits |
| Choose any two courses below. | | |
| AE-611 | Space Systems Engineering | 3 |
| EE-614 | 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 67.

# Master of Science in Information Assurance

The information assurance (IA) 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 College a National Center of Academic Excellence in Information Assurance Education. The Master of Science in Information Assurance (MSIA) 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 IA certification.

## Course Requirements

**Master of Science** **36 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Core Courses | | 24 Credits |
| IAE-670 | Network Systems Security Concepts | 3 |
| IAE-671 | Legal Aspects of Computer Security and Information Privacy | 3 |
| IAE-673 | Secure Information Transfer and Storage | 3 |
| IAE-674 | Security Risk Management | 3 |
| IAE-675 | Computer Forensics and Incident Handling | 3 |
| IAE-677 | Malicious Software | 3 |
| IAE-680 | Perimeter Protection | 3 |
| IAE-682 | Internal Protection | 3 |
| Elective Courses | | 12 Credits |
| Choose any combination of four courses from the following list of electives: | | |
| Information Assurance Electives | | |
| IAE-611 | Wireless Security | 3 |
| IAE-621 | Applied Wireless Network Security | 3 |
| IAE-679 | Vulnerability Mitigation | 3 |
| IAE-684 | Managing Information Security | 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 |
| Law & Policy Electives | | |
| IE-717 | Invention, Innovation, and the Use of Intellectual Property | 3 |
| MBA-658 | Legal, Political, and Ethical Implications for Leadership | 3 |
| SM-587 | Law and Regulation of E-Commerce | 3 |
| Technology Management Electives | | |
| SM-563 | Managing Information Systems | 3 |
| SM-567 | Business Data Communications and Networking | 3 |
| SM-569 | Decision Support & Expert Systems | 3 |

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 67.

# Master of Science in Information and Telecommunications Systems Management

The online Master of Science in Information & Telecommunications Systems Management (ITSM) degree is structured as an interdisciplinary study of systems management theory and practices. As a technology management oriented degree, the main objective of the program is to develop student abilities to anticipate, recognize, and solve organizational and technological problems, optimize their own capabilities and the capabilities of others, allocate and effectively use resources, and apply systems management theory to organizational situations. Specialization options include leadership, information assurance, or technology management law and policy. ITSM is a 36-credit degree program. All students complete the 27-credit core and select three remaining elective options of their choice.

## Course Requirements

**Master of Science** **36 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Core Courses | | 27 Credits |
| MBA-625 | Organizational Behavior | 3 |
| MBA-640 | Managerial Economics | 3 |
| SM-513 | Systems Management and Organization Theory | 3 |
| SM-517 | Psychological Factors in Systems Management | 3 |
| SM-518 | Principles of Systems | 3 |
| SM-525 | Statistics for Managers | 3 |
| SM-563 | Managing Information Systems | 3 |
| SM-567 | Business Data Communications and Networking | 3 |
| SM-569 | Decision Support and Expert Systems | 3 |
| Specialization Options | | 9 Credits |
| Complete a 9-credit specialization option, or with permission, choose any three graduate-level courses from the college inventory. | | |
| Leadership | | |
| 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 | | |
| IAE-670 | Network Systems Security Concepts | 3 |
| IAE-677 | Malicious Software | 3 |
| IAE-682 | Internal Protection | 3 |
| Technology Management Law & Policy | | |
| IAE-671 | Legal Aspects of Computer Security | 3 |
| IE-717 | Invention, Innovation, and the Use of Intellectual Property | 3 |
| SM-587 | Law and Regulation of E-Commerce | 3 |

Courses are offered only online in 16-week or 8-week accelerated formats. For descriptions of required courses, see courses beginning on page 67.

# 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** **30 Credits**

| *Course* | | *Credits* |
|---|---|---|
| Core Courses | | 27 Credits |
| IE-701 | Principles of Designing and Engineering Computer Networks | 3 |
| IE-703 | Thin and Fat Client Deployment with Multitiered/Service-Oriented Architecture and Web 2.0 | 3 |
| IE-705 | Comparison of Operating Systems and Web Servers | 3 |
| IE-707 | Network Architecture Convergence Using Wireless Technology | 3 |
| IE-709 | Comparison of Object-Oriented and Scripting Languages | 3 |
| IE-712 | Design and Practice of Secure Information Networks | 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 67.

# 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 67.

## 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 | 3 |
| IE-703 | Thin and Fat Client Deployment with Multitiered/Service-Oriented Architecture and Web 2.0 | 3 |
| IE-705 | Comparison of Operating Systems and Web Servers | 3 |
| IE-707 | Network Architecture Convergence Using Wireless Technology | 3 |

## 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 | 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 |

## 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 and Information Privacy | 3 |
| IAE-674 | Security Risk Management | 3 |
| IAE-675 | Computer Forensics and Incident Handling | 3 |
| IAE-680 | Perimeter Protection | 3 |

## 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 | 3 |
| SM-563 | Managing Information Systems | 3 |
| SM-567 | Business Data Communications and Networking | 3 |
| SM-569 | Decision Support and Expert Systems | 3 |

## Network Protection
**(12 credits)**

This certificate provides students with a detailed understanding of the methods computer attackers utilize to infiltrate web and application technologies and how the security professionals can anticipate and protect against attacks. Students learn the anatomies of viruses and worms and the defense mechanisms for the perimeter and the inner network. A course in malicious software serves as an introduction to what security professionals deal with daily and the basic anti-virus programs individuals can utilize to protect their information on the small scale of personal computing. The three additional courses focus on the need for internal and external vulnerability assessment, a detailed understanding of firewalls and perimeter network defense, and methods practices for protecting the inner network in the event of a perimeter breach.

*Required Courses*

| | | |
|---|---|---|
| IAE-621 | Applied Wireless Network Security | 3 |
| IAE-677 | Malicious Software | 3 |
| IAE-679 | Vulnerability Mitigation | 3 |
| IAE-682 | Internal Protection | 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 | Wireless Security | 3 |
| IAE-670 | Network Systems Security Concepts | 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

The following programs are offered through the Critical Infrastructures and Cyber Protection Center (CICPC) at Capitol College. For more information about the center, see page 7.

### Cyber Intelligence Certificate Programs

The Cyber Intelligence program offers courses and certificates in cyber intelligence, security, and operations. Programs deal with the functional areas of the cyber intelligence analysts' tradecraft, counter cyber terror operations, and cyber law and intelligence for managers.

### FISMA Compliance Certificate Program

The E-Gov Act of 2003 and specifically the Federal Information Security Management Act (FISMA) requires information assurance professionals and managers throughout the federal government to comply with a defined set of policies, procedures and security countermeasures to protect sensitive information and critical infrastructures. The CICPC FISMA Program provides training that is designed to facilitate a thorough understanding of current requirements published by the National Institute of Standards and Technology (NIST). This workforce development program is highly beneficial to both technical practitioners and non-technical security managers.

### Homeland Security Certificate Programs

The Homeland Security and Anti-Terrorism program offers courses and certificates in homeland security and critical infrastructure protection. Focus is placed on homeland security and defense, asymmetric threats to global security, homeland security law and intelligence, and inter-agency and homeland security operations.

### Industry Certification Preparation Programs

These programs are uniquely crafted to enhance learning and the knowledge retention while maximizing participant ability to pass an industry certification exam. Coursework focuses on the common bodies of knowledge (CBK) and dedicates one four-hour learning module to each CBK. Recorded leading modules can be replayed up to four months after the class, allowing attendees the opportunity to replay sessions to enhance mastery of the coursework.

### National Information Assurance Training Standards Certificate Programs

CICPC offers a certificate-bearing program to educate participants about national information assurance training standards as designated by the Committee on National Security Systems (CNSS). The Senior Systems Managers 4012 standard and the Systems Certifiers 4015 standard have been combined allowing participants to satisfy both requirements simultaneously.

Capitol College's designation by the Department of Homeland Security and the National Security Agency as a Center of Academic Excellence in Information Assurance Education (mapped to all six of the CNSS domains at the most advanced level where appropriate) uniquely positions CICPC as a leading provider of standards training to the federal workforce and DoD contracting community. Scheduling of modules and online delivery can be customized to meet organizational needs and constraints.

# 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. (3-0-3)

**AE-150 Introduction to Space**

Introduces the student to elements of astronomy and space sciences, 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 (3-0-3)

**AE-200 High Vacuum Testing Techniques**

This course covers the basic theory and practical knowledge to use, operate, manage or 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. (3-0-3)

**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 into satellite telemetry, command and control subsystems, as well as the software needed to build and run a ground system. Introduction to CCSDS standards and mission planning. Corequisite: CS-130, 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 (3-0-3)

**AE-351 Orbital Mechanics**

Newton's equations and Keplers 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 (3-0-3)

**AE-361 Remote Sensing**

The course is a survey of remote sensing techniques applied to understanding of the earth system. Some of the topics covered in the course are: an overview of electromagnetic radiation and its interactions with matter; spectral responses of different types of surfaces in visible, near infrared, thermal infrared and microwave regions; principles of atmospheric remote sensing; space based instruments used for passive and active remote sensing of land, ocean and atmosphere; impact of human activities on the global climate; use of remotely sensed data for management of human environment. Laboratory and image interpretation exercises are part of the course. Prerequisite: PH-263 and AE-311 (3-0-3)

**AE-400 Special Topics in Astronautical Engineering**

Research into astronautical engineering subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and academic dean. 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 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-300 and AE-351 (3-0-3)

**AE-411 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 life-cycle. Focus will be on the following areas: the project life cycle phases, from mission requirements to retirement; the relationship between design decisions and system operations, maintenance, and logistics; and studying how system lifecycle modeling can be used to support design decision-making. Explore illustrative case studies. Team projects are assigned. Written reports and oral presentations are required. This is the undergraduate version of AE-611. Prerequisites: AE-311, AE-351 or permission of instructor. (3-0-3)

**AE-454 Spacecraft Dynamics and Control**

Analysis of methods of monitoring maintaining and controlling spacecraft attitude and positioning. Propulsion systems. Effects of gravity gradients, space environment and atmospheric drag. Stabilization using controllers, actuators, sensors and impulse devices. Design of control subsystems. Systems engineering approach. Prerequisite: EE-453 (3-0-3).

**AE-455 Satellite Communications**

Analysis of satellite communications systems. Communications subsystems, telemetry, tracking and monitoring, data handling, satellite link design, propagation effects, modulation techniques and performance, error control. Satellite control networks SN, GN. TDRSS systems, positioning command and control. Prerequisites: EL-261, MA-128 and MA-262 or equivalent. (2-2-3)

**AE-458 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-602 Spacecraft Mission Architecture and Management**

Provides an overview of all aspects of space mission design for practical approaches to reducing cost. Also, will examine the different programmatic/conceptual design/choice creation methods for space missions. Aerospace system engineering/architecture tools will be used to create innovative projects

**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 life-cycle. Focus will be on the following areas: the project life cycle phases, from mission requirements to retirement; the relationship between design decisions and system operations, maintenance, and logistics; and studying how system lifecycle modeling can be used to support design decision-making. 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 control centers in both the NASA and NOAA environments. Examines the roles of flight operations, communications, mission planners, and other entities needed to perform successful satellite ground systems operations.

**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.

Pre-requisite: AE-351

**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, AE-311 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.

**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. Specifically, this course will cover the

foundations of remote sensing, visual interpretation, characteristics of multiple sensing systems, i.e., thermal, multispectral, hyperspectral, lidar, and microwave, and introduction to digital image processing. 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 NOAA 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.

#### 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 magnetic and electric 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.

#### AE-701 Project Management

Provides an introduction of planning, scheduling, and controlling a system project during its life cycle. Focus on ethical, theoretical, and practical challenges of the project management framework, including the basic project management phases from initiation to closure and interactions. Projects will focus on the integration of project management and strategic management of satellite missions.

#### AE-708 Master's Project Research

This course will cover all aspects of proposing and executing a research and development task. Case studies on how to identify, interpret, and respond to Broad Agency Announcements. Creating 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, 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 (the 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.

#### AE-711 Space Mission Analysis and Design

Spacecraft mission design, space environment, attitude determination and control, telecommunications, 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 NOAA past and current space mission.

#### 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

#### 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 with 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 system design project with presentation of proposals, design reviews and completed design projects. Prerequisite: AE-711

#### AE-758 Master's Project

Students integrate prior course work and personal experiences into a master's project. Students develop a full final proposal, including abstract, statement of work, schedule, milestones, deliverables as learned in EE-708. Proposal must be delivered to class and approval of project advisor required. Regular progress reports required. Final presentation will be live over the Internet. Prerequisite: AE-708.

**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 supervision 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. Strategies for effective communication will also be explored. Prerequisite: EN-102. (3-0-3)

**BUS-208 E-Commerce and the Law**

Students will examine the numerous legal concepts that arise when establishing web sites for personal or business purposes. More particularly, a myriad of legal issues arise when text, photographs, motion pictures and/or sound recordings either previously composed by others or originally created by the student are placed on the internet. In addition, the legal concepts that arise due to engaging in e-commerce and emailing will also be examined. In doing so, students will learn basic legal terms, as well as learn to identify and articulate the legal concepts and related issues that arise by their actions of placing text, photographs, motion pictures and/or sound recordings on the internet. This course of study enables students to avoid or diminish legal pitfalls encountered when engaging and using the internet for personal or business gain, for themselves or their present and/or future employers. 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 work with entity-relationship 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-005 or MA-006. (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, promissory notes, and valuation of assets. Prerequisite: BUS-270. (3-0-3)

**BUS-279 Introduction to Leadership**

This course overviews the disciplines and competencies associated with leadership in the 21st Century. In particular, the study and application of skills, theories, and concepts in a multicultural society will be examined. This is a seminar course with emphasis on class discussion and collaborative learning. Prerequisite: BUS-174 Corequisite EN-101.

**BUS-280 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-281 Microeconomics**

This course is an introduction to microeconomic concepts and analysis. The course focuses on competitive market dynamics including individual and firm behavior through the study of market structure and economic decisions regarding production, pricing, and personnel. Labor markets and labor unions are addressed as well as regulatory and distributional issues. Prerequisite: BUS-280. (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-271. (3-0-3)

**BUS-289 Entrepreneurship and Small Business Management**

This course provides an overview of the principles and processes 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 actual applications and use of tools such as MS Project. Among the concepts covered are project initiation, task definition, scheduling, budgeting, risk analysis, and control. 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. Prerequisite: BUS-174, or permission of department chair (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. (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. Specifically, topics that relate to operational, knowledge worker, management and executive-level computer-based information and online systems will be analyzed and discussed. These topics include information systems for database management, transaction processing, knowledge worker, office automation, management information, decision support, and executive support. The course also includes system security, troubleshooting, and disaster recovery, system upgrading, and client/server issues. Prerequisites: 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-110 or MA-114. (3-0-3)

**BUS-375 Human Resource Management**

Human Resource Management is a course with dual purposes. First, the development of employer-employee relations in both the private and public 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 will be covered. Wage and salary administration, forecasting employment needs, recruiting and selection, evaluation, and training issues will be the focus of discussion and lecture. Prerequisites: EN-101 and BUS-279. (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 the course. Prerequisite: BUS-174, BUS-200 and BUS-386. (3-0-3)

**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. (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-174. (3-0-3)

**BUS-384 Productions 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. Specifically, identification of customer needs, strategic decisions for meeting customer needs, and tactical decisions for meeting customer needs are discussed. 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, EN-102 and BUS-174. (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 BUS-375. (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. Prerequisite: MA-128. (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 and BUS-386. (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 factor affecting international business operations and their influence on 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: EN-102, BUS-174 or BUS-376 and BUS-372. (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. Prerequisite: BUS-410 and EN-408. EN-408 should be taken immediately before this course when possible. (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; oxidation states and redox; solutions, acids and bases, changes of state, thermodynamics, chemical kinetics and equilibrium. (2-2-3)

**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 programming language. Program constructs include selection, looping, 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: CT-115 or equivalent, MA-110 or MA-114. (4-0-4)

**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 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 handling, containers, iterators and the standard template library. Applications involve the use of simple data structures such as stacks, queues, linked lists and binary trees. Recursion, searching and sorting algorithms. The above concepts are implemented through a series of hands-on programming projects, all of which are completed as part of the homework requirements. Prerequisite: CS-130. (3-0-3)

**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. Preparing an application for publication. High-level programming will be performed using Java and XML. Native programming will be performed in C/C++. Programming in ARM-7 assembly language will be introduced. Prerequisites: CT-115 or CS-230. Some Unix/Linux experience is recommended. (3-0-3)

**CS-310 Computer Algorithms**

Mathematical fundamentals of algorithms and algorithmic techniques. Sorting, searching, hashing and other techniques associated with retrieving information. Basic and advanced graph algorithms. Dynamic Programming. NP-completeness. Course requires written programming assignments. Prerequisites: CS-230 and MA-124. Offered fall semester only. (3-0-3)

**CS-316 Intelligent Systems**

Fundamental techniques and concepts of intelligent systems: tree searching techniques including recursive searches, minmax algorithms, heuristics, alpha beta pruning. Lisp and Prolog programming languages. Genetic and a priori algorithms. Homework and programming assignments. Prerequisites: CS-230 and MA-124. Offered spring semester only. (3-0-3)

**CS-320 Database Administration**

This course covers the tasks performed by a database administrator. Topics include database architecture, capacity and performance requirements, database creation, user management, transaction management, backup and recovery, security, performance tuning and other administrative functions. Students will work with an Oracle database server. Prerequisite: CS-220 (3-0-3)

**CS-330 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 xcode. Graphical User Interface library and components. File system on the iPhone; SqlLite 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. Prerequisite: CS-230 (3-0-3)

**CS-351 Assembly Language Programming**

This course introduces the student to assembly language, specifically which is used with the Intel 80x86 computer architecture. Topics include data 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 (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-orientation. Using ASP.NET, this course explores the processing 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. Perquisites: CS-220 or understanding of SQL. (3-0-3)

**CS-400 Special Topics in Computer Science**

Applications of computer science principles or research into computer science subjects. Student primarily works in a guided study format with a mentor. Permission required from the instructor and academic dean. 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 principals and concepts, classes, objects and interfaces; as well as inheritance, encapsulation, polymorphism and aggregation; 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.

**CS-407 Database Systems Implementation**

This is an undergraduate version of the graduate database course CS-507. 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. Prerequisite: CS-220 or equivalent.

**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 relationship, storage management (real storage management policies in a multiprogramming environment), virtual memory management (segmentation and paging), secure memory management, access control lists and kernal protection. An overview of contemporary operating systems with these principles. Students program in a high-level language. Projects are assigned as part of the homework requirements. Prerequisites: CS-230, CS-225 and senior status. Offered fall semester only. (3-0-3)

**CS-430 Introduction to Game Programming**

Students learn how to develop a game on the iPhone/iPad platform. Students learn/review Objective-C review, the xcode development environment review, and will use the Model-View-Controller architecture. Drawing, animation of objects, sounds, screen refresh, collision detection, behavioral control of screen characters, tracking the state of a game. Introduction to Cocos2D as the vehicle to develop games on the iPhone platform. Introduction to OpenGL. Projects are assigned as part of homework requirements. Prerequisite: CS-330 (C or better) or CS-230 (A).

**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-330 and either CS-230 or CS-225. Offered spring semester only. (3-0-3)

**CS-504 Theory of Computation**

An investigation into the fundamental ideas and models underlying computing. Automata languages, determinism, Chompsky hierarchy, computability, Turing machines, Church's Thesis, complexity, NP-completeness, intractability. Offered as a full semester course. (3)

**CS-505 Software Design with UML**

Object Oriented principals and concepts, such as classes, objects and interfaces; as well as inheritance, encapsulation, polymorphism and aggregation; 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.

**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 grammers; parsers and parser construction; parsing expressions; tokenizing; assemblers; engines vs. interpreters; logic, query and imperative language parsers and assemblers. (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. Real-time 3D graphics are at the leading edge of these developments. Topics include mathematical foundations and modeling techniques, mapping, anti-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-701 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-705 Multithreaded and Distributed Programming**

Modern applications such as GUI interfaces use multithreaded programming to achieve responsiveness and to make efficient use of computer resources. In addition, the Internet has made distributed programming an integral part of almost every computing system. In today's world programmers and computer professionals must understand the principles underlying both these paradigms. Topics include concepts and applications of multithreaded and distributed programs. Process interaction using shared variables and message passing; systematic development of correct programs; general problem solving techniques; scientific computing; distributed systems. (3)

**CS-712 Research Methods**

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. (3)

**CS-714 Capstone Research Project**

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. (3)

**CSP 101 Introduction to Engineering Methods I**

Students are introduced to MATLAB. Using MATLAB to do calculations, solving systems of equations. Using data for data analysis statistics, graphing with applications in engineering. Special focus on trig and advanced trig functions, precalculus. Prerequisite placement exam. (2-2-3)

**CSP 102 Introduction to Engineering Methods II**

Students are introduced to MATLAB. Using MATLAB to do calculations, solving systems of equations. Using data for data analysis statistics, graphing with applications in engineering. Introduction to C++, classes and objects, CGI programming, Graphics and GUI's. Prerequisite placement exam. (2-2-3)

**CT-101 Introduction to Software Applications**

This is an introductory course on software that is essential for the successful use of a Windows-based PC system. Students are introduced to the basic features and functions of the Windows operating system, word processing, the use of spreadsheets and tools that accompany spreadsheets, setting up a simple database and the creation of PowerPoint presentations. Students will learn how to use and integrate the various applications into one larger document and produce a written, electronic and oral presentation. (3-0-3)

**CT-102 Introduction to Internet Applications**

Introduces students to dynamic HTML Web pages, designed using tables,style sheets, cascading style sheets (CSS), images, and dynamic images, with emphasis on page layout, navigation bars and forms. Scripting languages are used to enhance Web page features. Graphic, video and 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-115 Introduction to Programming**

An introductory programming course that teaches computer essentials and programming essentials: components of a computer, the computer as a tool for connecting to networks/ internet, digital vs. analog, binary arithmetic, how information is stored, algorithms, branching, looping, functions and arrays. An important aspect of this course is to present students with techniques for translating problem descriptions into computer algorithms, which are then implemented as a computer program. Extensive programming assignments are completed as part of the homework assignments. Acceptance based on placement test score. (3-0-3)

**CT-152 Introduction to UNIX**

Unix file 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-240 Internetworking with Routers and 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: TC-110 and CT-115 or CS-130 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 libraries. Labs include how to use the prototype and scriptaculous 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: CT-115 or CS-130.

**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 C#. 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 telecommunications and emerging technologies. Oral presentation required. Prerequisite: Senior status. (3-0-3)

**DSR-900 Writing the Doctoral Dissertation**

Students work individually in the classroom environment with the dissertation mentor completing chapter one and beginning work on chapter two of the dissertation proposal.(3)

**DSR-925 Dissertation Preparation I**

Students come to residency with chapters one through three prepared for review and/or proposal submission. Students will receive guidance from faculty mentors in both the group and one-on-one environment in the development of the dissertation proposal. (3)

**DSR-935 Dissertation Preparation II**

Learners complete the dissertation milestones developed by the learner and the mentor. Students who are not prepared to defend on in DSR-950 must repeat DSR-935. (3)

**DSR-950 Dissertation Presentation and Oral Defense**

Learners prepare the dissertation for publication. Learner research is examined through an oral defense. (3)

**EE-159 Circuit Theory**

Network analysis, mesh analysis, nodal analysis, Thevenin, Norton, superposition, reciprocity, capacitors, inductors, RC circuits, RL circuits, RLC circuits. Steady state and transient conditions involving RC time constants, RL time constants. AC circuit analysis involving sine waves, phasors, reactance, impedance in series circuits, parallel circuits, and series-parallel circuits. Thevenin, Norton, network theorems. Power, effective power, resonance and filter circuits. Prerequisite: MA-114. Students who have taken EL-100 and EL-150 may not take this course for credit. (3-2-4)

**EE-300 Power Supply and Regulator Design**

Design and analysis of power supplies and regulators. Includes special adjustable and fixed voltage regulator ICs, three-pin regulators, switch-mode supplies. DC to DC convertors. Supply topologies, power handling, current limiting methods. Prerequisites: EL-250 and MA-261. (2-2-3)

**EE-304 Digital Design I**

Minimization of Boolean functions using Kamaugh Maps and Quine-McCluskey Tabulation. Multilevel circuits: PLAs, PALs, gate arrays. Combinational logic design with MSI LSI. Chip count reduction. Sequential circuit analysis and design. State tables and state diagrams. Asynchronous circuit design. Introduction to PAL design software. Students design, simulate and build circuits. Design using programmable devices. Prerequisite: EL-204. (2-2-3)

**EE-309 Circuit Design and Simulation**

An advanced circuit analysis course that introduces students to computer-aided electronics packages and automated design. Students design and analyze circuits both mathematically and with computer simulation. Students build the circuits and compare predicted results with measured results obtained in the laboratory. Prerequisites: MA-261 and EL-250 or equivalent. (2-2-3)

**EE-353 Power System Engineering**

Fundamentals of power transmission and electric motors. Single versus three-phase, poly-phase systems, synchronous, asynchronous machines. DC and compound DC motors, induction motors. Equivalent circuit modeling of motors. Start-up conditions. Transformers, Transmission of Electrical Energy, Energy Distribution and Harmonics. Prerequisites: EE-159 and MA-261. (3-0-3)

**EE-354 Digital Design II**

Continuation of Digital Design I. Students explore larger-scale digital arithmetic and logic circuits using PAL programmer and related software. Extension to VHDL design and implementation. Programming CPLDs and FPGAs. Students design and build circuits according to design objectives in two parts: students first design, compile and verify their circuits using timing simulation on computers; students build and test circuits. Final project involves design, assembly, and testing of a PLD-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 flow gain, noise figure and intercept point. Students fabricate microstrip circuit boards using an in-house milling machine and then test the completed amplifiers in the laboratory. Actual and simulated results are presented. Prerequisite: EE-309. (2-2-3)

**EE-362 Microcontroller System Design**

Study of the MC68HC11 Microcontroller and related families. Evaluation board hardware preparation and checkout. PC to EVB interfaces. S-records, utilities and I/O routines. Expanded MUX-Modes, EPROM-based CONFIG register. On-chip memories. Synchronous serial Peripheral Interface, Asynchronous Serial Communication Interface. A/D converter, real-time interrupts. Design case studies and projects. Students will be required to build, write drivers for and test their circuits using the 68HC11 EVB. Written report and oral presentation required. Prerequisite: EL-262 or microcomputer, micro-assembly background. (2-2-3)

**EE-364 Computer Architecture**

Design and architecture of modern computers. System components: processor, memory and interfaces. Instruction sets and operations. Reduced instruction sets (RISC) and RISC architecture. Processor design to support RISC instruction set. Evolution to parallel processing and multiprocessing. 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. Sensors for 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 of 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-403 Environment and Renewable Energy Systems**

Teaches the students theory and practice for direct production of electricity from alternate energy sources such as solar, wind and geothermal. Course material includes characteristics of direct energy conversion, and storage devices used in alternate energy sources. Impact of solar heating and lighting on building design is also introduced. Topics include solar/wind systems, small energy systems and the solar house. Concepts of engineering economics are discussed as well. Practical problems and projects are assigned. This course will expose students to concepts applied in electrical, civil and mechanical engineering and architecture. Prerequisite: Senior status.

**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 assignments. Variable modes and operators, entities and architectures, behavioral descriptions. Dataflow, synchronous and asynchronous processes using procedures and subfunctions. Library support packages and generation of test-bench data. Prerequisite: EE-354. Offered during fall semester only.

**EE-406 Signals and Systems**

Mathematical models, systems, signal classifications, I/O differential and difference equations, block diagram realizations, discrete-time systems. Convolutions: discrete-time and continuous-time. The Z-transform in linear discrete-time systems, transfer functions. Trigonometric Fourier series, polar and rectangular forms, odd/even functions, response of a linear system to periodic input. Fourier transform, symmetry properties, transform theorems, linear filtering, modulation theorem. Prerequisite: MA-360. Offered during fall semester only. (3-0-3)

**EE-409 Network Analysis and Synthesis**

Comparison of analysis and synthesis. Transfer function and frequency response: phase and time delay. Familiarization with complex impedance and admittance functions. Active filter design: bandpass, bandreject, FDNR and gyrator. Impedance evaluation: Foster I, Foster II, Cauer I and Cauer II. Synthesis of Butterwork and Chebyshev filters. Sensitivity of networks to parameter changes. Prerequisites: EE-309 and MA-360 or knowledge of Laplace transforms. (2-2-3)

**EE-415 Microwave Theory and Devices**

Waveguide theory: modes of operation. Waveguide components: tuners, windows, sifters, tees and couplers, filters, mixers, isolators, circulators. Microwave tubes. Klystrons: multicavity and reflex. Magnetron, traveling wave tubes, backward wave oscillators, amplifier techniques, microwave semiconductors: operations and applications. Microwave measurement techniques. Prerequisite: MA-340 and PH-262. Offered during fall semester only. (2-2-3)

**EE-419 Electrostatics**

Stationary electric and magnetic fields. Introduction to vector calculus. Gauss's Law, Laplace and Poisson's equations. Solutions to static field problems. Ampere's Law, Faraday's Law. Prerequisites: PH-262 and MA-340. Offered during fall semester only. (3-0-3)

**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 and derivation of transfer function. 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. Design of compensator. System bode plots, crossover frequencies, gain and phase margins. The course will stress use of a variety of famous industrial computer-aided control system design software packages. Prerequisite: MA-360 or knowledge of Laplace transforms. (2-2-3)

**EE-456 Digital Signal Processing**

Discrete-time methods applied to continuous-time processes. Use of Z, fast-Fourier and discrete transforms. Design methods for digital filters. Digital filter software packages introduced. Prerequisite: MA-360. Offered during spring semester only. (2-2-3)

**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 considered in developing the final product. For EE, TET, EET, CE and CET programs. CE and CET students should see advisor before registering. Prerequisites: EN-408 and Senior standing. (1-4-3)

**EE-459 Electromagnetic Field Theory**

Continuation of EE-419. 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 quadrate decomposition. Signal-to-noise improvement in AM and FM demodulators. Maximum likelihood digital signal detection. Signal space representation of modulated 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-463 Control II**

Introduction to state diagrams and state equations. 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 methods, controllable and observable/estimator, observer design and design of optimal control system. Prerequisites: EE-453. Offered during spring semester only. (3-0-3)

**EE-471 Remote Sensing**

The course is a survey of remote sensing techniques including photogrammetry, RADAR, and GPS. The fundamental topics are numerical methods for tracking applications, Bayesian state estimation equations for general nonlinear Gaussian and non-Gaussian stochastic systems, Markov dynamic models, observation models for different sensors, uncertainty models for noise, and sensor fusion from different data sources. Emphasis will be placed on the design and implementation of various trackers using MATLAB and the analysis of their behavior. Prerequisite: EE-406

**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 theorems. State-variable equations and solutions. The sampling theorem and the Nyquist criterion. Using Z-transforms to represent and analyze sampled data systems. (3)

**EE-600 Mathematical Analysis**

Advanced mathematics for scientists and engineers as either a review or an advanced introduction. Differential equations, Laplace transforms, linear algebra, vector analysis, introduction to tensor analysis, complex variables and probability. Many calculation techniques using MATLAB are introduced. Projects are performed using MATLAB and Simulink. Offered during fall semester. (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. Component selection and modeling use of libraries 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. Prerequisite: 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. Quantization theory. Introduction to recursive estimation. Prerequisite: normal undergraduate course in signal processing. (3)

**EE-607 Electromagnetic Interference & Compatibility**

Overview of Electromagnetic Interference with examples. Conducted and radiated emission. Mutual Capacitance and Inductance. Coupling Paths. Crosstalk. Shielding Theory and Applications. Modeling of circuits in noise applications. Parasitics and their reduction. 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 filteres Cables, Connectors and Components. 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 programing, with synthesis, simulation and verification. Applications change from semester to semester. Subjects included designing 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 software aspect of the 16-bit Motorola microcontroller. Overview of onboard chip components and available instruction sets with emphasis on the newer and enhanced version. Student is required to develop a hardware application and write and test modular code. Software developmental tools will be employed. High level language compliers 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, Controllability and Observability, Specification and Structures, Feedback System Stability Classical and Modern Approach, Multivariable

Control, Sampled-Data Digital Control System, Impulse Samples, Aliasing, Zero-Order Hold, Z-Transform, Discrete-Time Systems, Sampled-Data Systems, Stability by Jury Criterion, Root Locus, Nyquist Criterion, Discretization of Continuous-Time Design. Prerequisite: EE-600 and EE-601 or equivalent. (3)

**EE-656 Image Processing**

Two-dimensional Fourier Transforms and Z-Transforms. Two-dimensional convolution. Filtering and masking. Discrete Cosine transforms, Haddamard transforms, Karhunen-Loeve transforms. Radon transformations. Contour estimation (Sobel, Snake algorithm). Motion estimation and compensation. Compression techniques (JPEG,MPEG). Prerequisite: EE-606. (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. Prerequisite: 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 for the U.S. Government. Case studies on how to identify, interpret, and respond to Broad Agency Announcements. Creating 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, 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 (the 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. 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 rule 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 pattern generation. Scanning and scan based design rules. Critical paths. Memory test and diagnostics. Built-in self-testing. ATE equipment, local and remote testing and limitations. Students will have access to on-line test workstations. Normally offered during summer semester. (3)

**EE-758 Master's Project**

Students integrate prior course work and personal experiences into a master's project. Students develop a full final proposal, including abstract, statement of work, schedule, milestones, deliverables as learned in EE-708. Proposal must be delivered to class and approval of project advisor 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 techniques. Current, voltage, resistance and power. Ohm's law, series and parallel resistive 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. Sinusional waveforms, phasors and use of the J operator. Reactance 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-150 DC/AC Circuits and Analysis**

Applications of Kirchhoff laws to multiple source and complex series-parallel circuits. Determinants and matrices. Mesh and nodal analysis. Network Theorems: Thevenin, Norton, superposition, maximum power transfer. Review of complex number manipulation. Application to capacitive and inductive circuits, impedance. Complex Mesh analysis. Network theorems applied to complex RLC networks. Frequency response of RL and RC circuits. 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-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 optimum bias, and DC and AC load lines. Input and output impedances, and voltage and current gains for each amplifier configuration. Prerequisite: EL-100 or EE-159. (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. Memory, shift registers and counters. (2-2-3)

**EL-212 Transmission Lines**

Study of transmissions lines: characteristic impedance, propagation constant, standing wave ratio and reflection coefficient. Transmission line response to transients. Bounce diagrams. Lossless and lossy line analysis using classical approach as well as graphical approach (Smith Chart). Voltage and power calculations on transmission lines. Matching techniques for transmission lines and discrete circuits. Measurements using slotted lines. Prerequisite: EE-159 or EL-150. Offered spring semester only. (2-2-3)

**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. Cascaded stages with direct, capacitor and transformer coupling of amplifier stages, loads and signal sources. Analysis of power transfer, efficiency, thermal effects, and distortion of amplifier circuits in large signal operation, amplifier operating classes and push-pull amplifier circuits. Operational Amplifier applications. Regulators. Oscillators: Wein Bridge, RC phase shift, Hartley, Colpitts, Clapp, Negative resistance and crystal types. Prerequisites: EE-159 or EL-150 and EL-200. (3-2-4)

**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-150 or EE-159 and EL-200. (2-2-3)

**EL-261 Introduction to Communication Circuits and Systems**

Fundamental concepts in communications. Amplitude and frequency modulation. Waveform and waveform analysis. Spectral content of signal. Circuits used to generate signal. Signal recovery circuits. Introduction to digital modulation and digital waveforms. Students build and test circuits. Prerequisites: EE-159 or EL-150, and EL-200. Corequisite: MA-261. Offered during spring semester only. (2-2-3)

**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. Students build and test their circuits. Prerequisites: EL-250, EL-261 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 design techniques, measurement techniques for noise factor and noise bandwidth. Ground loops and how to elimi-

nate them. Grounding techniques, shielding, digital circuit radiation, electrostatic discharge and electromagnetic pulse. Prerequisites: EL-261. (2-2-3)

**EL-400 Special Projects in Technology**

Guided Study. Project-oriented course. Students are expected to design and build electronic systems in their specialization. Students will produce a final project including a written report and an oral presentation. Prerequisite: permission of instructor. (0-6-3)

**EL-452 Automated Test Systems**

Systems design course for automating the testing of electronic circuits and systems in both the engineering and production environments; stresses both hardware design and system software development. Begins with simple PC-based systems assembly for circuit testing as part of the design process and progresses to the design and development of full-scale systems for testing of large production volumes. Detailed study of the operation of the IEEE-STD-488 and its use in test systems assembly. Prerequisites: CS-130. Offered during spring semester only. (2-2-3)

**EN-001 Basic Writing Skills**

Course in 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 plus sentence construction and 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 P-pass or R-repeat. (3-0-3)

**EN-101 English Communications I**

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, compare/contrast, personal experience, definition, illustration and process demonstration. Oral presentation skills are developed through the delivery of two speeches on related topics. Prerequisites: acceptance based on placement test scores (3-0-3)

**EN-102 English Communications II**

This sequel to EN-101 involves more sophisticated research, reading, writing, and speaking assignments. Emphasis is on summarizing and analyzing short articles, including one in-class analysis. Students will demonstrate competence in research and documentation methods by conducting one major research project during the semester. Prerequisite: EN-101. (3-0-3)

**EN-250 Technical Writing for Engineers, Managers and Scientists**

Students in IT, engineering, computer sciences and information technologies will develop the skills they need to write professional and technical documents successfully. Students will develop their insights regarding readers' needs, reactions and reading circumstances in the professional and technical workplaces. This course aims to help students become confident, flexible and effective communicators on the job. The course also will address rhetorical principles and compositional practices necessary for writing effective and professional communications. Students will learn writing and research skills needed for preparing their senior project. Prerequisite: EN-102 (3-0-3)

**EN-408 Writing Seminar in Technical Research**

Students will undertake the research necessary to complete EN-458. The course emphasizes application of professional and technical skills and knowledge acquired in the undergraduate education. The course will focus on the application of research design, quantitative and qualitative research practices and business analysis to produce an analytic report that justifies, explains and documents the planned execution of the senior project. Prerequisite: EN-102 and senior status (96 or greater earned credits). Students needing assistance in research areas will need to demonstrate proficiency in course-administered modules. (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, compare/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. (4-0-3)

**ENI-LAB English Comm Intensive Lab**

Based on placement test scores, students in this lab will focus on specific areas for improvement including punctuation, grammar, verb formation and usage. Must be taken with EN-001 and ENI-101, and can be taken with EN-101.

**ESL-099 Intermediate American English**

This course focuses on developing the skills of non-native speakers in reading, writing, speaking and listening. Special emphasis is placed on vocabulary development, reading strategies, writing grammatical sentences and paragraphs, pronunciation, auditory comprehension and American culture. Students are encouraged to work collaboratively and independently. Class meets up to eight hours per week with additional homework hours. This course does not meet the AAS or BS requirements for graduation. Grades are pass (P) or repeat (R). (3-5-3)

**ESL-100 Advanced American English**

This second course further develops the skills of non-native speakers. This course may either be a first course for some advanced students or a continuing course for students who started in ESL-099. Emphasis is placed on developing skills in college reading and studying, writing at the level of the paragraph and the short essay, making oral presentations, conversation, and understanding American culture. Preparing the students to enter EN-101 English Communications I is the goal of this course. Class meets up to eight hours per week with additional homework hours. This course does not meet the AAS or BS requirements for graduation. Grades are pass (P) or repeat (R). (3-5-3)

**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 in 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: EN-101. (3-0-3)

**HP-253 Critical Issues in US History II**

This is 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: EN-101. (3-0-3)

**HU-163 Horror Fiction**

This course offers the student a survey of horror fiction beginning with Edgar Allan Poe and ending with present-day writers such as Stephen King. Students read short stories as well as novels. The translation of horror literature into film is also examined. Prerequisite or Corequisite: EN-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 as expressions of 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 to apply critical thinking toward identifying the fine lines that often exist between disparate accounts of history. (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".(3-0-3)

**HU-205 21st 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-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-102. (3-0-3)

**HU-331 Arts and Ideas**

This course enables students to study and appreciate various forms of art, including painting, sculpture, architecture, music, drama, film, and literature through in-class and on-site experiences. The arts are also surveyed from an historical perspective, focusing primarily on eras in Western civilization. This enables students to sense the parallel development of 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/social forces that result in distinct philosophies and ideologies. Prerequisite: EN-102. (3-0-3)

**HU-345 Approaches to Shakespeare**

This course introduces students to the most enduring playwright of the English language. The readings will include at least one play from the genres of history, comedy, tragedy, and romance. Some attention will also be given to the sonnets. The historical context of the literature of Elizabethan England is also explored. Prerequisite: EN-102. (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 academic dean. (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 detections; viruses; 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 Part 1**

Both IAE-301 and its compliment, IAE-302, are designed to provide students with an opportunity to master many of the common and basic IA principles supporting the CompTIA Security+ certification. IAE-301 centers on the administrative portion of network security. Topics include IA terms and background, introduction to organizational IA policy, risk analysis, backups and contingency planning. Also included are Linux history and commands, administrative tools and snap-ins for Windows Professional versions. Prerequisite: IAE-201 (3-0-3).

**IAE-302 Comprehensive Computer and Network Security Part 2**

IAE-302 is the companion course to IAE-301. This course provides students with instruction on IA-related protocols, including IPv4 and IPv6, TCP, UDP, ICMP and other supported protocols related to secure data communications. Intrusion detection and firewall principles supporting the protection of networks in a secure enclave architecture are also discussed. Other topics include infrastructure security requirements, network enclave security architecture, introduction to IEEE-802.11 wireless security history and requirements, principles of authentication and access controls, Kerberos authentication, and the use of LDAP. This course maps to the CompTIA Security+certification. Prerequisite: IAE-201; Corequisite: IAE-301. (3-0-3)

**IAE-315 Secure System Administration and Operation**

This course introduces students to security settings and requirements of Linux and Windows-based systems 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 service, securing Apache web service, access control methods and host auditing and tools. (3-0-3)

**IAE-325 Secure Data Communications and Cryptography**

This course follows the protocol education provided in IAE-301 and IAE-302 with a more detailed and practical look at secure transactions and correspondence, as well as protection of data in storage. Within the confines of the ISO-OS1 model, this course discusses data communication with emphasis on the security available at the layers, 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 processes and algorithms. Prerequisites: IAE-301 and IAE-302. (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 academic dean. This course may be repeated with different projects. (1-4)

**IAE-402 Introduction to Incident Handling and Malicious Code**

This course provides a detailed understanding of incidents from attacks of malicious software. This course addresses the history and practice of coding that occurs in viruses, worms, spyware, Trojan horses, remote management back doors and root kits. Students learn preventative measures and tools, and explore how to rid systems of malicious software and prevent re-infection. Recovery processes and backup methods are explored. In addition to covering basic incident handling preparation, response and recovery practices, and the course goes into detail regarding malicious software. Prerequisites: IAE-301 and IAE-302. (3-0-3)

**IAE-406 Forensic Investigative Processes**

This course will explore forensics and the investigation processes. Students will 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-301, IAE-302, IAE-315, NT-150 and CT-152. (3-0-3)

**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 academic dean. This course may be repeated with different projects. (1-4)

**IAE-611 Wireless 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), CMRS and PCS-second, third and fourth generations (2G, 3G and 4G), laptops equipped with Wireless Network Interface Cards (WNICs), Personal Digital Assistants (PDAs), Bluetooth and Zigbe devices, and Radio Frequency Identity (RFID) devices. Retail store security and proximity payment application security are also discussed. Corequisite: IAE-670 (3)

**IAE-621 Applied Wireless Network Security**

This 16-week course provides students with practical, real-world experience with wireless network security with an understanding of wireless fundamentals, wireless network threats, tools to test wireless security, and safeguards. Specifically, this course addresses the most popular hacking, cracking and wireless security network analysis tools and trains 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. Corequisite: IAE-670 (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 of 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, including the legal and regulatory compliance issues critical for chief information security officers. It discusses the key 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 throughout the course. Corequisite: IAE-670 (3)

**IAE-673 Secure Information Transfer and Storage**

This course will provide the student a history of cryptography from Caesar's cipher to elliptic-curve cryptography of today. Students will study public and private key algorithms and understand their functionality, and how they work with network protocols. One-way hashes and digital signatures will be discussed, and used by the students in submissions to the instructor. Public-key infrastructure with certificate authorities and web-of-trust infrastructure methods will be learned. Corequisite: IAE-670 (3)

**IAE-674 Security Risk Management**

This course will begin with an understanding of why risk management evaluations are useful. This class will discuss the general methodologies for security risk assessment and security test and evaluation, including the interviews and documentation research necessary. The student will be provided practical 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 planning and security policy formulation and enforcement. 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 moves on to understanding 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. Corequisite: IAE-670. (3)

**IAE-677 Malicious Software**

This course examines malicious software detection and malicious software defenses including tripwire and signature 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 application technologies and resulting insecurities will be discussed in detail. Students will then review the underlying methodologies used by the anti-virus vendors and freeware offerings to protect electronic assets from harm or other compromise. Corequisite: IAE-670 (3)

**IAE-679 Vulnerability 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. Corequisites: IAE-670 . (3)

**IAE-680 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 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-coursework. 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 protect the inner network from the attacker who has successfully circumvented the perimeter or from the disgruntled insider. Use of methodologies including host-based intrusion detection methods, audit settings and review PC Firewalls, host operating hardening for Linux and Windows 2000, and Virtual LANs will be reviewed. Corequisite: IAE-670 (3)

**IAE-684 Managing Information Security (formerly Complementary Security)**

This class explores the overarching security architectures and vectors of information assurance from a management perspective to allow the learner to formulate the basis for sound business decisions. The course will provide a basic understanding of all aspects involving IA management, needs analysis, risk assessments, policy formation, security planning and technology integration. Students will gain an appreciation for systems, networks, processes, methodologies, documentation requirements, recovery processes, certification and accreditation processes as well as "best practice" implementation, training and continuous improvement. Discussions in this course will give the correct acumen of personnel security, physical security, and technical operational security as these principles relate and interface with information security principles. Defense-in-depth strategies will also be addressed for designing proper physical security programs. At the completion of the course students should be able to manage an IA function and evaluate an organization's contingency planning process for adequacy. Prerequisites: IAE-670 and IAE-682. (3)

**IAE-820 Situation 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 (PREDICT) program will be discussed. (3)

**IAE-830 Information Assurance 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. (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-840 Information Assurance Consulting**

Learners examine the skills necessary for executive leadership in the role as consultant. A survey approach is applied with the learner examining the role of assessment, intervention and analysis from a consultant lens. (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-850 Business Continuity Planning**

Learners examine the continuity planning process in the context of disaster recovery, incidence response and forensics. The course covers the development of plans and the establishment of the protocols required for rapid response as it is relevant to information assurance. (3)

**IAE-855 Information Assurance Requirements for Compliance**

Learners examine the various legal and regulatory requirements corporations, government and military leadership face today. Included in the topics will be DIACAP, FISMA, the COBIT Framework, ITIL, industry best practices, due diligence and compliance. (3)

**IAE-857 Information Assurance and the System Life Cycle**

Learners examine the importance in integrating information assurance into the life cycle of all information systems. Discussions will include the necessity for security integration in each phase to the systems development life cycle including testing, verification and validation of IA controls, operations and decommissioning. (3)

**IAE-860 Advanced Mixed Methods Research**

This course builds on the skills acquired in RSC-810 and IAE-825. Learners will examine research designs integrating both quantitative and qualitative design methods and will gain an understanding of the appropriateness of the approach to their individual research. (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-870 Executive Awareness in Information Assurance**

Learners examine the various conceptual and procedural components of an Information Assurance Program for their organization. Roles and significance of certification and accreditation activities, executive consideration in resource allocation and leading the organization in the holistic art of information assurance will be examined. (3)

**IAE-871 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)

**IAE-875 Information Assurance 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. Students must request a faculty member who is a topic specific expert to facilitate the course. (3)

**IE-701 Principles of Designing 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 Multi-tiered/Service-Oriented Architecture and Web 2.0**

Client/Server has been extended to Multi-tiered environments, distributed communications via CORBA,COM/DCOM, 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 Technologies**

This course will investigate the techniques used by successful network engineers to create converged network architectures and provide optimum information access to their users. These techniques include how to select the optimum mix of mobile technologies for performance and cost, and mandatory feature requirements such as expandability, extensibility and security. 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 OpNet, the most advanced network modeling software currently available. Technical information on specific equipment and software will be provided as instruction supplemental to the testbook, 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 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 and Practice of Secure Information Networks**

This course will examine Internet security concerning two key network design issues: information security and information privacy. Students will 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 venue 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 a on-demand mode. This is the technical underpinning of the “any where, any time” mantra of the Internet. However, these components do not always 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 of 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. While lawmakers and intellectual property owners struggle with this challenge, others such as Linux and Napster seek to test the new paradigm. This course will examine the legal and regulatory limits of an e-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 or a project. (3)

**MA-005 Basic Mathematics**

Designed for students needing math skills for MA-110 and MA-114. Topics 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 Mathematics**

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 College Mathematics with Business Applications**

This is an introductory course in contemporary mathematics used in conducting business. Topics include understanding your checking and bank accounts and average daily balances. Setting up word problems to solve business situations, percentages, discounting, markups and markdowns. Compound interest and annuities; present and future values; mortgages and payment schedules. Excel will be used throughout to assist with calculations. Introduction to Excel financial functions. (3-0-3)

**MA-114 Algebra and Trigonometry**

Algebra: basic operations on real and complex numbers, fractions, 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: 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. 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-114. Fall-daytime only; Spring-evening only. (3-0-3)

**MA-261 Calculus I**

Lines, circles, ellipses. Functions and limits, differentiation, power rule, higher-order derivatives, product, quotient and chain rules, implicit differentiation, applications. Integration: definite integrals; indeterminate forms; exponential, logarithmic, trigonometric and hyperbolic functions; differentiation and integration, graphing. Prerequisite: MA-114. Fall - daytime only; Spring - evening only. (4-0-4)

**MA-262 Calculus II**

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

**MA-263 Calculus III**

Multivarible and vector calculus. Integrals in two and three dimensional coordinate systems. Cylindrical and spherical coordinates. Vector functions and their derivatives, directional derivatives. Gradients, divergence and curl. Stokes theorem, Green's theorem, Gausses theorem. Prerequisite: MA-262. (4-0-4)

**MA-300 Mathematical Methods for Engineering**

This course covers the use of standard software tools such as MATLAB and other applications to the solution of engineering problems. Solutions to linear equations, numerical methods and applications to integration are covered. Prerequisites: MA-261 and junior standing. (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 undetermined 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**

Sets and methods of counting. Probability density functions, expected values and correlations. Binomial, Poisson, exponential and normal distribution. Central limit theorem and statistical estimation. Introduction to stochastic processes. Applications to noise and reliability. Prerequisite: MA-262. (3-0-3)

**MA-355 Numerical Analysis**

Number systems, floating-point arithmetic and error analysis. Taylor, interpolating and minimax 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 and trigonometric functions; basic theorems including shifting, initial and final-value theorems; unit-step, periodic and delta functions; methods of inverting transforms; solutions of differential equations by transform methods; applications to network problems; 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 and academic dean. This course may be repeated with different projects. (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 to 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 managing change. Cases are analyzed to develop skills in applying theories to common managerial problems. Conducting business today means dealing with a variety of difficult ethical decisions. Students will apply ethical decision-making skills they learn in class to business matters involving conflicts of interest, work requirements, work conditions, and dealing with work-related problems. (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: MBA-600 or 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-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-652 Identity Management**

Students will learn fundamental and advanced IdM (Identity Management) topics, concepts, and current issues. The course will prepare the students for real-world IdM 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 IdM, including broad technical aspects, legal and policy issues, implementation scenarios, case studies, and industry and government applications of IdM components. Students will prepare for an exam at course completion, allowing them the opportunity to become certified industry professionals in addition to receiving academic credit (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 organization development, functions and systems are examined. This course will also examine both the theory and practices of leadership through a review of the literature, class discussions, and critical analysis of leadership techniques based on the literature and focusing on transformational leadership. 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 they face through the term project. (3)

**MBA-658 Legal, Political and Ethical Implications for Leadership**

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 systems 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 Business Administration**

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

**MBA-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 entrepreneurial careers, evaluating opportunities, writing business plans, and financing the venture.

**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 customers' needs. Participation 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)

**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-110 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)

**OP-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**

Non calculus-based physics intended for credit in engineering technology courses. Use PH-261 for electrical, computer and software engineering courses. Mechanics: units, conversion factors: vector diagrams, translational equilibrium, friction, torque and rotational equilibrium: uniformly accelerated motion, projectiles: Newton's Law, work energy and power: kinetic and potential energy, conservation of energy: impulse and momentum. Heat: temperature scales, thermal properties of matter, heat and temperature change, heat and change of phase, physics of heat transfer; applications. Prerequisite: MA-114. Fall-evening only; Spring-daytime only. (2-2-3)

**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 relations. 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. In addition to exams and quizzes, students will be required to research selected topics of interest in order to enhance their understanding of the most recent advances in the fields of energy and the environment. 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, equilibrium, elasticity, periodic motion. Prerequisite: MA-261. Corequisite: MA-262. Fall-evening only; spring-daytime 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-daytime only; spring-evening 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 Special and General 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, momentum in Special Relativity; mass in Relativity, Schwarzschild metric, Black Holes and Cosmology, behavior of light and applications to Global Positioning Systems. Prerequisites: 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. Schrodinger's wave equation and solutions. WKB approximation, and time-dependent 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)

**RSC-601 Professional Writing Practicum**

This course is designed to provide doctoral learners the necessary writing skills to be successful at the doctoral level. (3)

**RSC-801 Fundamentals of Doctoral Learning**

Doctoral programs educate students for highly specialized careers in academe or practice. 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 at the doctoral level and prepare them for the entire program of study. Students will each develop a Doctoral Learning Contract (DLC) that will serve as guides through graduation. (3)

**RSC-810 Professional Research: Theory and Practice I**

This course is designed to provide students an overview of a broad range of qualitative and quantitative methodologies applicable to doctoral level research. The course will examine the research process, including problem statements, developing dissertation research questions, conducting a literature review and ethical implications in research. Students begin examining topics for Chapter 1 of the dissertation. (3)

**RSC-812 Professional Research: Theory and Practice II**

This course is designed to move the student from the problem statement to the research question and research methodology appropriate to the individual dissertation. Prerequisite: RSC-810 (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. (3)

**RSC-815 Problem Solving and Decision Making Using Quantitative Methods**

This course provides information security professionals with advanced decision-making skills, supported by mechanized information-gathering tools. Specifically, this course combines quantitative analysis with decision-making science to support strategic, operational and tactical requirements. (3)

**RSC-820 Situation Awareness, Analysis and Action Plan Processes**

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.

**RSC-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 (PREDICT) program will be discussed.

**RSC-830 Information Assurance 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.

**SE-301 Software Engineering**

Introduction to software design. Software performance, modularity, portability and reliability. Students apply engineering principles to create software solutions to specified problems. Software testing and CASE-tools introduced. Emphasis on UML and object-oriented code. Prerequisite: CS-220. Offered during fall semester only. (2-2-3)

**SE-321 Human Computer Interaction**

Students learn user-centered design of computer systems with the goal of high usability. Emphasis is on designing systems that are efficient, easy-to-use, enjoyable and effective. Explores the selection of interaction style, hardware, and the use of color, font, text and images. Explores design implications due to user characteristics such as age, dexterity, experience and disabilities. Students learn requirements gathering, prototype building and user testing. A group project is assigned. Prerequisite: CS-220 or BUS-250. Offered during Spring semester only. (3-0-3)

**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)

**SE-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 SE, SIA, 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-513 Systems Management and Organization Theory**

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; hard and soft systems approaches; multidisciplinary approaches to organizational problem solving, feedback loops and system change. (3)

**SM-525 Statistics for Managers**

Develop probabilistic and statistical concepts, methods, and models through the use of real-life data from business. Stresses the role that statistics plays in the managerial decision making process. Use of statistical software package is emphasized. This course is best completed after MBA-640. (3)

**SM-563 Managing Information Systems**

This course provides the student with an understanding of principles, practices, methodologies, and terminology used in planning, designing, implementing, operating, and managing information systems in government and industry. The overall approach is to examine the technology and roles of information systems within the organization, concentrating on how information systems are designed and how they operate. Knowledge of computer concepts will be provided to students new to this field. (3)

**SM-567 Business Data Communication and Networking**

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." (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. (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. As electronic commerce becomes increasingly global, complications arise as a result of political pressures, both foreign and domestic. As a result, electronic commerce law and regulation are in flux, and changing rapidly to catch up to the impact of the information revolution on the global economy. 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 academic dean. This course may be repeated with different projects. (1-4)

**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.

**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 methodology employed in the discipline will be included. Perquisite 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. Perquisite 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-351 Ethics**

This course is designed to help students improve their ability to make ethical decisions in business. This is done by providing a framework that enables the student to identify, analyze, and resolve ethical issues that arise when making decisions in business. 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 academic dean. (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-309 Network Simulation and Modeling**

Provides an introduction to probability, statistics, and discrete event simulation. Topics include survey of discrete and continuous simulation languages, elementary queuing theory, discrete and continuous random variable selection applied to computer networks. Information is used to generate random variables to study network traffic, network utilization, response time, throughput, capacity, and queuing delay for discrete event simulation models. Emphasis is placed on student design development. An introduction to the use of simulation software is included. Prerequisites: MA-128 or MA-345 and MA-261 and TC-110 or Equivalent. (2-2-3)

**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. Prerequisite TC-309 (2-2-3)

**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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Eta Kappa Nu

# Calendar

## Fall Semester 2011

### Undergraduate Classes

*Semester-long Classes*

| | |
|---|---|
| Aug. 15-19 | Registration for part-time students |
| Aug. 17-19 | Orientation, registration and residence hall check-in for new students |
| Aug. 19 | Final day of registration |
| | December graduates notify Office of Registration and Records |
| Aug. 20 | Residence hall check-in for returning students |
| Aug. 22 | Classes begin |
| | Last day for 100% refund |
| | First tuition installments due |
| | Library opens |
| | Cooperative education work period begins |
| Aug. 29 | Electronics, physics/chemistry and computer labs open |
| | Tutoring Resource Center opens |
| Sept. 5 | Labor Day – college closed |
| Sept. 6 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Sept. 12 | Last day for 50% refund |
| Sept. 19 | Last day for 25% refund |
| | Second tuition installment due |
| Sept. 20-26 | Financial Aid Disbursement Week/ Pell Census |
| Sept. 27 | Career Day - no classes |
| Sept. 28 | Faculty Colloquium, Noon -1 p.m. |
| Oct. 17 | Final tuition installment due |
| Oct. 26 | Last day to drop course with W or audit course |
| | Registration for spring semester begins for continuing students |
| Nov. 23 | Classes canceled – college closes at 5 p.m. |
| Nov. 24-27 | Thanksgiving recess – college closed |
| Dec. 9 | Classes end |
| | Electronics, physics/chemistry and computer labs close |
| | Tutoring Resource Center closes |
| | All library materials are due |
| | Last day for cooperative education work |
| | Last day to withdraw |
| Dec. 12-16 | Final examinations |
| Dec. 16 | Library closes |
| | Residence halls close at 5 p.m. |
| Dec. 21 | College closes at 5 p.m. for recess |
| Dec. 22-Jan. 2 | Winter recess – college closed |

*Calendars for undergraduate terms, not running on a 16-week schedule, are available online.*

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Aug. 26 | Final day of registration |
| Aug. 29 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| Sept. 5 | Labor Day – college closed (Online classes will meet asynchronously.) |
| Sept. 12 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Sept. 19 | Last day for 50% refund |
| Sept. 26 | Last day for 25% refund |
| | Final 50% tuition installment due |
| Nov. 2 | Registration for spring semester begins |
| Nov. 7 | Last day to drop course with W or audit course |
| Nov. 23 | College closes at 5 p.m. (Online classes will meet asynchronously.) |
| Nov. 24-27 | Thanksgiving – college closed (Online classes will meet asynchronously.) |
| Dec. 9 | Last day to withdraw |
| Dec. 16 | Classes end |
| Dec. 21 | College closes at 5 p.m. for recess |
| Dec. 22-Jan. 2 | Winter recess – college closed |

*Fall – Term I*

| | |
|---|---|
| Aug. 26 | Final day of registration |
| Aug. 29 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| Sept. 5 | Labor Day – college closed (Online classes will meet asynchronously.) |
| | Last day to add a course |
| | Last day to drop course without W |
| Sept. 6 | Last day for 75% refund |
| Sept. 12 | Last day for 50% refund |
| Sept. 19 | Last day for 25% refund |
| Sept. 20 | Last day to drop course with W or audit course |
| Sept. 26 | Final 50% tuition installment due |
| Oct. 14 | Last day to withdraw |
| Oct. 21 | Classes end |

*Fall – Term II*

| | |
|---|---|
| Oct. 21 | Final day of registration |
| Oct. 24 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| Oct. 31 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Nov. 2 | Registration for spring semester begins |
| Nov. 7 | Last day for 50% refund |
| Nov. 14 | Last day for 25% refund |
| Nov. 15 | Last day to drop course with W or audit course |
| Nov. 21 | Final 50% tuition installment due |
| Nov. 23 | College closes at 5 p.m. (Online classes will meet asynchronously.) |
| Nov. 24-27 | Thanksgiving – college closed (Online classes will meet asynchronously.) |
| Dec. 9 | Last day to withdraw |
| Dec. 16 | Classes end |
| Dec. 21 | College closes at 5 p.m. for recess |
| Dec. 22-Jan. 2 | Winter recess – college closed |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

# Spring Semester 2012

## Undergraduate Classes

*Semester-long Classes*

| | |
|---|---|
| Jan. 3 | College opens |
| Jan. 2-6 | Registration for part-time students |
| Jan. 5 | Residence hall check-in for new students |
| Jan. 6 | Final day of registration |
| | Graduation applications due for Class of 2012 |
| | Orientation and registration for new students |
| Jan. 7 | Residence hall check-in for returning students |
| Jan. 9 | Classes begin |
| | Last day for 100% refund |
| | First tuition installments due |
| | Library opens |
| | Co-op work period begins |
| Jan. 16 | Martin Luther King Jr. Day – college closed |
| Jan. 17 | Electronics, physics/chemistry and computer labs open |
| | Tutoring Resource Center opens |
| Jan. 24 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Jan. 30 | Last day for 50% refund |
| Feb. 6 | Last day for 25% refund |
| | Second tuition installments due |
| Feb. 7-13 | Financial Aid Disbursement Week/ Pell Census |
| Mar. 5 | Final tuition installment due |
| Mar. 12-16 | Spring recess (service offices open) |
| Mar. 19 | Classes resume |
| Mar. 20 | Last day to drop course with W or audit course |
| Mar. 22 | Honors Convocation |
| Mar. 28 | Registration for summer semester begins for continuing students |
| Mar. 30 | Career Fair |
| Apr. 4 | Pre-registration for fall semester begins for continuing students |
| Apr. 30 | Classes end |
| | Last day to withdraw |
| | Electronics, physics/chemistry and computer labs close |
| | Tutoring Resource Center closes |
| | All library materials are due |
| | Last day for cooperative education work |
| May 1-7 | Final examinations |
| May 7 | Library closes |
| May 8 | Residence halls close at 7 p.m. |
| May 12 | Commencement |

*Calendars for undergraduate terms, not running on a 16-week schedule, are available online.*

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Jan. 2 | Final day of registration |
| Jan. 3 | College opens |
| | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| | Graduation applications due for Class of 2012. |
| Jan. 16 | Martin Luther King Jr. Day – college closed (Online classes will meet asynchronously.) |
| Jan. 17 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Jan. 24 | Last day for 50% refund |
| Jan. 31 | Last day for 25% refund |
| | Final 50% tuition installment due |
| Mar. 7 | Registration for summer session begins |
| Mar. 13 | Last day to drop course with W or audit course |
| Apr. 11 | Pre-registration for fall semester begins |
| Apr. 16 | Last day to withdraw |
| Apr. 23 | Classes end |
| May 12 | Commencement |

*Spring – Term I*

| | |
|---|---|
| Jan. 2 | Final day of registration |
| Jan. 3 | College opens |
| | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| | Graduation applications due for Class of 2012 |
| Jan. 10 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Jan. 16 | Martin Luther King Jr. Day – college closed (Online classes will meet asynchronously.) |
| Jan. 17 | Last day for 50% refund |
| Jan. 24 | Last day for 25% refund |
| Jan. 25 | Last day to drop course with W or audit course |
| Jan. 31 | Final 50% tuition installment due |
| Feb. 20 | Last day to withdraw |
| Feb. 27 | Classes end |

*Spring – Term II*

| | |
|---|---|
| Feb. 27 | Final day of registration |
| Feb. 28 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| Mar. 6 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Mar. 7 | Registration for summer semester begins |
| Mar. 13 | Last day for 50% refund |
| Mar. 20 | Last day for 25% refund |
| Mar. 21 | Last day to drop course with W or audit course |
| | Registration for summer semester begins |
| Mar. 27 | Final 50% tuition installment due |
| Apr. 11 | Pre-registration for fall semester begins |
| Apr. 16 | Last day to withdraw |
| Apr. 23 | Classes end |
| May 12 | Commencement |



Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

# Summer Session 2012

## Undergraduate Classes

*Session-long Classes*

| | |
|---|---|
| May 18 | Final day of registration |
| | August graduates notify Office of Registration and Records |
| | Cooperative education work period begins |
| May 21 | Classes begin |
| | Last day for 100% refund for 8- and 11-week courses |
| | First tuition installments due |
| | Library opens |
| May 28 | Memorial Day – college closed |
| May 29 | Last day for 75% refund for 8-week courses |
| | Electronics, physics/chemistry and computer labs open |
| | Last day to add a course |
| | Last day to drop course without W |
| June 4 | 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 11 | Last day for 25% refund for 8-week courses |
| | Last day for 50% refund for 11-week courses |
| June 12 | Last day to drop 8-week course with W or audit 8-week course |
| June 18 | Last day for 25% refund for 11-week courses |
| | Second tuition installments due for 11-week courses |
| June 19-25 | Financial Aid Disbursement Week/ Pell Census |
| July 3 | Final tuition installment due for 8-week courses |
| July 4 | Independence Day – college closed |
| July 9 | Last day to withdraw from 8-week courses |
| | Last day to drop 11-week course with W or audit 11-week course |
| | Classes end for 8-week courses |
| July 10-16 | Final exams for 8-week courses |
| July 16 | Final tuition installment due for 11-week courses |
| July 31 | Electronics, physics/chemistry and computer labs close |
| | All library materials are due |
| | Last day to withdraw from 11-week courses |
| | Classes end for 11-week courses |
| Aug. 1-7 | Final exams for 11-week courses |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Apr. 27 | Final day of registration |
| Apr. 30 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| May 12 | Commencement |
| May 14 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| May 21 | Last day for 50% refund |
| May 28 | Memorial Day – college closed (Online classes will meet asynchronously.) |
| May 29 | Last day for 25% refund |
| | Final 50% tuition installment due |
| July 4 | Independence Day – college closed (Online classes will meet asynchronously.) |
| July 9 | Last day to drop course with W or audit course |
| Aug. 10 | Last day to withdraw |
| Aug. 17 | Classes end |

*Summer – Term I*

| | |
|---|---|
| Apr. 27 | Final day of registration |
| Apr. 30 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| May 7 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| May 12 | Commencement |
| May 14 | Last day for 50% refund |
| May 21 | Last day for 25% refund |
| May 22 | Last day to drop course with W or audit course |
| May 28 | Memorial Day – college closed (Online classes will meet asynchronously.) |
| May 29 | Final 50% tuition installment due |
| June 15 | Last day to withdraw |
| June 22 | Classes end |

*Summer – Term II*

| | |
|---|---|
| June 22 | Final day of registration |
| June 25 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| July 2 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| July 4 | Independence Day – college closed (Online classes will meet asynchronously.) |
| July 9 | Last day for 50% refund |
| July 16 | Last day for 25% refund |
| July 17 | Last day to drop course with W or audit course |
| July 20 | Final 50% tuition installment due |
| Aug. 10 | Last day to withdraw |
| Aug. 17 | Classes end |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

# Fall Semester 2012

## Undergraduate Classes

*Semester-long Classes*

| | |
|---|---|
| Aug. 13-17 | Registration for part-time students |
| Aug. 15-17 | Orientation, registration and residence hall check-in for new students |
| Aug. 17 | Final day of registration |
| | December graduates notify Office of Registration and Records |
| Aug. 18 | Residence hall check-in for returning students |
| Aug. 20 | Classes begin |
| | Last day for 100% refund |
| | First tuition installment due |
| | Library opens |
| | Cooperative education work period begins |
| Aug. 27 | Electronics, physics/chemistry and computer labs open |
| | Tutoring Resource Center opens |
| Sept. 3 | Labor Day – college closed |
| Sept. 4 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop without a W |
| Sept. 10 | Last day for 50% refund |
| Sept. 17 | Last day for 25% refund |
| | Second tuition installments due |
| Sept. 18-24 | Financial Aid Disbursement Week/ Pell Census |
| Sept. 25 | Career Day - no classes |
| | Faculty Colloquium, Noon -1 p.m. |
| Oct. 15 | Final tuition installment due |
| Oct. 24 | Last day to drop course with W or audit course |
| | Registration for spring semester begins for continuing students |
| Nov. 21 | Classes canceled – college closes at 5 p.m. |
| Nov. 22-25 | Thanksgiving recess – college closed |
| Dec. 7 | Classes end |
| | Electronics, physics/chemistry and computer labs close |
| | Tutoring Resource Center closes |
| | All library materials are due |
| | Last day for cooperative education work |
| | Last day to withdraw |
| Dec. 10-14 | Final examinations |
| Dec. 14 | Library closes |
| | Residence halls close at 5 p.m. |
| Dec. 19 | College closes at 5 p.m. for recess |
| Dec. 20-Jan. 1 | Winter recess – college closed |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Aug. 24 | Final day of registration |
| Aug. 27 | Classes begin<br>Last day for 100% refund<br>First 50% tuition installment due |
| Sept. 3 | Labor Day – college closed<br>(Online classes will meet asynchronously.) |
| Sept. 10 | Last day for 75% refund<br>Last day to add a course<br>Last day to drop course without W |
| Sept. 17 | Last day for 50% refund |
| Sept. 24 | Last day for 25% refund<br>Final 50% tuition installment due |
| Oct. 31 | Registration for spring semester begins |
| Nov. 5 | Last day to drop course with W or audit course |
| Nov. 21 | College closes at 5 p.m.<br>(Online classes will meet asynchronously.) |
| Nov. 22-25 | Thanksgiving – college closed<br>(Online classes will meet asynchronously.) |
| Dec. 7 | Last day to withdraw |
| Dec. 14 | Classes end |
| Dec. 19 | College closes at 5 p.m. for recess |
| Dec. 20-Jan. 1 | Winter recess – college closed |

*Fall – Term I*

| | |
|---|---|
| Aug. 24 | Final day of registration |
| Aug. 27 | Classes begin<br>Last day for 100% refund<br>First 50% tuition installment due |
| Sept. 3 | Labor Day – college closed<br>(Online classes will meet asynchronously.) |
| Sept. 4 | Last day for 75% refund<br>Last day to add a course<br>Last day to drop course without W |
| Sept. 10 | Last day for 50% refund |
| Sept. 17 | Last day for 25% refund<br>Final 50% tuition installment due |
| Sept. 18 | Last day to drop course with W or audit course |
| Oct. 12 | Last day to withdraw |
| Oct. 20 | Classes end |

*Fall – Term II*

| | |
|---|---|
| Oct. 20 | Final day of registration |
| Oct. 22 | Classes begin<br>Last day for 100% refund<br>First 50% tuition installment due |
| Oct. 29 | Last day for 75% refund<br>Last day to add a course<br>Last day to drop course without W |
| Oct. 31 | Registration for spring semester begins |
| Nov. 5 | Last day for 50% refund |
| Nov. 12 | Last day for 25% refund |
| Nov. 13 | Last day to drop course with W or audit course |
| Nov. 19 | Final 50% tuition installment due |
| Nov. 21 | College closes at 5 p.m.<br>(Online classes will meet asynchronously.) |
| Nov. 22-25 | Thanksgiving – college closed<br>(Online classes will meet asynchronously.) |
| Dec. 7 | Last day to withdraw |
| Dec. 14 | Classes end |
| Dec. 19 | College closes at 5 p.m. for recess |
| Dec. 20-Jan. 1 | Winter recess – college closed |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

# Spring Semester 2013

## Undergraduate Classes

*Semester-long Classes*

Dec. 31-Jan. 5
Registration for part-time students

Jan. 2
College opens

Jan. 3
Residence hall check-in for new students

Jan. 4
Final day of registration
Graduation applications due for Class of 2013
Orientation and registration for new students

Jan. 5
Residence hall check-in for returning students

Jan. 7
Classes begin
Last day for 100% refund
First tuition installments due
Library opens
Co-op work period begins

Jan. 14
Martin Luther King Jr. Day – college closed

Jan. 15
Electronics, physics/chemistry and computer labs open
Tutoring Resource Center opens

Jan. 21
Last day for 75% refund
Last day to add a course
Last day to drop course without W

Jan. 28
Last day for 50% refund

Feb. 4
Last day for 25% refund
Second tuition installments due

Feb. 5-11
Financial Aid Disbursement Week/ Pell Census

Mar. 4
Final tuition installment due

Mar. 11-15
Spring recess (service offices open)

Mar. 18
Classes resume

Mar. 19
Last day to drop course with W or audit course

Mar. 21
Honors Convocation

Mar. 22
Career Fair

Mar. 27
Registration for summer semester begins for continuing students

Apr. 3
Pre-registration for fall semester begins for continuing students

Apr. 29
Classes end
Last day to withdraw
Electronics, physics/chemistry and computer labs close
Tutoring Resource Center closes
All library materials are due
Last day for cooperative education work

Apr. 30- May 6
Final examinations

May 6
Library closes

May 7
Residence halls close at 7 p.m.

May 11
Commencement

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Jan. 1 | Final day of registration |
| Jan. 2 | College opens |
| | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| | Graduation applications due for Class of 2013. |
| Jan. 14 | Martin Luther King Jr. Day – college closed (Online classes will meet asynchronously.) |
| Jan. 16 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| Jan. 23 | Last day for 50% refund |
| Jan. 30 | Last day for 25% refund |
| | Final 50% tuition installment due |
| Mar. 6 | Registration for summer session begins |
| Mar. 13 | Last day to drop course with W or audit course |
| Apr. 10 | Pre-registration for fall semester begins |
| Apr. 16 | Last day to withdraw |
| Apr. 23 | Classes end |
| May 11 | Commencement |

*Spring – Term I*

| | |
|---|---|
| Jan. 1 | Final day of registration |
| Jan. 2 | College opens |
| | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| | Graduation applications due for Class of 2013 |
| Jan. 9 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop without a W |
| Jan. 14 | Martin Luther King Jr. Day – college closed (Online classes will meet asynchronously.) |
| Jan. 16 | Last day for 50% refund |
| Jan. 23 | Last day for 25% refund |
| Jan. 24 | Last day to drop course with W or audit course |
| Jan. 30 | Final 50% tuition installment due |
| Feb. 19 | Last day to withdraw |
| Feb. 26 | Classes end |

*Spring – Term II*

| | |
|---|---|
| Feb. 26 | Final day of registration |
| Feb. 27 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| Mar. 6 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| | Registration for summer semester begins |
| Mar. 13 | Last day for 50% refund |
| Mar. 20 | Last day for 25% refund |
| Mar. 21 | Last day to drop course with W or audit course |
| Mar. 27 | Final 50% tuition installment due |
| Apr. 10 | Pre-registration for fall semester begins |
| Apr. 15 | Last day to withdraw |
| Apr. 23 | Classes end |
| May 11 | Commencement |

Refer to Capitol College's online calendar at www.capitol-college.edu for an updated calendar.

## Summer Session 2013

### Undergraduate Classes

*Session-long Classes*

| | |
|---|---|
| May 17 | Final day of registration |
| | August graduates notify Office of Registration and Records |
| | Cooperative education work period begins |
| May 20 | Classes begin |
| | Last day for 100% refund for 8- and 11-week courses |
| | First tuition installments due |
| | Library opens |
| May 27 | Memorial Day – college closed |
| May 28 | Last day for 75% refund for 8-week courses |
| | Electronics, physics/chemistry and computer labs open |
| | Last day to add a course |
| | Last day to drop course without W |
| June 3 | 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 10 | Last day for 25% refund for 8-week courses |
| | Last day for 50% refund for 11-week courses |
| June 11 | Last day to drop 8-week course with W or audit 8-week course |
| June 17 | Last day for 25% refund for 11-week courses |
| | Second tuition installments due for 11-week courses |
| June 18-24 | Financial Aid Disbursement Week/ Pell Census |
| July 2 | Final tuition installment due for 8-week courses |
| July 4 | Independence Day – college closed |
| July 8 | Last day to withdraw from 8-week courses |
| | Last day to drop 11-week course with W or audit 11-week course |
| | Classes end for 8-week courses |
| July 9-15 | Final exams for 8-week courses |
| July 15 | Final tuition installment due for 11-week courses |
| July 30 | Classes end for 11-week courses |
| | Electronics, physics/chemistry and computer labs close |
| | All library materials are due |
| | Last day to withdraw from 11-week courses |
| July 31-Aug 6 | Final exams for 11-week courses |

## Graduate Classes

*Semester-long Classes*

| | |
|---|---|
| Apr. 26 | Final day of registration |
| Apr. 29 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| May 11 | Commencement |
| May 13 | Last day for 75% refund |
| | Last day to add a course |
| | Last day to drop course without W |
| May 20 | Last day for 50% refund |
| May 27 | Memorial Day – college closed (Online classes will meet asynchronously.) |
| May 28 | Last day for 25% refund |
| | Final 50% tuition installment due |
| July 4 | Independence Day – college closed (Online classes will meet asynchronously.) |
| July 8 | Last day to drop course with W or audit course |
| Aug. 9 | Last day to withdraw |
| Aug. 16 | Classes end |

*Summer – Term I*

| | |
|---|---|
| Apr. 26 | Final day of registration |
| Apr. 29 | Classes begin |
| | Last day for 100% refund |
| | First 50% tuition installment due |
| May 6 | Last day for 75% refund |
| May 6 | Last day to add a course |
| | Last day to drop course without W |
| May 11 | Commencement |
| May 13 | Last day for 50% refund |
| May 20 | Last day for 25% refund |
| May 21 | Last day to drop course with W or audit course |
| May 24 | Final 50% tuition installment due |
| May 27 | Memorial Day – college closed (Online classes will meet asynchronously.) |
| June 14 | Last day to withdraw |
| June 21 | Classes end |

*Summer – Term II*

| | |
|---|---|
| June 21 | Final day of registration |
| June 24 | 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 |
| | Last day to drop course without W |
| July 4 | Independence Day – college closed (Online classes will meet asynchronously.) |
| July 8 | Last day for 50% refund |
| July 15 | Last day for 25% refund |
| July 16 | Last day to drop course with W or audit course |
| July 19 | Final 50% tuition installment due |
| Aug. 9 | Last day to withdraw |
| Aug. 16 | Classes end |

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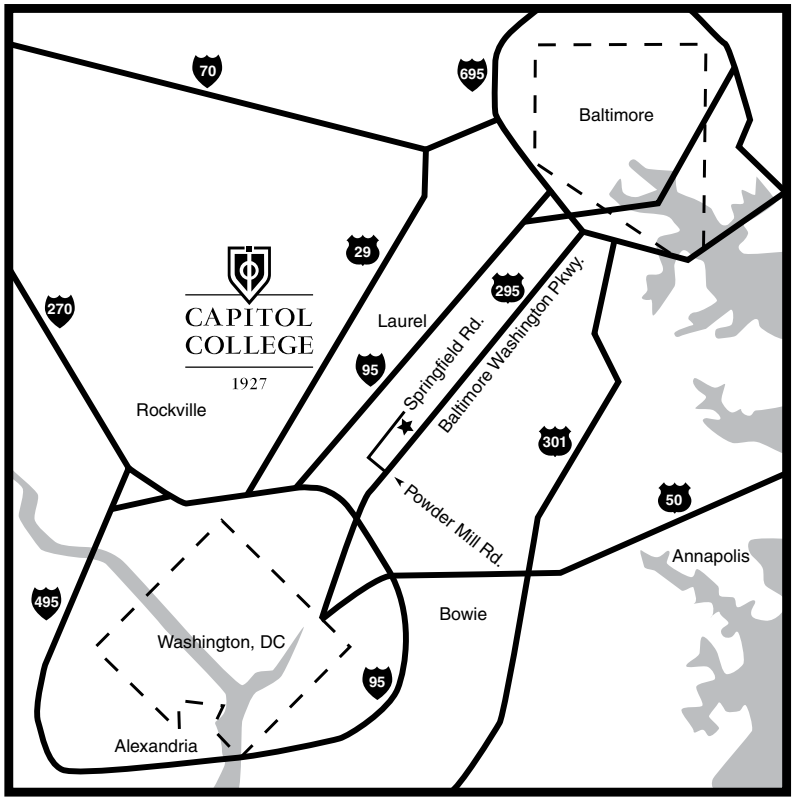
# Map and Directions




**Directions from Washington, DC and points south of Laurel, MD:**

Take the Baltimore/Washington Parkway (Exit 22, north off I-95) to the Beltsville Powder Mill Road exit. Turn left on Powder Mill Road and take the first right onto Springfield Road. Follow Springfield Road one mile. Capitol College 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 Beltsville Powder Mill Road exit. Turn right on Powder Mill Road and take the first right onto Springfield Road. Follow Springfield Road one mile. Capitol College is on the right.

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