CELEBRATING 50 YEARS

Florida Institute of Technology

university college

2008–2009 EXTENDED STUDIES AND DISTANCE LEARNING CATALOG

shaping minds | *creating the future*

University Mission Statement

Florida Institute of Technology is an independent technological university that provides quality education, furthers knowledge through basic and applied research, and serves the diverse needs of our local, state, national and international constituencies.

In support of this mission, we are committed to:

- An organizational culture that values and encourages intellectual curiosity, a sense of belonging and shared purpose among faculty, students and staff, and pursuit of excellence in all endeavors;
- Recruiting and developing faculty who are internationally recognized as educators, scholars and researchers;
- Recognition as an effective, innovative, technology-focused educational and research institution;
- Recruiting and retaining a high-quality, highly selective and culturally diverse student body;
- Continued improvement in the quality of campus life for members of the university community;
- Providing personal and career growth opportunities for both traditional and nontraditional students and members of the faculty and staff.

EXECUTIVE COUNCIL

President
Anthony J. Catanese, Ph.D., FAICP

Provost and Executive Vice President
T. Dwayne McCay, Ph.D.

Senior Vice President for Advancement
Thomas G. Fox, Ph.D.

Vice President for Financial Affairs and Chief Financial Officer
Joseph J. Armul, M.P.A., CPA

Florida Institute of Technology

University College
General Information and Degree Programs

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University College Mission Statement

The mission of University College at Florida Institute of Technology is to prepare adult students, wherever they may be located, for rewarding and productive professional careers in a work environment that is increasingly global in scope, driven by rapidly changing technology and focused on quality. In pursuit of our mission, we seek to provide our students with the finest possible graduate and professional development education using the most appropriate delivery technology. We offer an education that is reflective of current best practices and that is taught by instructors who are fully qualified academically and by virtue of professional practice.

Statement of Values and Beliefs

We, the faculty and staff of University College, believe that learning is a lifelong process that need not be constrained by time or place. We believe that learning is a cooperative process involving the joint responsibility of both students and teachers. We believe that knowledge resides in many places and in many forms, and it is the purpose of a university to acquire and disseminate this knowledge as widely and as completely as possible. Finally, we believe in the fundamental importance of traditional values as the basic underpinnings of our educational processes.

General Information

INTRODUCTION

This catalog represents a flexible program of the current curriculum, education plans, offerings and requirements that may be altered from time to time to carry out the purposes and objectives of the university. The provisions of the catalog do not constitute a contract between the university and the enrolled student. The university reserves the right to change any provision, offering, requirement or fee at any time.

A student may be required to withdraw (under appropriate procedures) whenever it is deemed to be in the best interest of the student and/or the university. The university may impose probation on any student whose conduct is unsatisfactory. Any admission based on false statements or documents presented by the student is void when the fraud is discovered, and the student is not entitled to credit for work that may have been completed. When a student is dismissed or suspended from the university for cause, there will be no refund of tuition and fees paid. If a dismissed student has paid only a part of the tuition and fees, the balance due the university will be collected. Florida Tech's extended studies programs and courses may be approved for payment of veterans education benefits subject to individual state approval authority. Independent study, audit and continuing education courses not taken for academic credit are not approved for payment of veterans education benefits.

There will be no refund of tuition, fees, charges or any other payments made in the event the operation of the university is suspended as a result of any act of God, strike, riot, disruption or for any other reason beyond the control of the university.

Enrollments may be restricted at some sites.

Florida Institute of Technology does not discriminate on the basis of race, gender, color, religion, creed, national origin, ancestry, marital status, age, disability, sexual orientation, Vietnam-era veterans status or any other discrimination prohibited by law in the admission of students, administration of its educational policies, scholarship and loan programs, employment policies, and athletic or other university-sponsored programs or activities.

Address all inquiries to the director of the site concerned.

THE UNIVERSITY

Florida Tech is an accredited, coeducational, independently controlled and supported university. It is committed to the pursuit of excellence in teaching and research in the sciences, engineering, high-tech fields, business, psychology, liberal arts, aviation and related disciplines, as well as providing the challenges that motivate students to reach their full academic and professional potential. Today, over 5,100 students are enrolled, equally divided between undergraduate and graduate programs. More than 3,600 students attend class on the Melbourne campus and more than 1,400 at Florida Tech's off-campus sites. Florida Tech offers 166 degree programs in science, engineering, aviation, business, education, humanities, psychology and communication. Doctoral degrees are offered in 22 disciplines, while 76 master's disciplines are offered.

Because of the moderate size of the student body and the university's dedicated faculty and staff, a student at Florida Tech is recognized as an individual. Acting as individuals or as members of student organizations, students are encouraged to express their

opinions on ways in which academic programs and student life might be made better for all. An active student government and student court plays a meaningful part in matters affecting student life.

Many students enrolled in graduate programs, as well as some undergraduates, take part in sponsored research programs and make significant contributions to project results. Florida Tech houses a number of research institutes and centers that, in collaboration with academic departments, aid in the students' training. These institutes and centers are described more fully under "Research: Institutes, Centers and Major Laboratories" in this section.

The university is organized into six academic units: the College of Aeronautics, College of Business, College of Engineering, College of Psychology and Liberal Arts, College of Science and University College.

The **College of Aeronautics** offers bachelor's degrees in aeronautical science, aviation management, aviation meteorology (with flight options available in each program) and aviation computer science, and master's degrees in airport development and management, applied aviation safety and aviation human factors.

The **College of Business** offers both bachelor's and master's degrees in business administration, and bachelor's degrees in accounting, business and environmental studies, eCommerce technology, information management and international business. An accounting track in the M.B.A. program is offered for individuals who have completed a four-year degree in accounting and require additional credits to be able to qualify for the CPA exam in Florida, or to receive reciprocal licensure in Florida from another state.

College of Business students are prepared to compete in a global, technologically driven business environment by integrating personalized and applied business instruction into a focused, high-quality academic learning experience.

The **College of Engineering** includes seven departments: chemical engineering, civil engineering, computer sciences, electrical and computer engineering, engineering systems, marine and environmental systems, and mechanical and aerospace engineering, and the School of Computing, home to the applied mathematics department that advises on all undergraduate mathematics courses. Programs offered in addition to those included in the department names are biological oceanography, chemical oceanography, coastal zone management, construction, earth remote sensing, engineering management, environmental resource management, environmental science, geological oceanography, marine environmental science, meteorology, ocean engineering, physical oceanography and software engineering.

The **College of Psychology and Liberal Arts** includes the School of Psychology, Department of Humanities and Communication, the Division of Languages and Linguistics, and military science (Army ROTC). Florida Tech offers two- and four-year Army ROTC programs to interested, qualified students. Students may qualify for a reserve commission in the U.S. Army through normal completion of both the college basic and advanced cadet programs, or may enter directly into the advanced program after completing their basic program requirements before entering the university.

The college offers bachelor's degrees in communication, humanities, psychology and forensic psychology, and master's degrees in applied behavior analysis, industrial/organizational psychology, organizational behavior management, and technical and professional communication. Doctoral degrees are awarded in clinical psychology and industrial/organizational psychology.

The **College of Science** is composed of the departments of biological sciences, chemistry, mathematical sciences, physics and space sciences, and science and mathematics education. Bachelor's degrees are offered in all of these areas and in biochemistry and interdisciplinary science. Master's degrees are offered in applied mathematics, biological sciences, chemistry, computer education, environmental education, mathematics education, operations research, physics, science education, space sciences and teaching. Advanced degrees include the Specialist in Education, and doctoral degrees in applied mathematics, biological sciences, chemistry, mathematics education, operations research, physics, science education and space sciences.

University College consists of four divisions that include **Applied Research, Distance Learning, Extended Studies** and **Professional Development**. Extended Studies began in August 1972 as "Off-Campus Programs," when 42 students enrolled in a master's degree program in electrical engineering at the Naval Air Test Center, Patuxent River, Maryland. From that modest beginning, the graduate programs have grown to more than 1,400 students per year enrolled in 35 degree programs. Extended studies programs that benefit employees of industry were added in 1976 when in-plant courses started with several firms and the municipal government in St. Petersburg, Florida, and with Martin Marietta Aerospace in Orlando, Florida.

Florida Tech's extended studies and distance learning programs are conducted in a very traditional manner with admission and graduation standards the same as those required on campus. Each site is staffed with at least one full-time terminally degreed faculty member. Most courses are taught by instructors possessing terminal degrees. Curricula and course content are tailored to meet the needs of the students and their employers, while maintaining the highest possible academic quality and integrity. Class times and locations are selected for the convenience of the students. The conduct of administration is made as effective and efficient as possible by on-site staff and University College in Melbourne, which was established for that sole purpose. Since the 1972 beginning, nearly 16,000 Florida Tech master's degrees have been conferred on off-campus candidates representing the military services, federal and local government employees and a wide variety of businesses and industries.

Distance learning degree programs can be found on our Web site at http://uc.fit.edu/dl.

HISTORY

Founded in 1958 as Brevard Engineering College by Dr. Jerome P. Keuper, Florida Tech initially offered continuing education opportunities to scientists, engineers and technicians working at what is now NASA's John F. Kennedy Space Center. The new school grew quickly, in many ways paralleling the rapid development of space technology that was taking place at Cape Canaveral. In 1966 the name was changed to Florida Institute of Technology to acknowledge its growing identity as a scientific and technological university, the only such independent institution in the Southeast.

From its inception, Florida Tech has shown its commitment to graduate education. An article in the *New York Times* in 1962 described Brevard Engineering College as "the only space engineering college in the country … its graduate course offers engineers the opportunity to obtain a master's degree and keep up with the advancement taking place daily at the Cape." Originally, all graduate students attended classes on a part-time basis, but at present approximately one-half of the on-campus graduate students attend class and carry out research full time.

The university moved to its current Melbourne campus in 1961, and construction began immediately on administration and classroom buildings to augment existing buildings that had been used by the former University of Melbourne. From that beginning, growth of the campus has been continual through the years.

More than 45,000 degrees have been earned by students at Florida Institute of Technology. As the institution advances and the alumni ranks multiply, the university remains dedicated to developing concerned scientists, engineers and business leaders who will make positive contributions to our society.

ACCREDITATION AND MEMBERSHIPS

Florida Tech is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; (404) 679-4501) to award associate, baccalaureate, master's, education specialist, and doctoral degrees.

The university is approved by the Office of Education of the U.S. Department of Education.

The university is a member of the Independent Colleges and Universities of Florida, the American Council on Education, the College Entrance Examination Board, the American Society for Engineering Education and Oak Ridge Associated Universities.

OPERATION AND CONTROL

Florida Tech was granted a charter as a nonprofit corporation by the state of Florida in December 1958. The corporate charter established the school as an independent institution of higher learning with academic programs leading to undergraduate and graduate degrees. The charter ensures that the university will be coeducational in character and that admission will be open to all qualified applicants regardless of race, gender, color, religion, creed, national origin, ancestry, marital status, age, disability, sexual orientation, Vietnam-era veterans status or any other discrimination prohibited by law. Under the corporate charter, control of the university is vested in a self-perpetuating board of trustees. Members of the board are selected on the basis of outstanding ability, integrity and personal interest in the development and preservation of the university.

The university is in compliance with the Americans with Disabilities Act. Florida Tech provides access to higher education for persons with disabilities through the office of Academic Support Services on the main campus. Individuals are encouraged to contact the office at (321) 674-7110 to obtain information about the process of registering for accommodation and services.

FINANCIAL SUPPORT

The university is supported by tuition and fees, research grants and contracts, and assistance from foundations, industry and the local community. Careful attention to sound business policies has placed the institution on a sound financial basis year after year.

TAX EXEMPTION

Florida Tech was ruled tax-exempt under Section 501(c)(3) of the Internal Revenue Code (IRC) of the U.S. Treasury Department in January 1960. The university was classified in October 1970 as an organization that is not a private foundation as defined in Section 509(a) of the IRC. Gifts to the university are thus tax deductible.

RELEASE OF STUDENT INFORMATION

The Solomon Amendment established guidelines for the release of directory information to the United States military for recruiting purposes.

This congressional act allows release of the following directory information without student consent to military recruiters for present and previously enrolled students at least 17 years of age: student name, address, date and place of birth, telephone number, level of education, major field(s) of study, degrees received and the educational institution in which the student was most recently enrolled.

The Federal Family Educational Rights and Privacy Act of 1974 (FERPA) established a set of regulations governing access to and the release of personal and academic information contained in student records. FERPA gives students who have reached the age of 18 or who attend a postsecondary institution, the right to inspect and review their education records, the right to amend their records and the right to exercise some control over the disclosure of certain information contained in these records.

This act allows release of the following directory information to the public without student consent: student name, address, date and place of birth, telephone number, major field(s) of study, e-mail address, participation in officially recognized activities and sports, weight and height of athletics team members, dates of attendance, part-time or full-time status, degrees and awards/honors received and the most recent educational institution attended.

Students may request to suppress the release of directory information by completing the Request to Prevent Disclosure of Directory Information form.

Students may consent to release personally identifiable information such as semester grades, class schedule, academic record and transcript, current academic standing and the student and/or Social Security number. The act allows disclosure of this information without student consent to certain government agencies/officials, sponsoring agencies, parents of dependent students and to selected university personnel determined to have legitimate educational interest in such records.

Students may consent to release of personally identifiable information to others by completing the Authorization for Release of Student Information form available online.

1. Disclosure is defined as: permitting access to or the release, transfer or other communication of the education records of a student or the personally identifiable information contained therein to any party, orally, in writing, by electronic means or by any other means. Disclosure of confidential information to a school official having a legitimate educational interest does not constitute authorization to share that information with a third party without the student's written permission.

2. One exception that permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the university in an administrative, supervisory, academic or research, or support staff position, including law enforcement unit personnel and health staff; and a person or a company with whom the university has contracted, such as attorney, auditor or collection agent.

3. Upon request, the university may disclose education records without consent to officials of another school in which a student seeks or intends to enroll; a person serving on the board of trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

4. A school official has a legitimate educational interest as opposed to a personal private interest if the official needs to review an education record to fulfill his or her professional responsibility, and such determination is made by the University Registrar on a case-by-case basis.

Student Rights Under the Federal Family Educational Rights and Privacy Act of 1974

1. The right to inspect and review their education records within 45 days of the day the university receives a request for access.

2. The right to request amendment of their education records the student believes are inaccurate or misleading. FERPA was not intended to provide a process to be used to question substantive judgments that are correctly recorded. The rights of challenge are not intended to allow students to contest, for example, a grade in a course because they felt a higher grade should have been assigned or to request removal of a test grade.

3. The right to exercise some control over the disclosure of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by Florida Tech to comply with the requirements of FERPA.

   The Family Compliance Office reviews and investigates complaints from the respective student(s) for alleged violations under FERPA. The name and address of the office that administers FERPA is:

   Family Compliance Office
   United States Department of Education
   400 Maryland Avenue, SW
   Washington, D.C. 20202-4605

Information about the provisions of the Family Educational Rights and Privacy Act of 1974 as Amended may be found in the *University Catalog* and the full text of the law from the *Federal Register* may be obtained from the University Registrar.

STUDENT RIGHT TO KNOW

Florida Tech is in compliance with both the Student Right to Know Act of 1990 and the Campus Awareness and Campus Security Act of 1990.

Data in compliance with the student right to know act can be found in the university's *Student Handbook*. The office of campus security keeps statistics on compliance with the campus awareness and campus security act. These statistics can be found on the university Web site, and are published and distributed to the university community on an annual basis. They are also available upon request to other interested parties.

Extended Studies and Distance Learning Programs

PURPOSE

Florida Tech's extended studies and distance learning programs are tailored to meet the educational needs of local residents, employees of industry and business, active duty military personnel and their families and U.S. government civilian employees in management and engineering. Enrollment in some programs in certain locations must be restricted to specified categories of individuals because of state requirements, laws pertaining to veterans benefits or local conditions.

GRADUATE DEGREE PROGRAMS

Courses are open to those seeking a graduate degree, as well as those wishing to take selected subjects for professional development. Degree requirements can be met by a combination of Florida Tech courses, transfer credits from other accredited institutions and transfer credits

from certain military schools for those courses designated by Florida Tech. Information on the specific military courses accepted is available from the site director.

Management courses used to support master's degree programs are identified by the prefix MGT. These courses are taught both on the main campus and at the off-campus sites based on enrollment demand. A description of the MGT courses appears in *Section 16* of this catalog.

PART-TIME STUDENTS

The normal course load for a part-time student is two courses per semester, each requiring one class attendance each week. This allows completion of a degree program in less than two years; less if transfer credits are accepted. Although a degree program may be extended beyond two years, the cumulative work including transfer credits may not span an elapsed time of more than seven years.

DEGREE COMPLETION PROGRAMS

With approval of the Department of the Army, a cooperative degree program is conducted at Fort Lee, Virginia, in conjunction with the Logistics Executive Development Course (LEDC) presented by the U.S. Army Logistics Management College. While attending that course, students also take certain Florida Tech classes. The credits for these classes plus the transfer credits awarded for satisfactory completion of the Army course itself are sufficient to allow the student to complete a degree program in two or three additional semesters, when authorized to attend Florida Tech classes on a full-time basis. The entire program can be completed at Fort Lee.

Similarly, Florida Tech awards transfer credits for certain classes taken as part of the resident course at the Command and General Staff College, Fort Leavenworth, Kansas. This permits qualified students to be sent under Army orders to an appropriate Florida Tech site, including the main campus in Melbourne, Florida, to complete a graduate degree program.

ADMISSION

Admission to graduate study is granted to qualified applicants. Successful applicants for the master's degree will have received a bachelor's degree from a regionally accredited institution, or its equivalent internationally, in a program that provides suitable preparation in the applicant's chosen field. The academic record of the applicant must indicate probable success in the desired program. As a general rule, an undergraduate cumulative grade point average (GPA) of at least 3.0 is required for regular admission. Individual academic units may have higher minimum standards. Only in unusual cases, in which clear and substantive evidence justifies such action, will students be admitted who do not meet this standard.

Evaluation of the applicant's record is made by the applicant's desired academic unit. In the case of a special student described below, the evaluation will be made by the Office of Graduate Programs. Admission requires the approval of the Office of Graduate Programs and the head of the appropriate academic unit. For those cases in which the student has acceptable undergraduate achievement but has course deficiencies, the major academic unit will specify those Florida Tech courses that, if taken, will remove the deficiencies.

APPLICATION

Applications for admission can be obtained from and submitted to the local Florida Tech site. The application must be accompanied by payment of the nonrefundable application fee.

One officially certified copy of all undergraduate and graduate (if applicable) transcripts must be sent directly from the student's institution to the site, for forwarding to University College. One additional certified copy of all transcripts may be requested for site use.

Transcripts from foreign universities must be accompanied by a certified English translation.

REAPPLICATION

Admission to University College is valid for two years from the semester of acceptance or from the last semester the student is enrolled in graduate study. Individuals wishing to begin or resume graduate work after a two-year lapse are required to reapply for admission. Individuals who leave Florida Tech and attend another university must reapply for admission and submit grade transcripts regardless of the length of time since last attending Florida Tech.

READMISSION POLICY

A student who has been away from the university for four or more consecutive semesters (excluding summer terms) or who has attended another institution during an absence from the university must apply for readmission. If readmission is approved, degree requirements for the peer group at the time of readmission must be met.

A student is not considered to be absent from the university during a period of study at another institution if a Request to Study at Another Institution form was submitted and approved prior to enrollment for the other institution's courses. While still currently enrolled, a student may also request a leave of absence from the associate provost of graduate programs. If the request is approved, the student can resume full-time study at Florida Tech under the previous program without applying for readmission, but may be required to meet the graduation requirements established for the new peer group.

A student who has been away for less than four semesters and who has not attended any other college or university may register for class without filing an application for readmission.

REGISTRATION PRIOR TO ADMISSION

Under certain circumstances, applicants to graduate programs can avoid delaying their education by registering for courses, for one semester only, while their applications are being processed, provided they are citizens or permanent residents of the United States.

Students who register prior to admission are not eligible to receive federal student financial aid until they are admitted to the university. Such registration requires a preliminary review of written documentation from the degree-granting institution (not necessarily official) showing previous academic courses taken, grades received and degrees awarded. The review should be carried out by the academic unit head or his or her designee. Permission to register pending formal acceptance requires a decision that there is a high probability of eventual acceptance into the program applied for and that registration prior to acceptance is in the best interest of both the academic unit and the student.

In the event that applicants are denied admission while enrolled in graduate courses, they will be given the option of either withdrawing with full tuition refund or completing the courses underway. If the applicant completes one or more graduate courses prior to being denied admission or completes a course for any other reason, he or she will not be given the option of withdrawing or receiving a tuition refund after completing the course.

Any exceptions to this policy require the written approval of the dean, University College.

EVALUATION

The applicant will be notified of the decision regarding his or her admission only after the officially certified transcripts and application for admission have been received and reviewed. Evaluation of the applicant's record is made by appropriate faculty at the main campus. In the case of a Special Student, defined below, the evaluation will be made by the appropriate

dean. Admission requires approval of the academic unit head of the program of study and the corresponding dean. In cases where the student has acceptable undergraduate achievement, but has course deficiencies, the cognizant academic unit will specify those Florida Tech courses that, if taken, will remove the deficiencies. Students who have more than 18 semester hours of deficiencies will not be admitted to graduate studies but may remove the deficiencies while enrolled as a special undergraduate student.

The Graduate Management Admissions Test (GMAT) is required for admission to the Professional MBA and MBA. In all other master's programs, the GMAT, GRE General Test and/or GRE Subject Tests, as well as letters of reference, may be required for admission in the case of any students whose previous academic achievement is deemed to be marginal. Official test scores must not be over five years old. Test results may take up to six weeks to be reported by the educational testing service.

INTERNATIONAL APPLICANTS

International applicants will not be admitted to a Florida Tech off-campus program as full-time students. Immigration forms (I-20) will not be issued by Florida Tech to off-campus students.

Transcripts from foreign universities must be accompanied by a certified English translation.

The GMAT is required of any applicant relying on a degree from a foreign (non-U.S.) university for admission to a College of Business degree program. Test scores must not be more than five years old.

Any student whose native language is not English will be required to submit TOEFL scores of at least 550. An exception to this rule is made for the student who has earned a bachelor's or master's degree from an American university in which English is the principal language of instruction.

International applicants must be admitted to graduate studies at the university before commencing classes.

CLASSIFICATION OF GRADUATE STUDENTS

Assignment to one of the following classifications will be made at the time of admission:

Regular Student: A student whose undergraduate GPA is 3.0 or greater out of a possible 4.0 and who meets all other criteria for admission to a particular program is classified as a regular student.

Provisional Student: A student whose undergraduate GPA is less than 3.0 out of a possible 4.0 or equivalent, or whose academic unit identifies course deficiencies that are considered excessive, is classified as a provisional student. After completing nine credit hours, a provisional student with a GPA of 3.0 or greater is reclassified as a regular graduate student. A provisional student whose GPA is less than 3.0 will be placed on academic probation. A grade of D or F in any academic course taken while in provisional status results in dismissal. Provisional students cannot be admitted to doctoral programs.

Special Student: Special student classifications are used for students who, for various reasons, are not enrolled in degree-seeking programs. Specific instances include:

1. a student taking course work for credit to apply at another institution;

2. a student taking courses to fill specific professional or vocational needs; or

3. a prospective graduate student with generally acceptable undergraduate achievements but with subject matter deficiencies (usually as a result of changing fields) that, in the judgment of the academic unit, preclude immediate acceptance into the degree program.

In the last mentioned case, the student will normally have the option of pursuing an undergraduate degree in the desired discipline or making up the deficiencies while enrolled as a special student. The student will then be considered for admission to the appropriate graduate degree program once sufficient additional work has been done to form an adequate basis for a decision by the academic unit.

The customary classification of special students will be as undergraduate students, regardless of the existence of previous bachelor's degrees. A student may, however, be classified as a special graduate student. In such a case, designation and continuation of graduate student status will be at the discretion of the cognizant academic unit, or the director of graduate programs in the case of students who are not seeking eventual admission to a graduate degree program.

CONTINUING EDUCATION

Continuing Education Units

The continuing education unit (CEU) is a nationally recognized unit that indicates successful participation in a qualified program of continuing education. It is defined as 10 contact hours of participation in an organized educational experience under responsible sponsorship, capable direction and qualified instruction.

Students enrolled for CEUs in courses that are being offered for academic credit are required to do all homework, outside reading assignments, term papers or special assignments and to attend at least 90 percent of the class sessions, but they are not required to take midterm or final examinations.

In some situations, the continuing education (CE) student may want or need to receive credit rather than CEUs, and this alternative is allowable. Students enrolled for credit, whether degree-seeking or not, must take all examinations in addition to completing all course assignments. Students may switch from CEU to credit or vice versa, any time before the end of the first week of classes.

Enrollment Restrictions

A CE student may not enroll in any graduate course, either for graduate credit or for CEUs, without the written approval of the head of the academic unit offering the course. With the exception of graduate courses that have no listed prerequisites, this approval is based on a review of the student's previous preparation and qualifications, and even in the case of registration for CEUs, there should be a reasonable expectation that the student is capable of doing all homework, outside reading assignments, term papers and special assignments required of students taking the course for graduate credit.

A student who has been dismissed from a graduate degree program may enroll as a CE student to take graduate courses for CEUs subject to the same requirements for approval as any other continuing education student. A change of major from the former degree program to "0100" continuing education is necessary prior to any further enrollment. Under no circumstances will a dismissed student be allowed to take courses for graduate credit while enrolled as a CE student.

Admission to Degree Programs
A CE student may seek admission to a degree program through the normal admission process. If a CE student subsequently decides to pursue either an undergraduate or graduate degree at Florida Tech and is accepted into the degree program, a maximum of 12 semester credit hours earned as a CE student may be applied toward the degree, provided the course work is academically appropriate.

GRADUATE STUDY AT OTHER INSTITUTIONS

A currently enrolled student may take a limited number of courses at other institutions for transfer to a Florida Tech graduate degree program. The restrictions on graduate transfer credit apply. Prior approval is mandatory. The student must complete and submit the designated form with all required signatures and a written justification. A copy of the other institution's published course description(s) must be attached. The student must arrange for an official transcript to be sent by the other institution to the Florida Tech registrar's office.

AUDITING A COURSE

A student may audit a course with the permission of the adviser and payment of an audit fee. An auditor does not receive a grade; an AU is recorded on the transcript in place of the grade if the auditor has, in general, maintained a satisfactory course attendance (usually 75 percent class attendance) and completed the appropriate assignments. If the student does not meet requirements, a final grade of F may be awarded. No changes in registration from credit to audit or from audit to credit will be permitted after the second week of classes.

CORRESPONDENCE COURSES

The university does not offer courses by correspondence, nor does the university grant credit for courses completed by correspondence.

LIBRARY INFORMATION NETWORK (LINK)

To access Florida Tech's Library Information Network (LINK) and its many valuable resources and features, go to the Florida Tech home page (www.fit.edu) "Library" option or directly to www.lib.fit.edu/pubs/distancelearning. Some databases and services will require the remote user to input an identification (ID) number and an Evans Library four-digit personal identification number (PIN).

TUITION AND FEES PAYMENT POLICY

It is the policy of Florida Tech that all expenses, including tuition and fees, are due and are to be paid by each off-campus student at the time of registration unless specifically exempted. Students may be registered and attend classes without payment at the time of registration, if:

1. the student is sponsored by his employer who will make payments directly to the university, and the employer has furnished a letter to the local Florida Tech office accepting unconditional liability for all charges not paid by the student, regardless of whether or not the student completes the course or achieves a minimum grade for the course;

2. the student has a scholarship, loan or grant covering 100 percent of all costs that will be paid directly to the university by a sponsor who has notified the local Florida Tech office in advance, in writing, of the student's eligibility and acceptance; or

3. the student is eligible for a deferred payment of tuition through one of the university's approved payment plans.

Registration is made final only upon satisfaction of all charges. The university reserves the right to deny admission or to drop any student who fails to promptly meet his or her financial obligations.

STUDENT ACCOUNTS

An account is established for each student upon receipt of application. The student's name and number are used for account identification and should be included on the face of each payment check to ensure proper credit to the account. Students who pay more than the required amount can have the excess refunded or credited to their accounts.

TUITION

Students are assessed tuition and fees based on the locations and programs in which they are enrolled and the degrees being pursued. Students enrolled and pursuing degrees on the Melbourne campus are assessed the Melbourne tuition and fees.

Students enrolled and pursuing degrees through University College are assessed the University College tuition and fees. Students enrolled in programs and pursuing degrees as part of a partnership arrangement with another entity are assessed the tuition and fees approved by the partnership.

Tuition costs for courses conducted by Florida Tech for University College students will normally not exceed tuition charges at the Melbourne campus and may be less. Payment will be made to Florida Institute of Technology. Except for credit hours awarded free for designated U.S. military school courses and transfer credits from acceptable colleges and universities, tuition costs will be paid by the individual or, if authorized in writing, by his or her employer.

TYPICAL REFUND SCHEDULE

Fifteen week terms only: First week—100%, second week—90%, third and fourth weeks—50%, fifth through eighth weeks—25%, thereafter 0%. Does not apply to terms less than 15 weeks in length. Subject to change prior to start of each term.

REFUND POLICY

Florida Tech provides a fair and equitable refund policy that meets all applicable federal guidelines governing refunds for tuition, room, board and applicable fees as published in the *Federal Register.* The refund policy is published in the *Schedule of Classes* prior to the start of each term.

Students who believe that individual circumstances warrant exceptions from Florida Tech's refund policy, may appeal by submitting in writing, a letter to the site director, outlining any information or circumstances that may be pertinent to the situation.

FEES

All of the charges listed below are nonrefundable.

Applications

Master's Degree $50
Continuing Education $20
Reapplication $20

Late Fees

Late Graduation Petitions
(Applying after the deadline date, but before the semester of graduation) $30
(Applying late, during the semester of graduation) $60
Late Payments $30
Thesis Binding (five copies) $75
Transcript (per copy) ..... $ 5
Equivalency or Currency Examination $80

SATISFACTORY PROGRESS STANDARDS FOR STATE AND FEDERAL AID RECIPIENTS

The academic records of all students admitted to Florida Tech for the first time shall be considered sufficient to allow them to apply for financial aid. To remain eligible to receive financial aid, continuing students must meet the following satisfactory progress standards instituted by Florida Tech in accordance with federal law. A review for compliance with these standards will be conducted at the end of each semester.

1. Students are expected to achieve and maintain a GPA of 3.0 or higher. This GPA is calculated in accordance with the guidelines contained in this catalog.
2. Students are expected to complete 80 percent of the attempted course work. Students enrolled full time (nine or more credit hours) are expected to complete at least nine credit hours per semester. Students enrolled part time (five to eight credit hours) are expected to complete at least five credit hours per semester.
3. A master's degree program is expected to be completed within six semesters, or 54 credit hours attempted. Cases will be reviewed on an individual basis when additional time is needed.

VETERANS BENEFITS

Veterans benefits are administered by the Office of Veterans Affairs, which assists veterans and their dependents who are entitled to VA education benefits.

Veterans eligible to receive benefits should consult the Office of Veterans Affairs prior to registration and during the regularly scheduled registration days to renew their benefits each semester. A copy of the graduate program plan must be submitted to the Florida Tech site prior to the completion of 12 credit hours. Enrollment certification will not be submitted to the U.S. Department of Veterans Affairs beyond 12 credit hours without an approved program plan. Any change to the graduate program plan must be immediately reported to the site office. Failure to do so may result in a temporary interruption of VA benefits.

For the purpose of certification of graduate students receiving veterans education benefits, the following standards will be used.

Full-time	9+ hours
3/4-time	6, 7 or 8
1/2-time	5
More than1/4-time, less than 1/2-time	3, 4
1/4-time or less	1, 2

Students receiving benefits are required to make satisfactory progress in their degree programs. Failure of a graduate student to maintain the minimum cumulative grade point average specified will result in termination of veterans education benefits.

Credit Hours Completed	**Minimum Cumulative GPA**
9–17	2.50
18–23	2.70
24–32	2.90
33 or more	3.00

FEDERAL AND STATE FINANCIAL ASSISTANCE

As a general rule, a graduate student must be enrolled half time (at least five credit hours per term) as a regular student in a degree program and must be a U.S. citizen or an eligible noncitizen to qualify for federal and/or state financial aid.

The graduate student must also complete a FAFSA. These forms are available in the financial aid office.

Although applications are accepted throughout the year, we encourage graduate students to file prior to March 20 to ensure timely processing.

Students must reapply each year and maintain satisfactory academic progress as defined by the financial aid office to continue receiving federal assistance.

Federal Stafford Student Loan: Available to graduate students who apply for federal assistance and who maintain at least half time (five credit hours) enrollment in graduate-level courses. Stafford loans are either subsidized or unsubsidized. A subsidized loan is awarded on the basis of financial need. The federal government pays the interest on a subsidized Stafford loan until repayment begins and during authorized deferment periods. A student may borrow up to $18,500 in Stafford loans each year. At least $10,000 of this amount must be in an unsubsidized Stafford loan. Cumulatively, a graduate student may borrow up to $138,500 in Stafford loans with no more than $65,000 in subsidized Stafford loans. The graduate debt limits include any Stafford loans received for undergraduate study.

Federal Graduate PLUS Loan: A new federal loan program for credit-worthy graduate students, intended to supplement the Federal Stafford Loan. A credit-worthy graduate student may borrow the complete cost of attendance minus other financial aid. The interest rate is fixed at 8.5 percent. Payments can be deferred till after graduation, but interest accrues while the student is in school. Graduate students must be U.S. citizens or permanent residents to be eligible. Students must enroll for a minimum of five credit hours per semester to be eligible (at least half time).

Academic Policies

GENERAL ACADEMIC POLICIES

Academic policies are published in the *Graduate Policy Manual,* which is available for reference and photocopying in Evans Library, in each academic unit office, and at each off-campus site. It is also available on the Florida Tech Web site (www.fit.edu), under quick links/graduate programs. All graduate students are advised to review the manual early in their graduate careers and to refer to it if in doubt about any aspect of graduate degree program policy.

THE ACADEMIC YEAR

The university operates on the semester basis. Each semester is normally 15 weeks in length, but may vary slightly, without loss of academic time, to meet conditions at off-campus sites. The semesters are designated fall, spring and summer; however, a site may have to conduct more than one session during a given semester to accommodate students in scheduled military courses and degree completion programs.

CREDIT HOURS

The credit-hour value of each course normally represents the number of class meeting hours per week. Because there may be exceptions to this general rule, the course descriptions should be consulted for the credit hours of specific courses.

COURSE CANCELLATION/SCHEDULE CHANGES

The university reserves the right to cancel classes for which there is insufficient enrollment, to close a class when the enrollment limit in that class is reached and to make schedule changes as necessary, including a change in time, days, credit or instructor. The university does take the needs of students into account and schedule changes are made only when unavoidable.

FACULTY ADVISER SYSTEM

Each student is assigned a faculty adviser in his or her major academic unit at the beginning of the first semester of attendance. The adviser monitors the student's academic progress toward a degree. A conference is held with each student prior to registration to ensure that courses are scheduled in proper succession, that all relevant academic policies are adhered to, and that the schedule best serves the academic needs of the student. The faculty adviser is available throughout the academic year for consultation by appointment, and students are strongly encouraged to seek the counsel of their faculty advisers in other matters beyond registration and schedule changes.

TRANSCRIPTS

All courses taken at Florida Tech are indicated in chronological order on the student's academic transcript. A request for a transcript may be made in writing to the Office of the Registrar, Records Unit, with the appropriate fee enclosed, by logging on to the PAWS network or by fax to (321) 674-7827. Students with holds on their accounts will not be able to order transcripts online.

GRADING SYSTEM

Graduate work is evaluated by letter grades, with only grades of A, B, C and P being credited toward graduate degrees. Grades of D and F are failing grades in graduate degree programs. Failed courses must be repeated at the earliest opportunity, if they are required courses. An elective course in which a D or F is received must be repeated unless the academic unit approves an additional course to be taken in its place.

When Pass/Fail (P/F) grading is used, the total credit hours earned increases without having any effect on the cumulative GPA if a grade of P is earned. Whereas, no credit hours are earned and the GPA is adversely affected in the case of a grade of F, just as with any other F. Pass/Fail grading is used only for certain seminar courses and for master's theses.

The basic requirement for receiving any master's degree is a GPA of at least 3.0 on a 4.0 scale where A = 4, B = 3, C = 2, D = 1 and F = 0. The GPA is based on the student's program plan and includes all courses shown on the program plan as applying toward the master's degree, both graduate-numbered and undergraduate-numbered. Prior to submission of the program plan, the GPA will be based on all graduate-numbered courses taken at Florida Tech, with the exception of any that may previously have been used to satisfy the requirements of a bachelor's degree.

In cases where the degree-related GPA referred to above does not include all graduate courses taken at Florida Tech, an overall GPA is also calculated and reported. Courses used to compute the overall GPA, but not the program GPA, include courses taken as deficiencies, courses unrelated to the student's degree program, courses taken prior to a change of major and courses taken in satisfaction of the requirements of a previously earned graduate degree. Courses related to the degree program that are taken in excess of degree requirements are normally included in the program plan. It is not possible to delete a course from a program plan once the course has been taken, although an exception is made if the statute of limitations is exceeded, at which time it is dropped from the program plan and from both the program and overall GPAs. Courses are not otherwise dropped from the overall GPA except by special action of the Graduate Council following a change of major. If no degree was earned in the first major and the courses are clearly not applicable to the new major, the council can approve deletion from the overall GPA.

Grades of S (Satisfactory) and U (Unsatisfactory) are used as progress grades in thesis, dissertation, research and internship, and as final grades in some zero-credit seminar courses. They are similar to grades of P and F except that they carry no credit, and S grades (when used as progress grades) may be replaced at any later time by credit-carrying grade of P. U grades remain on the transcript permanently, but like grades of S they do not affect the grade point average.

Both the overall GPA and the applicable program GPA must be 3.0 or greater for any master's degree to be awarded.

At the close of the term, grades earned during the semester are made available to students on the PAWS system. These grades become a part of the student's official record and are not subject to change without authorization by the head of the academic unit responsible for teaching the course. Grade appeals must be submitted in writing by the student concerned to the director of their local site.

PROBATION AND DISMISSAL FOR MASTER'S STUDENTS

A master's student must continue to demonstrate academic proficiency in course work and must show reasonable progress toward the 3.0 grade point average (GPA) required for graduation. Failure to have the minimum GPA specified below results in academic probation. A student on probationary status will be informed in writing of the conditions of his or her probation. Failure to satisfy the conditions of probation will result in dismissal following the probationary semester.

ACADEMIC STANDARDS FOR MASTER'S STUDENTS

In the case of separate program and overall grade point averages, the current program average must meet the standard for the number of attempted credit hours shown on the current program plan, and the overall average must meet the standard for the total credit hours attempted.

Credit Hours Completed	**Minimum GPA**
9–14	2.60
15–17	2.80
18 or more	3.00

Students who have transferred credits from another institution will be permitted to complete nine credit hours of graduate courses at Florida Tech before evaluation of the GPA. After completing nine credit hours at Florida Tech, the student must meet the above standards for total semester hours completed (Florida Tech credits, plus transfer credits) by using Florida Tech's GPA.

A master's student with fewer than nine credit hours of graduate courses, but nine or more credit hours of undergraduate courses taken while enrolled as a graduate student at Florida Tech, must maintain a 3.0 average in these undergraduate courses. Failure to maintain this average will result in probation. Failure to meet probation terms will result in academic dismissal. On completion of nine credit hours of graduate courses, the graduate GPA will take precedence in probation and dismissal evaluations.

In addition, either of the following conditions will result in immediate academic dismissal:

1. Two or more grades of D, F or U in any courses taken as a graduate student.
2. Judgment by the Graduate Council that the student is not making satisfactory academic progress, or that the academic efforts of other students are hampered by his or her presence.

In all cases of academic probation and dismissal, the student will be so notified by the office of graduate programs. Any academic dismissal can be appealed for educationally sound reasons. A letter of appeal requesting reinstatement must be submitted to the office of graduate programs. The student will be allowed to continue attending classes pending Graduate Council action on the appeal. If the appeal is denied, or if no appeal is submitted within the time period specified in the dismissal letter, the student's registration will be canceled and further class attendance will not be permitted.

DISMISSAL FOR MISCONDUCT

Student conduct that violates the legal or ethical standards of the university may result in mandatory withdrawal from all classes and denial of permission to register in future terms for either a definite or indefinite period of time.

Examples of academic misconduct that could result in these actions include cheating, plagiarism, knowingly furnishing false information to the university, or forging, altering or misusing university documents or academic credentials.

Examples of research misconduct include fabrication, falsification, plagiarism, misappropriation of ideas of others or failure to comply with legal requirements governing research.

INCOMPLETE WORK

An I is given when a course cannot be completed because of circumstances beyond the student's control. The I indicates the course work is qualitatively satisfactory and there is reasonable expectancy that completion of the remaining work would result in a passing grade. The instructor must provide a statement of the work to be completed to the head of the academic unit. The student must complete the work at the earliest possible time but before the beginning of the seventh week of the following semester, unless an earlier deadline is established at the time the I is recorded and the student is notified of this fact. A waiver of the six-week limitation requires special written permission of the cognizant dean. The I will automatically become an F in the seventh week unless an approved waiver has been filed with the Office of the Registrar.

DROP/WITHDRAWAL POLICY

To add or drop a course, or withdraw from the university after the first week of classes, a student must complete a Change in Registration Status form. Students withdrawing from the university are asked to complete a withdrawal survey in the student's site office.

Failure to attend classes or verbal notification to instructors does not constitute an official drop or withdrawal. Students who drop or withdraw without filing the proper form will receive a failing grade of F. When a student drops a course on or before the last day to do so, as shown in the academic calendar for their site, the course will not appear on the permanent academic record. After this date, a W will appear on the permanent record for each dropped course. The W is not punitive and is not used in the computation of grade point averages. The last day to drop a course without receiving a failing grade is published in the academic calendar for each site.

Master's Degree Requirements

COURSE REQUIREMENTS

Course requirements are stated in each master's degree program description. The stated minimum credit hours can include any or all of the following, subject to academic unit approval and specific restrictions stated in the *Graduate Policy Manual*:

1. Up to 12 semester hours of credit transferred from a regionally accredited institution or, in some cases, from a foreign university; or, in the case of a partner institution in a joint-degree or dual-degree program with Florida Tech, up to one-half of the total minimum credit hours.

2. Up to six semester hours of credit for 3000- and 4000-level undergraduate courses taken at Florida Tech while enrolled in University College. Only 4000-level courses will be considered if the courses are in the student's major field of study.

3. Credit previously used to meet the requirements of another master's degree at Florida Tech may be used to meet up to one-half the credits required for the later degree.

4. Credit in excess of the seven-year statute of limitations if grades of A or B were earned, course content has not changed significantly since the course was taken and current mastery of the course material is demonstrated.

Academic credit applied toward the requirements of a bachelor's degree at Florida Tech or elsewhere, may not be used in any graduate program at Florida Tech, regardless of the level of the course.

DEGREE CANDIDACY

Admission to University College does not imply that courses taken by the student will be credited toward a degree. No commitment in this matter is made until the student is admitted to candidacy for a degree. A master's student becomes a degree candidate by satisfying all of the following requirements:

1. Removal of all course deficiencies specified at the time of admission.

2. Completion of at least nine credit hours of graduate courses in good standing as defined by the academic dismissal regulations of the Office of Graduate Programs.

3. Approval of a program plan by the academic unit head.

PROGRAM PLAN

Each master's-level graduate student is required to have an approved program plan on file in the cognizant department no later than one month prior to the time that nine semester credit hours of graduate courses have been completed.

Only one program plan can be in effect for a student at any given time. Because of the importance of the program plan in establishing a new program GPA following a change of major, no request to change majors will be processed unless accompanied by an approved new program plan. This requirement applies whether a degree was earned in the first major or not.

CHANGE OF PROGRAM PLAN

A request for a change of a program plan must be submitted through the student's site director, for approval by the academic unit head or his/her designated representative. Students should not deviate from an approved program plan prior to obtaining approval of the change.

CHANGE OF MAJOR

During their studies, students receive exposure to a number of different academic subjects, and some are attracted to programs different from their initial choices. A change of major is possible if the student submits a Change of Major/Minor, Change of Site or Dual Degree form that is approved by the new academic unit head. After a change of major, courses unrelated to the new program will not be used in computing the student's cumulative GPA. However, all earned grades and credits remain on the transcript.

Following a change of major, the degree requirements in the new major may be based on either the student's original catalog, or the catalog in effect at the time of the change of major, or on a catalog between those two, subject to the approval of the academic unit head, as indicated on the submitted change of major form.

DIRECTED STUDY

Directed study is a means of allowing a student to register for a course during a semester when it is not included in the *Schedule of Classes*. To enroll in a directed-study course, a Request for Directed Study Course form should be initiated and approved according to form instructions. Approval is at the discretion of the academic unit head or program chair responsible for the course, and normally requires evidence of a compelling need by the student. The student should submit the approved form to the site office during early registration. The tuition rate for a directed-study course is the standard undergraduate or graduate rate, plus an additional directed-study fee.

TRANSFER CREDIT

If the courses constitute a logical part of the student's master's program, a maximum of 12 semester hours of transfer credit from regionally accredited institutions may be accepted, with the approval of the head of the appropriate academic unit and the director of graduate programs under the following conditions:

1. The courses must have been taken for graduate credit.
2. They must have been graded courses, and grades of at least B or equivalent must have been earned in each course.
3. They must have been taken not more than six years prior to the student's first enrollment at Florida Tech.

No credit is given for courses listed on transcripts without grades, for courses carrying grades but not credit hours, for vocational/technical courses, correspondence courses, experiential learning, or for courses taken at an institution based in the United States that is not accredited by a regional accrediting association.

Transfer credits are not included in the computation of grade point averages.

Some courses presented by certain military schools, plus the resident courses of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, have been evaluated by Florida Tech and specific courses found acceptable for transfer to designated degree programs without charge to the student. Up to a maximum of 12 such credit hours may be transferred provided at least a B or its equivalent was earned in each course, and provided the same time limit as for university courses is met. Information concerning the specific courses found acceptable and the Florida Tech equivalents is available from University College in Melbourne.

The combined total credit hours transferable from other university courses and from designated military schools may not exceed 12 credit hours.

No transfer credit will be granted for correspondence courses or from college/universities that are not regionally accredited if in the U.S. Military courses must have been taken at an approved school. Off-site military courses do not normally qualify for transfer credit.

Requests for transfer of credits must be filled out on the forms provided and submitted to the site director. Transfer requests will not be evaluated until an officially certified transcript is received and until the applicant has been admitted to University College.

Approval of a request for transfer credits does not indicate acceptance of those credits in a degree program. That action is taken only through approval of a program plan.

Where a joint- or dual-degree program exists within another institution, up to one-half of the total credits required in the program may be transferred from the partner institution, provided the courses at that institution are periodically reviewed and monitored by the dean of the appropriate college or other graduate council representative. In each individual joint- or dual-degree program, the total transfer credits will be established prior to announcing the program or admitting students, and may be smaller than half the required credits if circumstances warrant. It is also noted that transfer credits from other institutions are not permitted in the case of a joint- or dual-degree program.

Permission to take a course at another institution for transfer to Florida Tech subsequent to being admitted to University College must be obtained from the cognizant academic unit head prior to taking the course.

FINAL PROGRAM EXAMINATIONS

A final program examination is required for master's degree programs with the exception of those in the College of Business and University College for which there is no on-campus counterpart.

Procedure for the development and grading of operations research (OR) final program examinations for off-campus students at Aberdeen, Fort Lee and the Virtual Campus:

1. The curriculum manager of the off-campus OR program will design the final program examination (i.e., determine areas to be tested, number of questions and/or problems, weighting, time limits and other test parameters). Faculty members from the off-campus sites (Aberdeen, Fort Lee and Virtual Campus) may submit questions or problems with associated solutions to the curriculum manager of the off-campus OR program for inclusion in the examination. The department head for the operations research program from the main campus will have the final oversight authority for examination design.

2. Final program examinations may be administered at the off-campus sites and graded by faculty members at the administering site. However, no grades will be final until both the curriculum manager of the off-campus OR program and department head for the operations research program from the main campus review the grading.

3. Off-campus sites shall notify the curriculum manager of the off-campus OR program upon learning of an eligible student's intent to sit for the final program examination. Notification shall include:

   a. Student name and contact information

   b. Anticipated examination date

   c. Where examination will be administered (off-campus site)

   d. Off-campus site point-of-contact

Every effort should be made to have final program examinations administered and graded no later than one month prior to the end of the intended graduation semester.

4. Completion of the examination report form will require these signatures:

   a. ***Major Adviser:*** On this line, the name/signature of a full-time graduate faculty member who is in the student's program (i.e., operations research) will be entered. This must be the student's program chair or another full-time graduate faculty member of the student's academic unit designated by the student's program chair.

   b. ***Outside Member:*** On this line, the name/signature of a full-time graduate faculty member who is administratively different from the student's program will be entered. Typically, this will be someone at the off-campus site who meets the above stated criteria.

   c. ***Other Member:*** On this line, the name/signature of other committee members who must be on the graduate faculty, but can be other than full time (adjunct, visiting, etc.). Typically, this will be the curriculum manager of the off-campus OR program.

5. Only students with an overall GPA of 3.0 at the beginning of the term during which the comprehensive examinations are administered are eligible to take the examination.

6. In the event of the student's failing part or parts of the comprehensive examination, the regulations as specified in the *Graduate Policy Manual,* section 1.6.5 will apply.

THESIS

Students in certain extended graduate programs are generally expected to undergo the required final program examinations. Permission to follow a thesis in lieu thereof must be requested in writing through the site director/faculty adviser to the cognizant academic unit head. If granted, the thesis policies enunciated in the *University Catalog* must be followed.

PETITION TO GRADUATE

All graduating students must file petitions to graduate no later than the dates shown in the academic calendar of their site; otherwise, the student will be subject to a late fee. Generally, this date is during the first part of the semester preceding the student's final semester. Petitions can be obtained from the student's site office. Approved program plans with amendments should be submitted with the petition.

If the student does not graduate at the time anticipated, he/she must re-petition for the appropriate semester. A second payment of the graduation fee is not required, but the student may be required to pay for a replacement diploma, depending on the circumstances.

TIME LIMITATION

A seven-year statute of limitations is in effect on all work applied toward a master's degree at Florida Tech. All course work and thesis research, including the thesis defense or final program examination, must be completed within a total elapsed time span of not more than seven years.

The academic unit head of the student's college may approve a waiver of the statute of limitations for up to six credit hours of course work taken either at Florida Tech or elsewhere, subject to the following conditions:

1. Any course so approved must have been completed within the previous 10 years, and with a grade of at least B.

2. Only those courses where course content has not changed significantly in the intervening years may be approved.

3. The student must provide evidence of current mastery of the course content.

The academic unit head must notify the registrar in writing of the action.

In the case of a waiver request that does not conform to these requirements, or a request involving more than six credit hours, the academic unit head may either deny the request outright or approve it based on accompanying proof of currency by written examination endorsed by Florida Tech faculty with a recommendation for a favorable decision.

All waivers will be valid for a period of seven years. In no case will a time waiver request be honored if the original course grade was less that B.

Students may have non-waived courses (that exceed the statute of limitations) excluded from GPA calculations upon submission to the registrar of a written request, approved and signed by the academic unit head and the main campus director of graduate programs.

SECOND (MULTIPLE) MASTER'S DEGREES

A student seeking a second master's degree from Florida Tech must enroll in the programs sequentially, not simultaneously. Following admission to the first program, the student may at any time thereafter apply for admission to an additional program. If accepted into the new program, actual enrollment in that program will take effect upon completion of the first master's degree.

With approval of the academic unit head, credit for non-thesis or non-degree projects used previously to meet requirements for a master's degree at Florida Tech may be used to meet up to one-half of the credits required for a subsequent master's degree. The academic unit head will decide, on a per-course basis, the applicability of each course to be transferred to the second program. The final program, including those courses transferred, must be approved by the academic unit head of the program in which the student wishes to enroll. However, at least one-half of the course work leading to any master's degree granted by Florida Tech must have been taken at Florida Tech, but never applied to any other Florida Tech degree.

The overall cumulative GPA carried on the transcripts will include all courses for all graduate degrees. A notation will be made of the program GPA compiled for each degree, which will include only courses that were applied to the respective degree.

Neither degree will be awarded unless both the program GPA compiled on the basis of only those courses applied to that degree, and the overall cumulative GPA are at least 3.0.

STUDENT COMPLAINT RESOLUTION

Purpose

1. To promote prompt resolution of perceived wrongs and/or injustices that may arise between students and faculty members or other parties.
2. To assure that the rights of privacy of all parties are maintained.
3. To develop a higher sense of community among all persons at Florida Tech's off-campus locations.

Complaint Resolution Process

1. Occasions may arise where a student feels that he/she has a legitimate basis for complaint. It is the policy of the university to promptly resolve these complaints. The normal process for resolution of complaints is as follows:

a. When a student feels that he/she has a complaint, it should be taken by the student directly to the party(s) involved. Those involved should attempt to resolve the matter informally and without the need to establish a record.

b. If the student and the other party are unable to resolve the matter, or if for any reason the student does not feel at ease in going to the other party, he/she should contact the site director for assistance. Very often the director is able to achieve an equitable solution to most problems.

c. If the student would rather not discuss the matter with the site director, he/she may contact, by telephone or letter, the dean of University College at the main campus in Melbourne, Florida.

d. If for any reason the student chooses not to deal with the individuals listed above, he/she may present their complaint to the associate provost of graduate programs, Florida Tech, Melbourne, Florida.

2. To promote prompt and equitable resolution of student grievances, complaints should be made as soon after the incident as possible. Students may seek the help of any of the individuals listed above at any point in the grievance process that they choose. They may also withdraw the complaint at any time. EVERY EFFORT SHOULD BE MADE BY ALL PARTIES CONCERNED TO RESOLVE THE GRIEVANCE WITHIN 90 DAYS.

3. Complaints involving sex discrimination or equal opportunity may be resolved using the procedures outlined above. However, if the student is not at ease with these procedures, or feels these to be ineffective, he/she may seek the aid of the Title IX Coordinator (Sherri Rummel, Director of Human Resources) at the main campus of Florida Tech in Melbourne, Florida, (321) 674-8100.

Definition of Title IX Coordinator

The Title IX Coordinator is the person designated by the university whose function is to ensure that the university is in compliance with federal laws regarding the resolution of allegations regarding sex discrimination. This individual has the added responsibility of ensuring compliance with all federal laws regarding equal opportunity.

Complaint Resolution Process for Distance Learning Courses

1. Administrative issues (registration matters, how to order books, etc.) should be handled by the student's site, if at all possible.

2. Technical issues (student can't log on, etc.) should be handled by the student's site, if possible; more complicated technical issues (e.g. the student is using a Macintosh computer and has problems, etc.) should be referred to the Information Technology staff of University College.

3. Instructional issues (lack of faculty feedback, material not presented in an understandable manner) should first be addressed by the student(s) with the instructor. Then, if talking to the instructor does not produce any response (or the student feels that this is not an option), the complaint should be communicated to the site director of the Virtual Campus who will communicate this information to the director of the site where the course originates. That site director will discuss the situation with the instructor to see what, if anything, can be done to resolve the complaint. That site director will relay what action(s) is (are) taken to the director of the Virtual Campus, who will relay the outcome(s) to the student(s).

Programs and Locations

Note: For Distance Learning program information, visit our Web site: www.uc.fit.edu/dl

Legend

R = Resident Classes, on site

DL = Distance Learning (online) classes

NA = Not available this location

UA = University Alliance

Locations

1. Aberdeen, MD
2. Fort Lee, VA
3. Hampton Roads, Fort Eustis/ Norfolk, VA
4. Melbourne, Main Campus, Melbourne, FL
5. National Capital Region, Alexandria, VA
6. Northeast, NJ
7. Orlando, FL
8. Patuxent, MD
9. Redstone, AL
10. Spaceport, KSC/Rockledge, Melbourne, FL
11. University Alliance
12. Distance Learning

DEGREES OFFERED
PROFESSIONAL MASTER OF BUSINESS ADMINISTRATION (PMBA)
ACQUISITION AND CONTRACT MANAGEMENT
eBUSINESS
HUMAN RESOURCES MANAGEMENT
INFORMATION SYSTEMS
MASTER OF PUBLIC INFORMATION (MPA)
MASTER OF SCIENCE (MS)
ACQUISITION AND CONTRACT MANAGEMENT
AEROSPACE ENGINEERING
COMPUTER INFORMATION SYSTEMS
COMPUTER SCIENCE
ELECTRICAL ENGINEERING
ENGINEERING MANAGEMENT
HUMAN RESOURCES MANAGEMENT
INFORMATION TECHNOLOGY
LOGISTICS MANAGEMENT
MANAGEMENT
ACQUISITION AND CONTRACT MANAGEMENT
eBUSINESS
HUMAN RESOURCES MANAGEMENT
INFORMATION SYSTEMS
LOGISTICS MANAGEMENT
TRANSPORTATION MANAGEMENT
MATERIEL ACQUISITION MANAGEMENT
MECHANICAL ENGINEERING
OPERATIONS RESEARCH
PROJECT MANAGEMENT
INFORMATION SYSTEMS
OPERATIONS RESEARCH
QUALITY MANAGEMENT
SOFTWARE ENGINEERING
SPACE SYSTEMS
SPACE SYSTEMS MANAGEMENT
SYSTEMS MANAGEMENT
INFORMATION SYSTEMS
OPERATIONS RESEARCH

1	2	3	4	5	6	7	8	9	10	11	12
R-DL	DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
DL	DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	R-DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
NA	NA	NA	NA	NA	NA	NA	R	NA	NA	NA	NA
DL	DL	R-DL	R-DL	DL	DL	R-DL	R-DL	R-DL	R-DL	NA	DL
NA	NA	NA	NA	NA	NA	R	R	NA	R	NA	NA
NA	NA	NA	NA	NA	NA	R	R	NA	NA	NA	NA
R	NA	R-DL	NA	NA	R	R	R	R	NA	NA	NA
R-DL	DL	R-DL	NA	DL	R-DL	R-DL	DL	R-DL	DL	NA	DL
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	UA	NA
DL	R-DL	R-DL	NA	DL	R-DL	R-DL	DL	R-DL	DL	NA	DL
R-DL	R-DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	R-DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	DL	NA	R-DL	R-DL	R-DL	R-DL	DL	DL	NA	DL
DL	DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	R-DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	R-DL	R-DL	NA	R-DL	R-DL	R-DL	DL	R-DL	DL	NA	DL
DL	R-DL	R-DL	NA	DL	R-DL	R-DL	DL	DL	DL	NA	DL
DL	R-DL	R-DL	NA	R-DL	R-DL	R-DL	DL	R-DL	DL	NA	DL
NA	NA	NA	NA	NA	NA	NA	R	NA	NA	NA	NA
R-DL	DL	DL	NA	DL	DL	DL	DL	DL	DL	NA	DL
R-DL	DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	R-DL	NA	R-DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
R-DL	DL	R-DL	NA	DL	R-DL	R-DL	R-DL	R-DL	DL	NA	DL
NA	NA	NA	NA	NA	NA	R	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	R	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	R	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	R	NA	NA
R-DL	DL	R-DL	NA	R-DL	R-DL	R-DL	DL	R-DL	DL	NA	DL
R	NA	R	NA	R	R	R	NA	R	NA	NA	NA
R-DL	DL	R-DL	NA	DL	R-DL	R-DL	DL	R-DL	DL	NA	DL

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DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

ABERDEEN

Florida Tech's site in Harford County, Maryland, provides graduate students at Aberdeen Proving Ground and in the surrounding area opportunities for continuing their education to maintain their professional and technical competence, and to enhance their career development and progression. Florida Tech programs are available to all who meet admission requirements of the university. Classes meet one night per week for three hours beginning at 5 p.m.

Aberdeen offers students the choice of 11 different management specialties. They range from an PMBA generalist to a master's-level specialist in contract management.

The site offers several support resources not usually available in off-campus programs. This includes a 16,000 volume, 300 periodical library, which has an active program of interlibrary loans with other libraries throughout the country via the Online Computer Library Center (OCLC). This system allows Florida Tech students quick access to the library holdings of the University of Maryland, Johns Hopkins University, University of Delaware, American University and George Washington University, as well as colleges and universities offering graduate degrees in other parts of the country. Each semester, the librarian places selected books on reserve on special shelves in support of Florida Tech courses offered that semester. Students also have access to the APG Education Center Computer Laboratory, and to computer systems in the site director's office. Classrooms are equipped with instructional audiovisual equipment. Also, the Aberdeen site is equipped with state-of-the-art telecommunications and data processing equipment, which allows for speedy registration, and improves communications between professor and student.

Several of the available programs and courses are particularly applicable to Department of Defense military and civilian personnel working at APG. For example, the Aberdeen site offers systems management with a concentration in operations research for the employee desiring to enhance his/her applied mathematics abilities, and offers a Master of Science in Contract Management for the career-oriented acquisition specialist.

Credit for specific DoD courses (up to a maximum of 12 semester hours) can be applied toward applicable Florida Tech degrees. For example, students attending the Ordnance Officer Advanced Course can earn up to six semester hours toward a master's degree in management after successfully completing OOAC. Also, students (again with prior Florida Tech approval) can attend a variety of DoD courses to earn up to 12 semester credit hours toward a master's degree with a contracts or logistics concentration. (Prior approval by the academic chair and the dean of University College, in writing, is required before graduate credit can be granted.)

Florida Tech programs at Aberdeen are approved by the Maryland State Higher Education Commission, and may be additionally approved by Maryland State Approval Authority for payment of veterans education benefits.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1-5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a clas with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT ABERDEEN

BAUGUS, B., Adjunct Instructor, Economics. B.A., McDaniel College; M.B.A., Vanderbilt University.

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McCAMPBELL, A.S., Associate Professor, Management and Site Director. B.S., M.B.A., University of Baltimore; D.B.A., Nova Southeastern University.

MOOZOUN, S., Adjunct Instructor, Management. B.S., M.S., Ph.D., West Virginia University.

VROMAN, H., Adjunct Instructor, Management. B.A., M.A., Northern Illinois University; Ph.D., University of Iowa.

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Location
U.S. Army Logistics Management College
Fort Lee, Virginia

Mailing Address
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Building 12500 ALMC
2401 Quarters Road
Fort Lee, VA 23801-1705

DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

Florida Institute of Technology is certified to operate by the State Council of Higher Education for Virginia.

FORT LEE

Problems related to World War II, and growth in the military establishment in response to the cold war caused the government to focus on the shortcomings of the military departments in wholesale logistics management. This problem was examined by the Hoover Commissions of the late 1940s and early 1950s, and by various congressional committees, including the House Committee on Government Organization in 1951 and 1952. These efforts culminated in the decision to establish the Army Supply Management Course.

The U.S. Army Logistics Management College (ALMC) was established in October 1954 as an activity with the single mission of conducting the two-month Army Supply Management Course at Fort Lee, Virginia.

The college has since grown to an institution with multiple missions and 71 resident courses. In 1962, ALMC became a part of the U.S. Army Materiel Command (AMC), and its mission was broadened to include the development of mid- and top-level logistics managers in the AMC work force. On October 1, 1991, ALMC was placed under operational command of the Combined Arms Support Command and Fort Lee, Training and Doctrine Command (TRADOC).

Florida Tech conducts evening graduate-level courses in facilities of the U.S. Army Logistics Management College (ALMC), Fort Lee, Virginia. These programs are available to active-duty military personnel, spouses and/or dependants of active-duty military personnel and U.S. government civilian employees who meet admission requirements of the university.

The course offerings listed in this catalog may be adjusted to provide maximum responsiveness to the needs of the participants.

ALMC/FLORIDA TECH PARTNERSHIP

Since 1973, ALMC and Florida Tech have worked cooperatively in offering graduate level degree programs.

All Florida Tech graduate degree programs require completion of 33 credit hours (excluding possible prerequisites). Requirements may be completely fulfilled through resident attendance at the Fort Lee site, or in combination with transfer credit from approved military programs and/or another master's degree program.

A maximum of 12 credit hours may be transferred into a Florida Tech graduate degree program. An official transcript is required to verify that a grade of B or better was achieved before transfer credit can be approved.

Many courses taught by the Army Logistics Management College (ALMC) and the Defense Acquisition University (DAU) can be used to provide transfer credit toward these degree programs. The following is a partial list of military courses most commonly used by students for transfer credit:

Military School	Course Title	Maximum Award*
ALMC	Logistics Executive Development Course (LEDC)	12 credit hours
	Associate Logistics Executive Development Course (ALEDC)	9 credit hours
	Material Acquisition Management Course (MAM)	6 credit hours
	Army Acquisition Basic Course (AABC)	9 credit hours
	Combined Logistics Captains Career Course (CLC3)	6 credit hours
	Operations Research/Systems Analysis Military Applications Course (ORSA-MAC 1 Phase 1 and 2)	12 credit hours
	Logistics Intern Training Program (DALITP)	12 credit hours
DAU	Contracting (CON-101)	3 credit hours
	Intermediate Contracting (CON-202)	3 credit hours
	Program Management Officer Course (PMT-352)	9 credit hours
	Program Managers Course (PMT-401)	6 credit hours

**Subject to change upon periodic review.*

COOPERATIVE DEGREE PROGRAMS

Florida Tech and ALMC provide several cooperative degree program opportunities. These programs generally facilitate completion of graduate degree requirements in 12 months.

Participation in a cooperative degree program requires completion of an ALMC course, followed by two or three academic sessions as a full-time student. ALMC/Florida Tech cooperative degree programs are currently available in conjunction with the LEDC, AABC and ORSA-MAC courses of instruction. Details for any of these programs may be obtained by contacting Fort Lee.

ENROLLMENT PROCEDURES

Individuals desiring to enroll in the LEDC, AABC or ORSA-MAC courses, and participate in the ALMC/Florida Tech cooperative degree programs must request approval through appropriate personnel channels and their chain of command. Further advice can be obtained from the Fort Lee site staff at (804) 765-4665 or e-mail rstocks@fit.edu.

Students should complete an application for admission to Florida Tech indicating acceptance for LEDC, ORSA-MAC I or AABC, and request admission in the graduate program of Florida Tech. Applications for admission to University College are available upon request from Fort Lee.

VETERANS BENEFITS

Florida Tech degree programs are approved for the payment of veterans education benefits.

COMPUTER FACILITIES

A computer lab with a variety of business software is available for the use of Florida Tech/ALMC students. Selected courses require the use of computers. Although not required, Florida Tech students are encouraged to acquire a personal computer.

PART-TIME STUDENTS

Florida Tech provides an opportunity for the continuing education of Fort Lee personnel who wish to maintain their professional and technical competence and/or enhance their development and career progression. The typical part-time student can complete graduate degree

requirements in two years at the normal load of two courses per academic session. This time may be reduced if transfer credits are accepted from other civilian institutions or designated military schools. Part-time students must complete all degree requirements within a period not to exceed seven years.

ACADEMIC CALENDAR

Fall 2008 (Aug. 18–Dec. 5)

July 7	Web Registration begins
Aug. 18	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 24	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)* Observed
Nov. 24–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday (Memorial Day)
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 17–Dec. 4)

July 6	Web Registration begins
Aug. 17	FALL SEMESTER BEGINS

FACULTY AT FORT LEE

ADLER, P.J., Lecturer. B.A., University of Wisconsin–Milwaukee; M.S., Florida Institute of Technology; C.P.L.

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BAWUAH, K., Adjunct Professor. B.A., Bethany College; M.B.A., M.A., Eastern Illinois University; Ph.D., Virginia Polytechnic Institute and State University.

BICE, W.S., Adjunct Professor. B.S., University of Illinois; M.B.A., University of Chicago; Ph.D., Virginia Commonwealth University.

CORREIA, C.A., Adjunct Professor. B.S., University of Massachusetts; M.A., University of Mississippi; M.S., Virginia Polytechnic Institute and State University; Ph.D., University of Virginia.

DRISCOLL, P.J., Adjunct Professor. B.S., U.S. Military Academy; M.S., Stanford University; Ph.D., Virginia Polytechnic Institute and State University.

FOWLER, C.W., Adjunct Professor. B.S., U.S. Military Academy; M.S., Rensselaer Polytechnic Institute; M.S., Ph.D., Georgia Institute of Technology.

HARTSON, M.J., Adjunct Professor. B.S., State University of New York–Oswego; M.Ed., Ed.D., College of William and Mary.

LEBOW, M.I., Adjunct Professor. B.S., University of Virginia; C.I.S., M.S., Ph.D., Virginia Commonwealth University. (CPA)

LEWIS, K.W., Adjunct Professor. B.A., Hampton Institute; M.Ed., University of Pittsburgh; Ph.D., Florida State University.

MASSEY, W.H., Lecturer. B.S., University of Richmond; M.S.B., Virginia Commonwealth University. (CPA)

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RANEY, T.W., Assistant Professor and Site Director. B.S., B.A., Bucknell University; M.B.A., Georgia State University; J.D., Case Western Reserve University.

WOO, J.S., Adjunct Professor. B.S., Mary Washington College; M.B.A., Averett University; D.B.A., Nova Southeastern University. (CCUE-CFSP)

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Location

Fort Eustis
Army Education Center
Building 1500, Madison Ave. and Lee Blvd.

Norfolk Naval Station
Navy College Office, Room 209,
Building CEP 87, First Street at Gate 5

DEGREE PROGRAMS IN RESIDENCE

Additional Programs Available Via Distance Learning at http://uc.fit.edu/dl

Florida Institute of Technology is certified to operate by the State Council of Higher Education for Virginia.

HAMPTON ROADS

Florida Tech maintains an off-campus site to serve the Hampton Roads, Virginia, area, with two convenient offices. On the Virginia Peninsula, the Fort Eustis office in the Army Education Center serves as the central office. A branch site office in Building CEP-87 on Norfolk Naval Station supports students on the south side of Hampton Roads.

The local Florida Tech program originally operated under a military waiver from the Commonwealth of Virginia, with courses limited to the military and Department of Defense civilian employees. In 1991 Florida Tech's graduate program received state approval to extend its service to dependents and members of the general public. Today, the student body is a richly diverse group from each of the military installations in the area, the NASA program at Langley Research Center, Northrop Grumman, Newport News Shipbuilding and a variety of technological corporations and general businesses on both sides of Hampton Roads.

Florida Tech is annually rated among America's best colleges in the *U.S. News & World Report*. Graduate courses in Hampton Roads' master's degree programs are taught by outstanding faculty members recruited from business and industry, with most having terminal (Ph.D., D.B.A. or J.D.) degrees within subject areas.

Florida Tech conducts graduate programs under a Memorandum of Understanding with the various commands, with graduate courses offered at Fort Eustis, Fort Monroe, NASA's Langley Research Center, Dam Neck, Coast Guard Station Portsmouth and at the U.S. Naval Station at Norfolk, Virginia.

Florida Tech students study real-life applications of business subjects under the expert instruction and dedication of faculty who are leaders in the local business and education community, as part of the university's tradition of excellence.

The main Florida Tech site is located in the Fort Eustis Education Building 1500 (at the corner of Lee Boulevard and Madison Avenue). Fort Eustis is situated in the historical triangle between Yorktown, Colonial Williamsburg and Jamestown.

A second site is maintained on the world's largest naval installation at Norfolk Naval Station, in Building CEP 87, on First Street at Gate 5.

The site director of Hampton Roads is a full-time faculty member and serves as graduate adviser for Hampton Roads students. A resident director manages administrative functions at the Fort Eustis and Norfolk sites.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT HAMPTON ROADS

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DEGREE PROGRAM IN RESIDENCE

Additional Programs Available Via Distance Learning
http://uc.fit.edu/dl

MELBOURNE

The Melbourne site houses the computer information systems degree program and offers only graduate-level courses for that program. It is located on the main campus in the Crawford Building and is the only University College site to reside on campus.

This program accepts international students and students attending this site are entitled to all main campus facilities and resources.

ACADEMIC CALENDAR

Fall 2008 (Aug. 18–Dec. 3)

April 4	Last day to file a Petition to Graduate for Fall Semester 2008 without a late fee
Aug. 3	Last day for returning students to register for Fall Semester 2008 without late registration fee of $150
Aug. 11	Tuition and fees due for Fall Semester 2008
Aug. 18	CLASSES BEGIN (Monday)
Aug. 22	Last day to register or add a class
Aug. 29	Last day to drop a class with full tuition refund and without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Sept. 12	Re-petition deadline for Fall Semester 2008 (for students who had petitioned for Spring Summer Semester 2008)
Sept. 19	Last day to file a Petition to Graduate for Spring Semester 2009 without a late fee
Oct. 13	Holiday *(Columbus Day)*
Oct. 13–14	Fall Break
Oct. 24	Last day to withdraw from a course with a final grade of W
Nov. 10	Registration for Spring Semester 2009 begins
Nov. 11	Holiday *(Veterans Day)*
Nov. 26–28	Holiday *(Thanksgiving)*
Nov. 30	Last day for returning students to register for Spring Semester 2009 without late registration fee of $150
Dec. 1	Last day to submit completed graduate-level defense and examination forms for Fall 2008 commencement
Dec. 3	Last day of classes
Dec. 4–5	Study Days (NO CLASSES)
Dec. 8–13	FINAL EXAMS
Dec. 13	Fall Commencement Exercises

Spring 2009 (Jan. 12–May 2)

Jan. 5	Tuition and fees due for Spring Semester 2009
Jan. 12	CLASSES BEGIN (Monday)
Jan. 16	Last day to register or add a class
Jan. 16	Last day to file a Petition to Graduate for Summer Term 2009 without a late fee
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Jan. 23	Last day to drop a class with full tuition refund and without receiving a grade of W
Jan. 26	Registration for Summer Term 2009 begins
Feb. 2	Re-petition deadline for Spring Semester 2009 (for students who had petitioned for Fall Semester 2008)
Feb. 16	Holiday *(Presidents Day)*
March 1	Priority deadline for filing Financial Aid Applications for 2009–2010
March 2–6	Spring Break
March 20	Last day to withdraw from a course with a final grade of W
March 30	Registration for Fall Semester 2009 begins
April 3	Last day to file a Petition to Graduate for Fall Semester 2009 without a late fee
April 27	Last day to submit completed graduate-level defense and examination forms for Spring 2009 commencement
May 2	Last day of classes
May 4–9	FINAL EXAMS
May 9	Spring Commencement Exercises

Summer/Fall 2009

May 4	Re-petition deadline for Summer Term 2009 (for students who had petitioned for Spring Semester 2009)
May 5	Tuition and fees due for Summer Term 2009
May 11	First day of classes, first 6-week term
May 18	First day of classes, 8- and 11-week terms
May 22	Last day to register, add a class, or drop a class with full tuition refund and without receiving a grade of W, 8- and 11-week terms
May 25	Holiday *(Memorial Day)*
June 19	Last day to withdraw from a course with a final grade of W, 8- and 11 week terms
June 19	Last day of classes, first 6-week term
June 22	First day of classes, second 6-week term
July 4	Holiday *(Independence Day)*
July 10	Last day of 8-week classes (final exam on last scheduled class day)
July 31	Last day of 11-week classes (final exam on last scheduled class day)
July 31	Last day of classes, second 6-week term
Aug. 2	Last day for returning students to register for Fall Semester 2009 without late registration fee of $150
Aug. 10	Tuition and fees due for Fall Semester 2009
Aug. 17	FALL CLASSES BEGIN (Monday)

FACULTY AT MELBOURNE

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DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

Florida Institute of Technology is certified to operate by the State Council of Higher Education for Virginia.

NATIONAL CAPITAL REGION

Florida Tech, located in northern Virginia, conducts an evening graduate-level professional development program in the greater Washington, D.C., area. The program is available to all qualified applicants who meet the requirements of the university.

The program is administered by the National Capital Region (NCR) site, which is centrally located in Alexandria, Virginia, and is comprised of an administrative suite and classrooms. NCR also operates an administrative office and classroom on the U.S. Marine Corps base in Quantico, Virginia. The NCR site's student body includes students from the entire metropolitan Washington, D.C., area.

Library support is available from the many fine federal and local libraries in the greater Washington, D.C., area.

In addition to the graduate degree programs identified in this catalog, NCR also offers five-course graduate certificate programs in logistics and contract management. The certificate program is intended to satisfy the needs for professional development for those students who do not choose to pursue a complete degree program. All classes are taught by full-time or adjunct faculty of Florida Tech.

The NCR off-campus program provides the opportunity for interested individuals to continue their education to increase professional and technical competence, and thereby enhance career development and progression.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3-7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT NATIONAL CAPITAL REGION

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DEGREE PROGRAMS IN RESIDENCE

Note: Not all degree programs are available at all teaching locations.

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

NORTHEAST

Picatinny Arsenal is located in New Jersey's Morris County approximately 35 miles west of New York City. Although it was established as an Army installation in 1880, the Arsenal's colorful history goes back to Revolutionary days, to General George Washington and the Continental Army.

Picatinny is the home of the U.S. Army Armament Research and Development Engineering Center (ARDEC). The mission of ARDEC primarily involves the development and improvement of U.S. military weapon systems and ammunition.

Under agreement with the commander, ARDEC, Florida Tech provides graduate programs to U.S. government military personnel, their dependents, veterans, civilian employees of the installation, contractor personnel, dependents of the foregoing and such other persons as may have access to Picatinny Arsenal under the installation access policy and who meet admission requirements of the university. This agreement has been ongoing since 1978 when Florida Tech's graduate program began at Picatinny.

Florida Tech is dedicated to continuing its participation in the Picatinny community by providing educational programs of distinction in management and technology. Toward this end, Florida Tech's master's degrees listed herein are designed to achieve the following:

1. Increase management skills among military and civilian personnel involved in planning, directing and controlling the various projects and programs assigned.
2. Provide the latest knowledge in management, contract management and program management to maintain a strong technological base and promote improved weaponry.
3. Provide the latest managerial problem-solving techniques in a variety of areas to effectively support United States armed forces.

The curriculum and prerequisites for each degree offered at this site can be found in this catalog.

Personnel interested in seeking admission to one of these graduate programs or in some other program offered by Florida Tech are encouraged to discuss their career plans and goals with the site director at Picatinny.

Only selected master of science degree programs have been approved for payment of veterans benefits to qualified students at the Picatinny Arsenal. Consult the site director for programs currently approved for payment of veterans benefits at teaching locations in New Jersey.

ARDEC TECHNICAL LIBRARY

Building 59, Hours: 8 a.m.–4:30 p.m., Monday–Friday, Phone: 724-3713

Florida Tech students are encouraged to use the excellent library facilities at Picatinny. The collection includes about 53,400 volumes, more than 1,200 periodicals, 266,000 reports on microfiche and 259,000 hard-copy reports on an immense range of subjects involving research and development, and other government reports. The services of the library include:

Documents (Room 1)

1. Reference and online searches of Defense Technical Information Center databases (DTIC) are available.

2. Order and circulation of the following is available:

   a. Classified and unclassified government reports.

   b. Independent Research and Development reports (IR&D).

   c. Government Information and Data Exchange Program (GIDEP).

Books (Main Room)

1. Area Library Membership: The library is a member of the Morris Area Coordinating Council. The council is composed of cooperating libraries of County College of Morris, Drew University, Don Bosco College, Fairleigh Dickinson University and the College of St. Elizabeth. Florida Tech students may avail themselves of these libraries.

2. Online Computer Library Center (OCLC): Through the Technical Library's membership in OCLC, students have available about 13 million titles from 2,500 libraries.

3. Online Bibliographic Searches in DIALOG and BRS databases: Through the Technical Library's availability of DIALOG, students can access more than 200 commercial databases regarding journals and periodicals that are indexed.

4. Interlibrary Loans: Book loans are available from throughout the United States. Loans will also be arranged for students from Morris County Coordinating Area Council libraries.

Periodicals (Room 10)

1. Technical Periodicals, Journals and Magazines: Current issues are in bound form in Room 11 and in film form in lektreivers. Most VSMF files are now online via the network. Access point in the library and selected other buildings.

2. The Visual Search Microfilm Films (VSMF) contain military specifications and standards and other materials.

Bulletins
New acquisitions are announced approximately biweekly via e-mail. Look for "library" at your login.

Copying Services
A copy machine is available in Room 10 for the limited reproduction of noncirculating reference material (other use must be authorized by a supervisor).

DREW UNIVERSITY LIBRARY

Through a Memorandum of Understanding, Florida Tech graduate students are authorized to use all services of the Drew University Library in Madison, New Jersey. To withdraw books from the library, a fee of $25 annually is required, and a Florida Tech student identification card must be presented.

Special borrower privileges extended to students are valid for one calendar year, at which time they may be renewed for another calendar year. There is a five-book limit.

Students can obtain ID cards from Florida Tech's Resident Office.

NAVAL AIR WARFARE CENTER

Florida Tech's site in Ocean County, New Jersey (located at the Naval Air Warfare Center, Lakehurst, New Jersey), provides graduate students there and in the surrounding area opportunities for continuing their education to maintain their professional and technical competence, and to enhance their career development and progression. Florida Tech programs are available to all who meet admission requirements of the university. Classes are held on base and meet one night per week for three hours beginning at 5 p.m.

The site in Ocean County offers several support resources not usually available in off-campus-type programs. This includes a 6,500 volume, 150 periodical library, which has an active program of interlibrary loans with other libraries throughout the country via the Online Computer Library Center (OCLC). This system allows Florida Tech students quick access to the holdings of local libraries as well as colleges and universities offering graduate degrees in other parts of the country. Each semester, the librarian places selected books on reserve on special shelves in support of Florida Tech courses offered that semester. Students also have access to computer systems in the site director's office. Classrooms are equipped with closed circuit TV in addition to conventional audiovisual equipment. Also, all off-campus sites, in particular Lakehurst, are equipped with state-of-the-art telecommunications and data-processing equipment, which allow for speedy registration, more accurate records keeping, and state-of-the-art communications between professor and student via computer bulletin boards and other data-processing peripherals.

Several of the available programs and courses are particularly applicable to Department of Defense military and civilian personnel working at Lakehurst, Fort Monmouth and Fort Dix, New Jersey, and at DISC–ICP, Philadelphia, Pennsylvania. For example, the Lakehurst site offers a Master of Science in Acquisition and Contract Management for the career-oriented acquisition specialist.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–July 3)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
June 12	Last day to withdraw from a class with a final grade of W
June 26	Last day of classes
June 29–July 3	Final Exams
July 4	Holiday *(Independence Day)*

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT NORTHEAST

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ORLANDO COMMUNICATION DIRECTORY

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DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

ORLANDO

Florida Tech conducts evening, graduate-level programs for students in the Orlando area with classes offered on-site at Lockheed Martin Electronics and Missiles Group facilities and the Florida Tech site in Baldwin Park.

All classes offered in Orlando are taught by Florida Tech faculty. Students may take courses at other Florida Tech sites as well as via distance learning.

The Orlando programs provide continuing education for personnel to maintain their professional and technical competence, and for their development and career progression. Any degree obtained by a U.S. government employee in the process of receiving such professional development is an incidental by-product thereof.

The program provides the working professional the chance to earn a graduate degree in two years as a part-time student taking a normal load of two courses per semester, each course requiring class attendance one evening a week. Transfer credits earned through certain military courses and at other universities may shorten the time required.

The classroom environment provides a unique opportunity for an extensive exchange of ideas and viewpoints among representatives of education, industry and U.S. government military and civilians.

Library facilities for the students are provided by agreement at the University of Central Florida and through online access or interlibrary loan with the main campus library in Melbourne, Florida.

Program approval has been awarded by the Florida State Approving Agency for payment of veterans benefits to qualified students.

Registration for each semester is conducted at designated locations in Orlando as scheduled in the academic calendar for the Orlando site.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT ORLANDO

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WHITE, K.R., Associate Professor, Management. B.S., New York University; Ph.D., University of Oklahoma.

PATUXENT COMMUNICATION DIRECTORY

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Office Hours
Monday–Friday 8 a.m.–4:30 p.m.
(Other times by appointment)

Mailing Address
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P.O. Box 2212
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Location
Florida Tech
22188 Three Notch Road, Suite D
Lexington Park, MD 20635

DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

Florida Institute of Technology is certified to operate by the Maryland Higher Education Commission.

PATUXENT

The Patuxent site of Florida Tech has provided graduate education in the southern Maryland area since 1972. Located on the Naval Air Warfare Center, Aircraft Division (NAWC-AD), the program at Patuxent is open to all qualified applicants who meet the requirements of the university.

All programs are designed to allow working professionals an opportunity to maintain professional and technical competence while earning a graduate degree without career interruption. Each course meets one evening per week to accommodate the full-time working professional. Classes are taught in traditional classroom format with some distance learning classes. Programs may be completed in two years (or less) or at the student's own pace, and a choice of elective courses is available in most programs.

The degree programs offered at the Patuxent site have been approved for payment of veterans benefits to qualified students under authority of Subchapter 1775, Chapter 36, Title 38, United States Code, Veterans Benefits.

Support resources not always available in off-campus programs are available at Patuxent. The Base Library with 130,000 items is a depository for government documents and a participant in the interlibrary loan system. Florida Tech's students have access to computers in the student resource center and computer lab located outside of Gate 1 of the Patuxent River Naval Air Station.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT PATUXENT

BREITLER, A.L., Adjunct Professor, Computer Science. B.A., Florida State University; M.A., George Washington University; Ph.D., Catholic University.

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CHLOSTA, N.W., Assistant Professor, Management and Site Director. B.S., St. Francis University; M.E.A., George Washington University; M.P.A., University of Southern California.

CLAPP, D. Professor Emeritus, Management. B.S., University of Colorado; M.S.E., Ph.D., Arizona State University.

COOKSEY, L.M., Adjunct Professor, Management. B.S., University of Maryland; M.S., Florida Institute of Technology.

GEORGE, D., Adjunct Professor, Management. B.A. Washington College; M.S. George Washington University.

GILL, J.A., Adjunct Professor, Computer Science. B.S., University of West Florida; M.S., U.S. Naval Postgraduate School; Ph.D., University of London.

GORDON, V.G., Associate Professor, Mechanical Engineering. B.S., Auburn University; M.S., Ph.D., U.S. Naval Postgraduate School.

HAWKINS, F., Adjunct Professor, Management. B.S., University of Virginia; M.S., Pennsylvania State University; Ph.D., University of Maryland.

HEFFERNAN, G.M., Adjunct Professor, Management. B.A., University of Dallas; M.A., Ph.D., George Mason University.

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LONG, G.D., Adjunct Professor, Computer Science. B.S., Massachusetts Institute of Technology; M.S., Ph.D., University of Maryland.

LONG, J.M., Assistant Professor, Mechanical Engineering. B.S., M.S., Ph.D., Johns Hopkins University.

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MALEY, S., Adjunct Professor, Aerospace Engineering. B.S., University of Massachusetts; M.S., Ph.D., Purdue University.

MAVOR, T.P., Adjunct Professor, Mechanical Engineering. B.S., M.S., Worcester Polytechnic Institute; Ph.D., University of Delaware.

MEANS, T.B., Adjunct Professor, Management. B.S., Ph.D., Pennsylvania State University; M.Ed., Vanderbilt University.

MUTSCHLER, D.W., Assistant Professor, Computer Science. B.A., Rutgers University; M.Engr., Pennsylvania State University; M.S., Ph.D., Temple University.

RHINE, R.M., Adjunct Professor, Management. B.A., Bethany College; M.B.A., Hood College; Ph.D., West Virginia University.

RUSSELL, J. Adjunct Professor, Management. B.S. Northeastern University; B.S. University of Maryland; M.S. University of Maryland University College.

SAAKIAN, A., Adjunct Professor, Electrical Engineering. B.S., Yerevan Polytechnical Institute; M.S., Institute of Telecommunications; Ph.D., University of Massachusetts–Lowell.

SCHALLER, R.R., Adjunct Professor, Management. M.B.A., Loyola College; Ph.D. (ABD), George Mason University.

SMITH, T.S., Adjunct Lecturer, Management. B.S., University of Maryland; M.S., University of Southern California.

SUBRAHMANYAM, M.B., Adjunct Professor, Electrical Engineering. B.E., Regional Engineering College (India); M.S., University of Chicago; Ph.D., University of Iowa.

TOWNSEND, G.W., Adjunct Lecturer, Management. B.S., Virginia Polytechnic Institute and State University; M.B.A., M.S., Florida Institute of Technology.

VANDREW, S.L., Adjunct Professor, Management. B.S., U.S. Military Academy; M.S., Ph.D., Colorado School of Mines.

WEDDLE, D.B., Associate Professor, Computer Science. B.A., M.S., University of Virginia; M.S., Ph.D., George Washington University.

WELO, R.L., Adjunct Professor, Management. B.S., U.S. Military Academy; M.B.A., University of Michigan; Ph.D., Texas A&M University.

WHITE, R.R., Adjunct Lecturer, Computer Science. B.S., Indiana University; M.S., Florida Institute of Technology.

WOOLBRIGHT, R., Adjunct Professor, Management. B.S., University of Maryland; M.S., University of Southern California; J.D., University of North Carolina–Chapel Hill.

WORMWOOD, E.E., Adjunct Professor, Management. B.S., University of Maryland; M.P.A., University of Maryland; J.D., George Washington University.

REDSTONE COMMUNICATION DIRECTORY

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Office Hours
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Mailing Address
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Sparkman Center
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Redstone Arsenal, AL 35898

DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

REDSTONE

Since 1976, Redstone has provided for continuing education of personnel in the greater Huntsville area to maintain their professional and technical competence, and for their development and career progression. The site offers both graduate degree and professional development programs. Live classes are offered evenings to allow working professionals an opportunity to earn a graduate degree or certificate without career interruption. Distance-learning courses are offered for those who cannot attend live classes.

While the programs are open to all who meet the admission requirements of the university, traditionally the Redstone site has served government agencies and many national and local firms with facilities in the Huntsville area. The major governmental agencies include:

- U.S. Army Aviation and Missile Command
- U.S. Army Space and Strategic Defense Command
- U.S. Army Strategic Defense Advanced Technology Center
- U.S. Army Engineer Division, Huntsville, Alabama
- U.S. Army Redstone Readiness Group
- U.S. Army Ordnance Missile and Munitions Center and School
- Marshall Space Flight Center, NASA

LOGISTICS SUPPORT ACTIVITY

Because of the moderate size of the student body, class size is relatively small. Students at Florida Tech are treated as individuals, not merely numbers. Each incoming student is assigned a graduate adviser to assist the student in formulating a graduate program plan to meet the individual needs of each student.

Each graduate degree program may be completed in two years or less. However, you may work to complete your degree program at your own pace. The majority of students usually enroll for one course per semester, but enroll for two or more courses when their schedules permit.

Instructors at the site are working professionals with hands-on experience in the discipline in which they teach. Over 90 percent of the instructors in the graduate programs have a terminal degree (Ph.D. or equivalent).

The site is conveniently located in Building 5304 (Sparkman Center) on Redstone Arsenal. Salient features of the program include:

- Degree programs range from 30 to 36 hours depending on the chosen program.
- Optional concentrations in the PMBA program include acquisition and contract management, eBusiness, human resources management and information systems.
- Optional concentrations in the M.S. management program include acquisition and contract management, eBusiness, human resources management, information systems and logistics.

- Optional concentrations in the M.S. project management and M.S. systems management programs include information systems and operations research.
- Limited class size.
- Each course meets one evening per week to accommodate the full-time working professional.
- Program may be completed in two years (or less) or at the student's own pace.
- Florida Tech is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; (404) 679-4501) to award associate, baccalaureate, master's, education specialist, and doctoral degrees.

HOME PAGE

The site maintains a Web page at http://uc.fit.edu/es/redstone. The latest information regarding course offerings and class schedules can be found on this page.

VETERANS BENEFITS

The Alabama State Approving Agency has approved Florida Tech programs for veterans education benefits.

LIBRARY FACILITIES

Students may access the main Florida Tech library (Evans Library) via the Internet. The Library Information Network (LINK) provides access to the catalog of books, government publications and periodicals owned by the library as well as access to databases, full-text documents and Internet sites.

Redstone Scientific Information Center (RSIC)

The RSIC is a joint U.S. Army Missile Command/Marshall Space Flight Center, NASA facility. The library, which is located in 50,000 square feet of space in Building 4484, has more than 1,500,000 documents, books and bound journals of which 200,000 books and 70,000 periodicals are available to support Florida Tech course offerings. RSIC is the largest technical library in the Southeast.

The University of Alabama in Huntsville Library (UAH):

The UAH library contains more than 250,000 volumes of monographs and journals and more than 210,000 items, such as microfiche, federal documents, maps, technical reports and sound recordings. The library has open access stocks and is staffed by professional librarians. Florida Tech students may use all facilities and, by paying a modest annual fee, are granted withdrawal privileges.

Huntsville–Madison County Public Library

The main library is located at 915 Monroe Street. There are three branches located in the north, south, and west sections of the county. The main library holdings include more than 250,000 volumes and a special business reference section. It is open to all residents of Huntsville and Madison County.

All of the above libraries have periodicals and newspapers, such as *Fortune, Forbes, Business Week, The Wall Street Journal* and *Barron's,* along with many technical magazines and other publications. Also available to Florida Tech students are reader printers for microfiche/microfilm, videotapes, strips and other audiovisual equipment.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)*
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
June 12	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 24	Last day of classes
July 27–31	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT REDSTONE

BILLINGS, J.C., Adjunct Professor, Management. B.A., Lehigh University; M.B.A., Alabama A&M University; M.P.A., D.P.A., Nova Southeastern University.

CERNY, J.D., Adjunct Professor, Management. B.S., U.S. Military Academy; M.S., East Texas State University; D.P.A., Nova Southeastern University.

GULBRO, R.D., Adjunct Professor, Management. B.S., M.B.A., University of Alabama; D.B.A., Mississippi State University.

HOBBS, H.L., Adjunct Professor, Management. B.S. Troy State University; M.S., Murray State University; Ph.D., Pacific Western University.

HOWELL, L.W. Jr., Adjunct Professor, Management. B.S., Florida Institute of Technology; Ph.D., Virginia Polytechnic Institute and State University.

LESTER, R.A., Adjunct Professor, Management. B.S., University of North Alabama; M.A., University of Alabama; Ph.D., University of Mississippi.

LONSBERRY, M.W., Adjunct Professor, Contracts & Business Law. B.B.A., University of Arkansas-Monticello; J.D., South Texas College of Law.

MARSHALL, D.D., Adjunct Professor, Management. B.S., M.S., University of Tennessee; M.A., M.B.A., Ph.D., University of Alabama–Huntsville.

McCAIN, J.W., Adjunct Professor, Management. B.S.E., Auburn University; M.S., Ph.D., University of Alabama–Huntsville.

McELYEA, R.D., Adjunct Lecturer, Management. B.S., Athens State College; M.B.A., M.S., Florida Institute of Technology.

PIEPLOW, T.C., Adjunct Professor, Management. B.S., B.A., Northwestern University; M.B.A., Florida Institute of Technology; D.P.A., Nova Southeastern University.

RATHBUN, W., Adjunct Professor, Management. B.A., Bowling Green State University; J.D., University of Toledo College of Law.

SALLEY, D.D., Adjunct Professor, Management. M.A., Duke University; Ph.D., Georgia State University.

TRUEBLOOD, R.P., Adjunct Professor, Computer Science. B.S., Auburn University; M.S., University of Tennessee; Ph.D., Virginia Polytechnic Institute and State University.

WHITE, T.J., Professor, Management and Site Director. B.A., Vanderbilt University; M.S., M.A.S., University of Alabama-Huntsville; M.P.A., D.P.A., Nova Southeastern University.

WHITLEY, W.R., Adjunct Lecturer, Management. B.S., University of Alabama–Huntsville; M.B.A., University of Houston; Ed.D., University of Alabama–Tuscaloosa. (CPA, Alabama and Texas)

WILKES, W.W., Adjunct Professor, Management. B.S., Rensselaer Polytechnic Institute; M.B.A., University of Chicago; M.S., London School of Economics; D.A., Middle Tennessee State University.

SPACEPORT COMMUNICATION DIRECTORY

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Kennedy Space Center
(321) 453-2030

Rockledge
(321) 504-4142
(321) 504-6246 Fax

Office Hours
Kennedy Space Center
Friday 8 a.m.–4 p.m.

Rockledge
Monday - Thursday 8 a.m. - 5 p.m.

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Kennedy Space Center
Florida Tech Spaceport/KSC
Center for Space Education
(AMF Building)
M6-306, Room 2000 (NASA Parkway)
Kennedy Space Center, FL 32899

Rockledge
Florida Tech Spaceport/Rockledge
1290 Rockledge Blvd. (U.S. Hwy. 1)
Rockledge, FL 32955

DEGREE PROGRAMS IN RESIDENCE

Additional Degree Programs Available Via Distance Learning
http://uc.fit.edu/dl

Graduate Certificate Programs are available via Distance Learning, not in residence at the Florida Tech Spaceport site.

SPACEPORT

The graduate-level programs offered at KSC and Rockledge provide individuals the unique opportunity for conveniently continuing their education as part-time students to improve their professional and technical competence and to enhance their career development and progression.

Carrying a normal load of two courses each semester, a qualified student can earn a master's degree in approximately six semesters or two years (Completion of degree requirements may require taking courses at more than one teaching location).

ELIGIBILITY

Students can take courses at KSC, Rockledge, the main campus, via distance learning, or at the Melbourne site, providing flexibility in scheduling and a wider selection of electives from which to choose. Individuals designated as off-campus students will pay the off-campus student tuition for courses taken at KSC, Rockledge or via distance learning. Spaceport students who elect to take courses on the main campus or at the Melbourne site will pay the main campus rate.

REGISTRATION

Registration for KSC and Rockledge students is conducted each semester online beginning on the date scheduled in the academic calendar in this section. Students are strongly urged to register before classes begin. Under certain circumstances, students may be able to register through the second week of classes.

On-Campus Students: Melbourne students may not register at the KSC or Rockledge offices. They must register online or at the Melbourne campus for all courses.

TEXTBOOKS

Available textbooks will be sold through www.mbsdirect.net or through MBS DIRECT: (800) 325-3252.

On-Campus Courses: Textbooks for main-campus courses will not be available at the KSC or Rockledge offices; they must be purchased by students at the main campus bookstore. Parking fees are assessed each term for parking on campus.

STUDENT ID CARDS

May be ordered at branch offices at no cost to students. ID cards are required at the campus library and bookstore.

LIBRARIES

Government libraries are available for Florida Tech students through agreements with KSC and Rockledge. Florida Tech's Evans Library on the Melbourne campus is within reasonable driving distance. Most services (except checking out materials) can be accessed via the Library Information Network (LINK) Web page at www.lib.fit.edu/. Other libraries located in Brevard County are available to students. These include the college libraries at Brevard Community College/UCF in Cocoa, and Brevard Community College in Melbourne and Titusville. Finally, public libraries are located in Brevard County population centers and include a research library in Cocoa.

WEB SITES

It is strongly recommended that students with questions not answered in this catalog refer to one of the Web sites listed below.

- General university information/University Catalog: www.fit.edu
- University College/ Extended Studies Division: http://uc.fit.edu/es
- Spaceport: http://uc.fit.edu/es/spaceport
- Master's degree, Computer Science or Software Engineering: www.cs.fit.edu

Note: Information about master's degrees in computer information systems, space systems or space systems management, please refer to this catalog.

E-MAIL

All Florida Tech students are automatically assigned an fit.edu e-mail address. To access this information go to www.fit.edu and select "computing."

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Sept. 1	Holiday *(Labor Day)*
Oct. 13	Holiday *(Columbus Day)*
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 11	Holiday *(Veterans Day)* Observed
Nov. 27–28	Holiday *(Thanksgiving)*
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
May 25	Holiday *(Memorial Day)*
July 3	Last day to withdraw from a class with a final grade of W
July 4	Holiday *(Independence Day)*
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT SPACEPORT

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KOURSARIS, C.M., Adjunct Instructor, Computer Science. B.S., Southern University; M.S., Florida Institute of Technology.

MA, T.C., Adjunct Instructor, Space Systems. B.S., National Cheng-Kung University; M.E., Ph.D., University of Michigan.

KULONDA, D.J., Professor, Management and Site Director. B.I.E., Kettering University; M.I.E., Cornell University; Ph.D., North Carolina State University. (Registered Professional Engineer)

MENENDEZ, A., Adjunct Instructor, Space Systems. B.S., Florida Institute of Technology; M.S., Massachusetts Institute of Technology.

MITCHELL, J.C., Associate Professor, Space Systems. B.S., Massachusetts Institute of Technology; M.S., Florida Institute of Technology.

MYERS, K.J., Adjunct Instructor, Space Systems. B.S., University of Evansville; M.S., Wright State University; M.D., Indiana University.

OSTENDORP, A., Adjunct Instructor, Space Systems. B.S., New Mexico State University. M.S., Florida Institute of Technology.

PLATT, D., Program Director, Space Systems. B.S., Florida Institute of Technology; M.S., Western Connecticut State University.

SCHULTHESS, D.R., Adjunct Instructor, Space Systems. B.S., Brigham-Young University; M.S., Florida Institute of Technology.

SHAYKHIAN, G.A., Adjunct Instructor, Computer Science. B.S., M.S., University of Central Florida.

SPEAKER, E.E., Program Director, Space Systems. B.S., U.S. Naval Academy; M.S., Massachusetts Institute of Technology; Ph.D., University of Michigan.

SYNAKIEWICZ, M.R., Adjunct Instructor, Space Systems. B.A.S., M.A.S., Embry-Riddle Aeronautical University.

UNIVERSITY ALLIANCE COMMUNICATION DIRECTORY

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(888) 352-8324

Location
Florida Institute of Technology
University Alliance Programs
Quad 405 West Side
150 W. University Blvd.
Melbourne, FL 32901 (Main Campus)

DEGREE PROGRAM OFFERED ONLINE

This program is available online through University Alliance
www.floridatechonline.com

UNIVERSITY ALLIANCE

Florida Tech, in conjunction with its partner, University Alliance, offers working adults the opportunity to earn a degree anytime, at home, at work or while traveling. Online students are taught by Florida Tech professors, and earn the same quality education as main campus students. The program offers the flexibility to attend class when convenient, with no classroom attendance required, making it possible to pursue a degree, while continuing to work.

The Master of Science in Information Technology is a comprehensive degree that merges management and technology. The MS/IT is designed to help professionals in information technology (IT) fields and those in other fields gain expertise in the management of information technology. The program consists of 11 required courses (33 hours). Sessions begin every eight weeks, allowing faster completion than in traditional programs.

Through advanced Internet technology, students are immersed in a stimulating online learning environment that facilitates communication and collaboration among participants and faculty.

STREAMING VIDEO LECTURES

Students watch and listen to university professors deliver course materials online or on CD. The video lectures are designed for viewing as many times as needed.

INTERNET MESSAGE BOARDS

Students are also given the opportunity to interact with faculty and classmates on key topics, class assignments and more through Internet message boards.

CHAT ROOMS

In online chat rooms, instructors host virtual office hours that allow students to collaborate in real-time with faculty and classmates.

E-MAIL

Through e-mail, students have direct contact with professors and classmates.

ACADEMIC CALENDAR

Fall 1 – 2008

July 7	First day to register for Fall 1
Aug. 19	Last day to register for Fall 1 without a late fee
Aug. 27	Last day for Fall I confirmation of tuition or financial aid
Aug. 27	Last day to register for Fall 1 with a late fee
Sept. 1	CLASSES BEGIN (Monday)
Sept. 1	Holiday *(Labor Day)*
Sept. 1	First day to register for Fall 2
Sept. 7	Last day to withdraw with a full refund
Oct. 6	Holiday *(Columbus Day)*
Oct. 12	Last day to withdraw with a W with no refund
Oct. 24	Last day to file a Petition to Graduate for Spring 1 – 2009 without a late fee
Oct. 26	Last Day of Classes (Sunday)

Fall 2 – 2008

Sept. 1	First day to register for Fall 2
Oct. 14	Last day to register for Fall 2 without a late fee
Oct. 22	Last day for Fall 2 confirmation of tuition or financial aid
Oct. 22	Last day to register for Fall 2 with a late fee
Oct. 27	CLASSES BEGIN (Monday)
Oct. 27	First day to register for Spring 1
Nov. 2	Last day to withdraw with a full refund
Nov. 11	Holiday *(Veterans Day)* Observed
Nov. 26–28	Holiday *(Thanksgiving)*
Dec. 7	Last day to withdraw with a W with no refund
Dec. 19	Last day to file a Petition to Graduate for Spring 2 – 2009 without a late fee
Dec. 13	Fall Commencement Exercises
Dec. 21	Last Day of Classes (Sunday)

Spring 1 – 2009

Oct. 27	First day to register for Spring 1
Dec. 30	Last day to register for Spring 1 without a late fee
Jan. 7	Last day for Spring 1 confirmation of tuition or financial aid
Jan. 7	Last day to register for Spring 1 with a late fee
Jan. 12	CLASSES BEGIN (Monday)
Jan. 12	First day to register for Spring 2
Jan. 18	Last day to withdraw with a full refund
Jan. 19	Holiday *(Martin Luther King Jr. Day)*
Feb. 16	Holiday *(Presidents Day)*
Feb. 22	Last day to withdraw with a W with no refund
March 6	Last day to file a Petition to Graduate for Summer 1 – 2009 without a late fee
March 8	Last Day of Classes (Sunday)

Spring 2 – 2009

Jan. 12	First day to register for Spring 2
Feb. 24	Last day to register for Spring 2 without a late fee
March 4	Last day for Spring 2 confirmation of tuition or financial aid
March 4	Last day to register for Spring 2 with a late fee
March 9	CLASSES BEGIN (Monday)
March 9	First day to register for Summer 1
March 15	Last day to withdraw with a full refund
April 19	Last day to withdraw with a W with no refund
May 1	Last day to file a Petition to Graduate for Summer 2 – 2009 without a late fee
May 2	Spring Commencement Exercises
May 3	Last Day of Classes (Sunday)

Summer 1 – 2009

March 9	First day to register for Summer 1
April 21	Last day to register for Summer 1 without a late fee
April 29	Last day for Summer 1 confirmation of tuition or financial aid
April 29	Last day to register for Summer 1 with a late fee
May 4	CLASSES BEGIN (Monday)
May 4	First day to register for Summer 2
May 10	Last day to withdraw with a full refund
May 25	Holiday *(Memorial Day)*
June 14	Last day to withdraw with a W with no refund
June 26	Last day to file a Petition to Graduate for Fall 1 – 2009 without a late fee
June 28	Last Day of Classes (Sunday)

Summer 2 – 2009

May 4	First day to register for Summer 2
June 24	Last day to register for Summer 2 without a late fee
July 1	Last day for Spring 2 confirmation of tuition or financial aid
July 1	Last day to register for Summer 2 with a late fee
July 4	Holiday *(Independence Day)*
July 6	CLASSES BEGIN (Monday)
July 6	First day to register for Fall 1
July 12	Last day to withdraw with a full refund
August 16	Last day to withdraw with a W with no refund
June 26	Last day to file a Petition to Graduate for Fall 2 – 2009 without a late fee
Aug. 30	Last Day of Classes (Sunday)

Fall 1 – 2009

July 6	First day to register for Fall 1
Aug. 18	Last day to register for Fall 1 without a late fee
Aug. 26	Last day for Fall 1 confirmation of tuition or financial aid
Aug 26	Last day to register for Fall 1 with a late fee
Aug. 31	CLASSES BEGIN (Monday)
Aug. 31	First day to register for Fall 2
Sept. 6	Last day to withdraw with a full refund
Sept. 7	Holiday *(Labor Day)*
Oct. 11	Last day to withdraw with a W with no refund
Oct. 12	Holiday *(Columbus Day)*
Oct. 23	Last day to file a Petition to Graduate for Spring 1 – 2010 without a late fee
Oct 25	Last Day of Classes (Sunday)

VIRTUAL CAMPUS COMMUNICATION DIRECTORY

http://uc.fit.edu/dl/vc

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DEGREE PROGRAMS OFFERED ONLINE

VIRTUAL CAMPUS

The purpose of the Virtual Campus is to extend the educational opportunity to pursue graduate studies to individuals and groups who are unable to access traditional resident-based graduate programs.

The Virtual Campus offers complete master's degree programs in a total distance learning online environment. There is no requirement for U.S. residency.

Graduate credit certificate programs are also available online. See *Section 15* of this catalog for details about available graduate credit certificate programs.

Admission is open to all individuals who possess an undergraduate degree from a university or college that is regionally accredited in the United States. Individuals who possess a degree from other than a U.S. college or university may be admitted subject to conditions for international student enrollments.

Admission criteria are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

Visit our Web site at http://uc.fit.edu/dl to obtain information on current course schedules and technical requirements for participation in distance learning online courses.

By contractual agreement with University Alliance/Bisk Education Inc., the master's degree program in information technology is offered online exclusively through their proprietary course management system. Visit www.floridatechonline.com for more information about the master's degree program, and for enrollment and tuition information.

Go to http://uc.fit.edu/dl/schedule to see a two-year projection of online courses.

ACADEMIC CALENDAR

Fall 2008 (Aug. 25–Dec. 5)

July 7	Web Registration begins
Aug. 25	FALL SEMESTER BEGINS
Aug. 29	Last day to file a Petition to Graduate for Spring Semester 2009
Aug. 29	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
Oct. 31	Last day to withdraw from a class with a final grade of W
Nov. 28	Last day of classes
Dec. 1–5	Final Exams

Spring 2009 (Jan. 5–April 17)

Nov. 10	Web Registration begins
Jan. 5	SPRING SEMESTER BEGINS
Jan. 9	Last day to file a Petition to Graduate for Summer Semester 2009
Jan. 9	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
March 13	Last day to withdraw from a class with a final grade of W
April 3	Last day to file a Petition to Graduate for Fall Semester 2009
April 10	Last day of classes
April 13–17	Final Exams

Summer 2009 (April 27–Aug. 7)

March 9	Web Registration begins
April 27	SUMMER SEMESTER BEGINS
May 1	Last day to register, add a class, drop a class with a full tuition refund, or drop a class without receiving a grade of W
July 3	Last day to withdraw from a class with a final grade of W
July 31	Last day of classes
Aug. 3–7	Final Exams

Fall 2009 (Aug. 24–Dec. 4)

July 6	Web Registration begins
Aug. 24	FALL SEMESTER BEGINS

FACULTY AT VIRTUAL CAMPUS

CROSS, W.C., Adjunct Instructor. B.A., Kenyon College; M.B.A., Florida Institute of Technology; Ph.D., Nova Southeastern University.

DEMENT, D.F., Adjunct Instructor. B.S., M.A., Ph.D., University of Houston.

DeNIGRIS III, J., Adjunct Instructor. B.S., Indiana University; M.B.A., Orlando College; Ph.D., Walden University.

HARPER Jr., R.L., Adjunct Instructor. B.S.B.A., University of Maryland; M.B.A., New Hampshire College; D.B.A., Nova Southeastern University.

JACQUES, R.B., Adjunct Instructor. B.S., University of Massachusetts–Boston; M.S., Northeastern University.

KEEN, L., Adjunct Instructor. B.S., University of Miami; J.D., University of Florida.

PRICE, T.E., Adjunct Instructor. B.S., Penn State University; M.B.A., Ph.D., University of South Florida.

SPANGENBURG, J.M., Adjunct Instructor. B.A., St. Leo University; M.S., Troy University; M.A., Fielding Graduate School; Ph.D., Regent University.

THOMPSON, A.D., Adjunct Instructor. B.A., J.D., University of Hawaii–Manoa.

WIRTH Jr., E.D., Adjunct Instructor. A.B., Dartmouth College, M.B.A., Northwestern University; Ph.D., Walden University.

EXTENDED STUDIES DEGREE PROGRAMS

**Program is not available via distance learning. Visit our Web site at http://uc.fit.edu.*

***Program is offered online exclusively through University Alliance. Visit the Web site at www.floridatechonline.com.*

PROFESSIONAL MASTER OF BUSINESS ADMINISTRATION (PMBA)

(Code: 8391)

The Professional Master of Business Administration program provides graduates with the skills needed to be adaptable performers in current positions and the competencies needed for long-term career development. This program develops within managers the skills and techniques for team leadership coupled with integrity, social responsibility and a high degree of professionalism. This program is designed to meet the needs of three groups of people:

1. Individuals whose careers have previously focused on specialized areas and who seek to develop a more generalist perspective in anticipation of advancement.
2. Individuals with work experience and business degrees who wish to build on that foundation for further advancement.
3. Individuals with limited work experience who plan to use the PMBA as a foundation on which to begin their careers.

The goal of the PMBA is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in business administration and identified concentration areas.

ADMISSION REQUIREMENTS

The applicant to the PMBA program must have a bachelor's degree from an accredited college with an acceptable grade point average and a satisfactory score on the Graduate Management Admission Test (GMAT). General admission requirements and the process for applying are presented in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

DEGREE REQUIREMENTS

The Professional Master of Business Administration degree, with or without a concentration, is conferred upon students who have successfully completed 36 credit hours of core and elective courses as listed on the student's approved graduate program plan. Additional prerequisite courses may be required depending on the applicant's undergraduate preparation.

CURRICULUM

All PMBA options require completion of a common set of nine core courses that are designed to prepare the student for an ever-changing, dynamic organizational environment. The student must complete the prerequisite requirements, if any, before completing nine credit hours of core courses, or enrolling in a core course for which a prerequisite course is needed.

Prerequisite Courses (noncredit for this program)
Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed courses in these prerequisite areas. The exact number of prerequisite courses is dependent on courses completed during the student's undergraduate studies.

MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MGT 5006 Introductory Managerial Statistics
MGT 5021 Business Law
MGT 5022 Analytical Methods for Management
MGT 5132 Basic Economics (or two undergraduate economics courses)

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Core Requirements (9 courses) 27
MGT 5001 Managerial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5011 Management Theory and Thought 3
or
MGT 5013 Organizational Behavior 3
or
MGT 5015 Organizational Planning and Development 3
MGT 5014 Information Systems 3
MGT 5018 Policy and Strategy for Business* 3
MGT 5019 Marketing Management 3
MGT 5071 Decision Theory 3
or
MGT 5007 Intermediate Managerial Statistics 3
MGT 5133 Advanced Analytical Methods for Management 3
MGT 5149 Economics for Business 3

Electives (3 courses) 9

TOTAL CREDITS REQUIRED 36

**Serves as the capstone course for this program.*

GENERAL PMBA

In addition to the nine core courses, students electing the PMBA without a designated concentration are also required to take three elective courses. Electives may be taken with approval of both the faculty adviser and academic unit head from other graduate-level offerings.

Concentration in Acquisition and Contract Management (PMBA-ACM)

(Code: 8397)

In addition to the nine core courses, students electing the PMBA with a concentration in acquisition and contract management are also required to take three elective courses. This degree option is for those students who are interested in contracts management.

Core Requirements (9 courses) 27

Electives (3 courses) 9
These electives must be selected from the MGT 52XX (MGT 5211 to MGT 5270) list of contracts courses.

TOTAL CREDITS REQUIRED 36

Concentration in eBusiness (PMBA-eBUS)

(Code: 8356)

In addition to the nine core courses, students electing the PMBA with a concentration in eBusiness are also required to take three elective courses. This degree option is for those students who are interested in eBusiness.

Core Requirements (9 courses) 27

Electives (3 courses) 9
MGT 5160 Introduction to eBusiness 3
MGT 5161 Policy and Organizational Strategies for eBusiness 3
MGT 5162 Survey of Information Technologies for eBusiness 3
MGT 5163 Marketing in an Internet-based Environment 3
MGT 5165 Special Topics in eBusiness 3
MGT 5166 Projects in eBusiness 3

TOTAL CREDITS REQUIRED 36

Concentration in Human Resources Management (PMBA-HRM)
(Code: 8400)

In addition to the nine core courses, students electing the PMBA with a concentration in human resources management are also required to take three elective courses. This degree option is for those students who are interested in human resources management.

Core Requirements (9 courses) 27

Electives (3 courses) 9
MGT 5015 Organizational Planning and Development 3
MGT 5016 Employee Relations 3
MGT 5033 Human Resources Management 3
MGT 5101 Leadership Theory and Effective Management 3
MGT 5105 Interpersonal Relations and Conflict Resolution 3
MGT 5106 Organizational Communication 3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management 3
MGT 5138 Business Ethics 3

TOTAL CREDITS REQUIRED 36

Concentration in Information Systems (PMBA-IS)
(Code: 8396)

In addition to the nine core courses, students electing the PMBA with a concentration in information systems are also required to take three elective courses. This degree option is for those students who are interested in information systems management.

Core Requirements (9 courses) 27

Electives (3 courses) 9
MGT 5070 Special Topics in Business 3
MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3
MGT 5153 Telecommunications Systems Management 3
MGT 5154 Advanced Management Information Systems 3

TOTAL CREDITS REQUIRED 36

MASTER OF PUBLIC ADMINISTRATION (MPA)

(Code: 8401)

ADMISSIONS REQUIREMENTS

The applicant to the Master of Public Administration program must have a bachelor's degree from a regionally accredited university. The bachelor's degree need not be in public or business administration; however, applicants may be assigned academic prerequisites to complete based on deficiencies in their undergraduate studies preparation.

The Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Public Administration is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in public administration.

DEGREE REQUIREMENTS

The MPA is conferred on students who have successfully completed 36 credit hours of graduate work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students who do not select an area of concentration may choose elective courses with the approval of both the faculty adviser and the academic unit head.

Program Prerequisites (noncredit for this program)
MTH 1701 College Algebra
MGT 5000 Financial Accounting (or two undergraduate accounting courses)

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses)..... 27
MGT 5001 Managerial Accounting..... 3
MGT 5003 Public Finance..... 3
MGT 5006 Introductory Managerial Statistics..... 3
MGT 5010 Seminar in Research Methodology..... 3
MGT 5013 Organizational Behavior..... 3
MGT 5014 Information Systems..... 3
MGT 5035 Public Administration and Management..... 3
MGT 5040 Public Program Policy and Evaluation*..... 3
MGT 5132 Basic Economics..... 3

Electives (3 courses)..... 9

TOTAL CREDITS REQUIRED 36

**Serves as the capstone course for this program.*

Students who do not select an area of concentration may choose electives from other graduate-level offerings in business, or other related disciplines, with the approval from both the faculty adviser and the cognizant academic unit head.

MASTER OF SCIENCE IN ACQUISITION AND CONTRACT MANAGEMENT (MS/ACM)

(Code: 8399)

The Master of Science in Acquisition and Contract Management is designed for adult working professionals in the public and private sectors of acquisition and contract management. The curriculum provides coverage of federal procurement practices, current issues in contracting and contract administration, legal and financial aspects of government contracting and policy issues associated with acquisition and contract management. Individuals without current experience in acquisition and contract management may be accepted into this program; however, all program prerequisite courses must be fulfilled.

The goal of the Master of Science in Acquisition and Contract Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in acquisition and contract administration.

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Acquisition and Contract Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive the program prerequisite requirements in the MS/ACM program based on an evaluation of their undergraduate

academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

DEGREE REQUIREMENTS

The degree of Master of Science in Acquisition and Contract Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from those listed below.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those courses.

Program Prerequisites (noncredit for this program)
MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MGT 5132 Basic Economics (or two undergraduate economics courses)

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses) 27
MGT 5001 Managerial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5013 Organizational Behavior 3
MGT 5211 Procurement and Contract Management 3
MGT 5213 Contract Changes, Terminations and Disputes 3
MGT 5214 Cost Principles, Effectiveness and Control 3
MGT 5217 Contract and Subcontract Formulation 3
MGT 5218 Contract Negotiations and Incentive Contracts 3
MGT 5220 Contract Management Research Seminar* 3

Electives (2 courses) 6
MGT 5017 Program Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5084 Materiel Acquisition Management 3
MGT 5138 Business Ethics 3
MGT 5212 Advanced Procurement and Contract Management 3
MGT 5240 Business and Legal Aspects of Intellectual Property 3
MGT 5231 Government Contract Law 3
MGT 5270 Special Topics in Contracts Management 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Note: Electives may be taken with the approval of both the faculty adviser and the program head from other graduate-level offerings in University College, or other colleges or academic units.

MASTER OF SCIENCE IN AEROSPACE ENGINEERING (MS/AE)

(Code: 8134)

The master of science degree can be earned in one of three major areas: aerodynamics and fluid dynamics, aerospace structures and materials, and combustion and propulsion. Because the purpose of each program is to prepare the student for either a challenging professional career in industry or for further graduate study, the programs do not permit narrow specialization. Emphasis is on required course work in several disciplines in which an advanced-degree engineer in a typical industrial position is expected to have knowledge and problem-solving expertise beyond that normally obtained during an undergraduate engineering education.

The master of science degree can be earned on either a full-time or a part-time basis. Full-time students can complete the program in a minimum of three semesters (four in the case of graduate student assistants). Students beginning their course work during the spring semester will be able to register for full course loads, although the commencement of thesis work will normally be delayed.

ADMISSION REQUIREMENTS

An applicant should have an undergraduate major in a field related to aerospace engineering. Applicants whose bachelor's degrees are in other fields are normally required to take some undergraduate course work in addition to the program described below, as determined by the department head. Applications are also invited from graduates with undergraduate majors in the physical sciences or mathematics. In these cases, at least one year of undergraduate course work in aerospace engineering is normally required before starting the master of science program. In evaluating an international application, due consideration is given to academic standards in the country where the undergraduate studies have been performed.

Master's applicants should take the Graduate Record Examination (GRE) General Test. Applicants from foreign countries must meet the same requirements as applicants from the United States.

Master's applicants should take the Graduate Record Examination (GRE) General Test. General admission requirements and the process for applying are presented in *Section 1* of this catalog.

DEGREE REQUIREMENTS

The Master of Science in Aerospace Engineering is offered with both thesis and nonthesis options. Each option requires a minimum of 30 credit hours of course work. Prior to the completion of nine credit hours, the student must submit for approval a master's degree program plan to indicate the path chosen and the specific courses to be taken. For the thesis option, up to six credit hours of thesis work may be included in the 30 credit hours' requirement. The thesis can be primarily analytical, computational or experimental; or it can be some combination of these. In each case, students must demonstrate the ability to read the appropriate engineering literature, to learn independently and to express themselves well technically, both orally and in writing. For the nonthesis option, a student may replace the thesis with additional elective courses and a final program examination, following approval of a written petition submitted to the department head. Generally, students wishing to pursue an academic career are encouraged to choose the thesis option.

CURRICULUM

The program of study leading to the master's degree in aerospace engineering is offered in the three listed areas of specialization. The minimum program requirements consists of nine credit hours of core courses, six credit hours of mathematics and 15 credit hours (which

may include six credit hours of thesis) of electives. Within the 15 credit hours of electives, six credit hours of course work are restricted electives. The department maintains a list of restricted electives for each specialization.

The nine credit hours of core courses must be chosen in consultation with the student's adviser from one of the lists below.

Aerodynamics and Fluid Dynamics
MAE 5110 Continuum Mechanics
MAE 5120 Aerodynamics of Wings and Bodies
MAE 5130 Viscous Flows
MAE 5140 Experimental Fluid Dynamics
MAE 5150 Computational Fluid Dynamics
MAE 5180 Turbulent Flows

Aerospace Structures and Materials
MAE 5050 Finite Element Fundamentals
MAE 5410 Elasticity
MAE 5430 Design of Aerospace Structures
MAE 5460 Fracture Mechanics and Fatigue of Materials
MAE 5470 Principles of Composite Materials
MAE 5480 Structural Dynamics

Combustion and Propulsion
MAE 5130 Viscous Flows
MAE 5150 Computational Fluid Dynamics
MAE 5310 Combustion Fundamentals
MAE 5320 Internal Combustion Engines
MAE 5350 Gas Turbines
MAE 5360 Hypersonic Air-breathing Engines

Electives are selected from these course offerings and appropriate courses in mathematics, in consultation with the student's adviser and committee. The topics of emphasis for aerospace engineering in the three areas of specialization include aerodynamics, computational fluid dynamics, experimental fluid dynamics, flow instability theory, combustion, aerospace propulsion and power, aerospace structures, composite materials, fracture mechanics and fatigue of materials.

MASTER OF SCIENCE IN COMPUTER INFORMATION SYSTEMS (MS/CIS)

(Code: 8372)
The Master of Science in Computer Information Systems is designed for students who seek a degree that prepares them for positions in organizations that design, develop or use computer systems. It is for students who do not necessarily have a bachelor's degree in computer science but who wish to obtain advanced training with special emphasis on component engineering, object-oriented design and analysis, and the building and maintenance of data-driven systems. The objective of the program is to meet the demand for information systems skills and to provide a path for professionals from diverse fields to rapidly transition to computer information systems career paths. The M.S. in computer information systems is also available in a complete online distance-learning mode through the Virtual Campus.

ADMISSION REQUIREMENTS

An applicant for the master's program in computer information systems is not required to have a bachelor's degree in computer science, but should have a background that includes mathematical proficiency beyond the level of college algebra. The GRE test is not required for admission into this degree program, but in those rare cases where the applicants' abilities are not clear, the program chair reserves the right to require it.

General admission requirements and the process for applying are discussed in *Section 1* of this catalog.

DEGREE REQUIREMENTS

The Master of Science in Computer Information Systems requires a minimum of 30 credit hours, as follows:

Required Courses (5 courses)..... 15
CIS 5080 Projects in CIS* 3
CIS 5100 Data Structures and Programming..... 3
CIS 5200 Advanced Programming 3
CIS 5220 Computer Organization..... 3
CIS 5230 Operating Systems..... 3

Electives (at least 6 credit hours in CIS, CSE or SWE courses) 15

**Serves as the capstone course for this program.*

A student who can verify competence in any required course may substitute an appropriate course with the permission of the appropriate site director and the program chair. Recommended electives include any BUS, CIS, CSE, ECE, MGT, MTH, ORP, SWE or SWE courses approved by the student's adviser and the program chair.

All students must take and complete the program capstone course, Projects in Computer Information Systems (CIS 5080), to graduate.

MASTER OF SCIENCE IN COMPUTER SCIENCE (MS/CS)

(Code: 8071)

This program offers a student the opportunity to pursue advanced studies in various areas of computer science. The program is designed for students with bachelor's degrees in computer science and provides a solid preparation for those who may pursue a doctorate. Master's students are encouraged to concentrate their studies in research areas of interest to faculty in the department.

ADMISSION REQUIREMENTS

Applicants must have taken courses in differential and integral calculus, discrete mathematics, statistics and data structures and algorithms, as well as at least 12 semester credit hours of advanced course work in undergraduate computer science. Admission may be granted with the stipulation that deficiencies are made up by taking the necessary extra courses. Graduate Record Examination scores (General Test only) are required.

DEGREE REQUIREMENTS

The Master of Science in Computer Science requires a minimum of 30 credit hours of approved graduate study. Students are encouraged to complete and successfully defend a thesis. Students who decide not to write a thesis must pass a final program examination.

To ensure students are exposed to a variety of areas in computer science, they must pass one course in each of three categories: applications, foundations, and software and systems, as listed below:

Applications
CSE 5260 Database Systems
CSE 5280 Computer Graphics
CSE 5290 Artificial Intelligence

Foundations

CSE 5210 Formal Languages and Automata Theory
CSE 5211 Analysis of Algorithms

Software and Systems

CSE 5231 Computer Networks
CSE 5251 Compiler Theory and Design
SWE 5001 Software Engineering 1

Students are exempted from this breadth requirement only if they can show evidence that they have passed courses equivalent to all of those on the category lists. A listed course can be replaced by another appropriate course only with permission of the student's adviser and department head.

The other course requirements are:

CSE	5500	Computer Science Seminar*	0
	or		
CSE	5501	Computer Sciences Internship*	0
CSE	5999	Thesis in Computer Science or Advanced Electives (CSE 5600 or higher)	6
		Electives (at least 6 credit hours must be in Computer Science, numbered CSE 5600 or higher)	12
MTH	5051	Applied Discrete Mathematics	3

** All students are required to register for Computer Science Seminar (CSE 5500) or Computer Sciences Internship (CSE 5501) twice during the degree program. The internship is completed with an information technology firm or industrial organization and is provided for students with no prior experience in a practical information technology setting.*

All electives that apply to the program must be approved by the student's adviser. The computer science office maintains an approved set of courses, including courses in other disciplines, from which electives can be selected. At most, six approved elective credits can be from other disciplines.

The department excels in several specializations of computer science, for example, computer security, computational intelligence and software testing. Students are encouraged to concentrate in one of these areas by careful selection of elective cou

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING (MS/EE)

(Code: 8042)

The master of science program can be taken on either a full-time or part-time basis. A two-year projection of course offerings is available on request. Course offerings are arranged to permit the master's program to be completed in three semesters for full-time students and in two calendar years for part-time students.

ADMISSION REQUIREMENTS

The undergraduate backgrounds of applicants for admission to the master's degree programs vary considerably. An applicant from a U.S. school should have a bachelor of science or equivalent degree from an electrical engineering program accredited by ABET. In evaluating an international application, consideration is given to academic standards of the school attended and the content of the courses leading to the degree obtained.

Applicants whose bachelor's degrees are in other engineering fields, mathematics, or the physical sciences may be accepted, but will be required to remedy any deficiencies by satisfactorily completing a number of undergraduate courses in preparation for graduate study in electrical engineering.

DEGREE REQUIREMENTS

The Master of Science in Electrical Engineering is offered with both thesis and nonthesis degree paths. Each requires a minimum of 30 credit hours of approved graduate study; however, course choices vary considerably depending on the student's area of interest. Prior to the completion of nine credit hours, a student must submit for approval a master's degree program plan to indicate the path chosen and the specific courses to be taken. Up to six credit hours of thesis may be included in the 30-credit-hour requirement. A nonthesis candidate must pass the master's final program examination. The master's final program exam measures the student's understanding of the technical concentration area they have chosen and corresponds to the department research areas.

CURRICULUM

To earn the master of science degree, the student must complete an approved program plan for a total of 30 credit hours. The program may be tailored to a specific area of study or it may follow the requirements for one of the available specialization areas. The program plan must include at least five ECE 5000-level courses, three of which are all from either the 51xx, 52xx or 53xx level. The program plan must also include at least two courses with the MTH (mathematics) or PHY (physics) prefix at the graduate-level (5000-level or above).

Electromagnetics

This area of specialization provides a background in applied and computational electromagnetics. Students develop analytical and computational tools needed to understand and solve for complex field interactions including antennas and radiating structures, radar, field and wave propagation, scattering and interaction with materials. The curriculum requirements are provided as follows:

ECE	5410	Electrodynamics 1	3
ECE	5425	Antennas 1	3
ECE	5431	Computational Electromagnetics	3
		Approved electives (may include 6 credits of thesis)	21
		TOTAL CREDIT HOURS REQUIRED	30

Photonics

Recent advances in optical communications and sensing have been largely due to the development of photonic devices and systems. This specialization is oriented to both devices and systems encompassing a wide range of areas including fiber-optic communication and sensing, lasers and laser system applications, and optical computing and signal processing. The study and research of these advanced devices and systems comprise the direction of this program.

Students are highly recommended to take the following three introductory courses:

ECE	5301	Semiconductor Device Theory	3
ECE	5350	Optical Electronics	3
ECE	5351	Optical Communication Systems	3
		Approved electives (may include 6 credit hours of thesis)	21
		TOTAL CREDIT HOURS REQUIRED	30

Recommended Electives

ECE	5311	Microelectronics Fabrication Laboratory
ECE	5333	Analog IC Design
ECE	5352	Fiber-optic Sensor Systems
ECE	5354	Acoustooptic and Electrooptic Devices
ECE	5355	Electrooptics Laboratory
ECE	5356	Optical Waveguides and Devices
ECE	5410	Electrodynamics 1

ECE 5418 Field Theory of Guided Waves 1
MTH 5201 Mathematical Methods in Science and Engineering
MTH 5202 Mathematical Methods in Science and Engineering 2
PHY 5020 Optics

Systems and Information Processing

Within this area of specialization, courses are selected to allow concentrations in areas that include systems, digital signal and image processing, neural networks and controls. Each student plans program of study with a member of faculty whose professional field is related to student's interest. Curriculum requirements for this area are provided as follows.

ECE 5201 Linear Systems 1 3
ECE 5234 Communication Theory 3
or
ECE 5223 Digital Communications 3
ECE 5245 Digital Signal Processing 1 3
MTH 5425 Theory of Stochastic Signals 3
Mathematics Elective 3
Approved Electives (may include 6 credits of thesis) 15
TOTAL CREDIT HOURS REQUIRED 30

Wireless Systems and Technology

This area is focused on technologies surrounding wireless communication. It covers a wide range of topics both on the system level and the component level. On the system level, some of the studied areas include 2G and 3G cellular communication systems, wireless sensor networks, radars systems, smart antenna and MIMO communication systems, multi-media communication, radars, WLAN and WiMAX. On the component level, this specialization covers topics in electronics, electromagnetics and antenna design. Additionally, enabling signal processing, linear system theory and radio propagation topics are covered. The curriculum requirements are separated into two parts as follows:

All courses from the core curriculum list 15
Approved electives (may include 6 credit hours of thesis) 15
TOTAL CREDIT HOURS REQUIRED 30

Core Curriculum

ECE 5111 Radio Frequency Propagation 3
ECE 5201 Linear Systems 3
ECE 5234 Communication Theory 3
ECE 5245 Digital Signal Processing 1 3
ECE 5555 Wavelet Transforms 3
MTH 5425 Theory of Stochastic Signals 3

Recommended Electives

ECE 5113 Wireless Local Area Networks
ECE 5115 Modern Wireless System Design
ECE 5117 Multimedia Communications
ECE 5118 Wireless Sensor Systems
ECE 5221 Personal Communication Systems
ECE 5223 Digital Communications
ECE 5238 Error Control Coding
ECE 5246 Digital Signal Processing 2
ECE 5248 Advanced Filtering
ECE 5251 Radar Systems
ECE 5333 Analog IC design
ECE 5418 Field Theory of Guided Waves
ECE 5425 Antennas 1
ECE 5426 Antennas 2
ECE 5450 Automated RF Measurements
ECE 5451 Microwave Circuit Design

With an approval of student's adviser other 5000-level courses may be added to the list of the approved electives.

PROGRAM FOR GRADUATES FROM OTHER FIELDS

A student admitted to this program is expected to have a bachelor's degree from a regionally accredited institution or the equivalent, with an undergraduate major in an engineering discipline, mathematics or the physical sciences, and an academic and/or professional record indicating a high probability of success in graduate work. Preparatory courses may be required to provide a student with the background necessary for successful graduate study. Depending on the individual's background, other courses (e.g., differential equations and linear algebra) may also be required. Proficiency in these areas may be demonstrated by either successful course completion or by passing an equivalency examination. When possible, a student will be notified of deficiencies at the time of acceptance. In addition to the preparatory work described, all degree requirements listed above must be fulfilled.

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT (MS/EM)

(Code: 8075)

The Master of Science in Engineering Management has been developed to meet the professional needs of the engineer who, although working in a technical field, finds it necessary to update his or her skills in engineering, as well as acquire knowledge in the management of engineering. Typically, the technical person finds that as he or she advances in the chosen field, the challenges of management increase as part of the overall responsibilities of the position. Many find that their careers would best be served by a program addressing both areas of their job responsibilities. This interdisciplinary program is designed for those individuals.

ADMISSION REQUIREMENTS

An applicant for the master's program in engineering management should have a bachelor's degree from an ABET-accredited engineering program. Applicants with bachelor's degrees in physical sciences, computer science and mathematics will also be considered. In evaluating an international application, consideration is given to the academic standards of the school attended and the content of the courses. Letters of recommendation and a statement of educational objectives reflecting the applicant's professional experience and career goals are encouraged. Applicants should also take the Graduate Record Examination (GRE).

General admission requirements and the process for applying are discussed in *Section 1* of this catalog.

DEGREE REQUIREMENTS

The master of science degree requires a minimum of 30 credit hours. Courses taken to satisfy admission prerequisites cannot be counted toward the degree requirements. Students without adequate undergraduate courses in accounting, statistics, linear algebra, differential equations, computer applications and economics will be required to make up these deficiencies. Applicants whose bachelor's degrees are not in engineering will also be required to remedy any additional deficiencies by satisfactorily completing a number of undergraduate courses selected to meet the prerequisites for graduate study in their engineering area of specialization.

CURRICULUM

The program requires five courses from the management area and five courses from the engineering or technical area. At least four courses should be taken from the engineering management (ENM) list and can be applied toward either the management or engineering

requirement. The ENM course list includes courses that are considered engineering and/or management. Faculty will assist the student with the selection of courses.

Management
Five courses with a clear focus on management are required. These courses may be from the foundation, core or elective courses offered by the College of Business; courses with a management emphasis from the ENM course list; or from other academic units in the university. Each student meets with a designated adviser with expertise in the field of management to select the five-course management sequence. A student must meet any prerequisites needed for a graduate course in management that may be required by the academic unit that offers the course.

Engineering
An engineering specialization is taken by every student based on his or her need for graduate education in technology. A specialization track can be drawn from any of the programs within the College of Engineering or closely allied disciplines such as mathematics or operations research. Some engineering courses may be selected from the ENM course list. Each student meets with a designated adviser familiar with the area of technical emphasis to form a sequence of five courses. A student must meet any prerequisites listed for a graduate engineering course.

A full-time student may complete an internship with an industrial, government or service organization, or elect to prepare and defend a thesis to account for up to six credit hours of the 30 credit hours required for graduation. In order to meet graduation requirements, a nonthesis student must present a portfolio of competencies and a summary of the career relevance of his or her academic study as part of the master's final program examination.

MASTER OF SCIENCE IN HUMAN RESOURCES MANAGEMENT (MS/HRM)

(Code: 8350)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Human Resources Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive some or all of the program prerequisites in the MS/HRM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Human Resources Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in human resources management.

DEGREE REQUIREMENTS

The degree of Master of Science in Human Resources Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from those listed below.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MGT 5132 Basic Economics (or two undergraduate economics courses)
MTH 1701 College Algebra

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses) 27
MGT 5001 Managerial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5013 Organizational Behavior 3
MGT 5014 Information Systems 3
MGT 5015 Organizational Planning and Development 3
MGT 5033 Human Resources Management 3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management* 3
MGT 5138 Business Ethics 3

Electives (2 courses) 6
MGT 5016 Employee Relations 3
MGT 5021 Business Law 3
MGT 5101 Leadership Theory and Effective Management 3
MGT 5105 Interpersonal Relations and Conflict Resolution 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Note: Electives may be taken with approval of both the faculty adviser and program head from other graduate-level offerings in University College or the College of Psychology and Liberal Arts.

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY (MS/IT)

(Code: 8420)

ADMISSION REQUIREMENTS

The applicant to the program must have a bachelor's degree from an accredited institution; however, the degree need not be in business administration. Students who are graduates from other fields, especially mathematics, science and engineering, are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive up to 12 hours of the program prerequisites in the MS/IT program based on an evaluation of their undergraduate academic transcripts.

DEGREE REQUIREMENTS

Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies. Students are not required to take the GRE to be accepted into the program.

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5013 Organizational Behavior 3
MGT 5014 Information Systems 3
MGT 5113 Project Management for Information Technology 3
MGT 5114 Introduction to Information Security Management 3
MGT 5115 Global IT Management 3
MGT 5154 Advances Management Information Systems* 3

Directed Electives (3 courses) 9
MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*
This program is available online through University Alliance (www.floridatechonline.com)

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT (MS/LM)

(Code: 8322)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Logistics Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive the program prerequisite in the MS/LM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Logistics Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in logistics management.

DEGREE REQUIREMENTS

The degree of Master of Science in Logistics Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete the program prerequisites. Students may choose elective courses from several of the management or related academic disciplines by securing approval of both their faculty adviser and academic unit head.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MTH 1701 College Algebra

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses) 27
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5014 Management Information Systems 3
MGT 5024 Production and Operations Management 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5062 Logistics Policy* 3
MGT 5071 Decision Theory 3
MGT 5100 Distribution Management 3
MGT 5132 Basic Economics 3

Electives (2 courses) 6
MGT 5010 Seminar in Research Methodology** 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5060 Management of Assets 3
MGT 5063 Inventory Control Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5065 Supply Chain Management 3
MGT 5069 Advanced Supply Chain Management 3
MGT 5079 Traffic Management 3
MGT 5084 Material Acquisition Management 3
MGT 5087 Transportation Management 3
MGT 5500 Integrated Logistics Management 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

***Students in the LEDC Cooperative Degree program must take MGT 5010 as one of their elective courses.*

Note: Electives may be taken with approval of both the faculty adviser and program head from other graduate-level offerings in other colleges or academic units.

MASTER OF SCIENCE IN MANAGEMENT (MS/M)

(Code: 8381)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive the program prerequisite in the MSM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in management and identified concentration areas.

DEGREE REQUIREMENTS

The degree of Master of Science in Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses with the approval of both the faculty adviser and the program head.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisite (noncredit for this program)
MTH 1701 College Algebra

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses) 27
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5020 Applied Management Project** 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Electives (2 courses) 6
These electives can be chosen from those courses offered to emphasize the area of greatest interest and benefit to the student.

TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Note: Electives may be taken with approval from both the faculty adviser and the program head from other graduate-level offerings in other colleges or academic units.

Concentration in Acquisition and Contract Management (MS/M-ACM)

(Code: 8403)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5220 Contract Management Research Seminar** 3

Electives (2 courses selected from concentration) 6
MGT 5070 Special Topics in Business 3
MGT 5084 Materiel Acquisition Management 3

MGT 5211 Procurement and Contract Management 3
MGT 5212 Advanced Procurement and Contract Management 3
MGT 5213 Contract Changes, Terminations and Disputes 3
MGT 5214 Cost Principles, Effectiveness and Control 3
MGT 5217 Contract and Subcontract Formulation 3
MGT 5218 Contract Negotiations and Incentive Contracts 3
MGT 5231 Government Contract Law 3
MGT 5240 Business and Legal Aspects of Intellectual Property 3
MGT 5270 Special Topics in Contract Management 3

TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Concentration in eBusiness (MS/M-eBUS)

(Code: 8404)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5019 Marketing 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5020 Applied Management Project** 3

Electives (2 courses selected from concentration) 6
MGT 5160 Introduction to eBusiness 3
MGT 5161 Policy and Organizational Strategies for eBusiness 3
MGT 5162 Survey of Information Technologies for eBusiness 3
MGT 5163 Marketing in an Internet-based Environment 3
MGT 5165 Special Topics in eBusiness 3
MGT 5166 Projects in eBusiness 3

TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Concentration in Human Resources Management (MS/M-HRM)

(Code: 8405)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management** 3

Electives (2 courses selected from concentration) 6
MGT 5016 Employee Relations 3
MGT 5021 Business Law 3
MGT 5070 Special Topics in Business 3

MGT 5101 Leadership Theory and Effective Management 3
MGT 5105 Interpersonal Relations and Conflict Resolution 3
MGT 5138 Business Ethics 3
TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Concentration in Information Systems (MS/M-IS)

(Code: 8406)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5020 Applied Management Project** 3

Electives (2 courses) 6
MGT 5070 Special Topics in Business 3
MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3
MGT 5153 Telecommunications Systems Management 3
MGT 5154 Advanced Management Information Systems 3
TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Concentration in Logistics Management (MS/M-LM)

(Code: 8407)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5062 Logistics Policy** 3

Electives (2 courses selected from concentration) 6
MGT 5024 Production and Operations Management 3
MGT 5060 Management of Assets 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5065 Supply Chain Management 3
MGT 5066 Systems Analysis and Modeling 3
MGT 5069 Advanced Supply Chain Management 3
MGT 5070 Special Topics in Business 3

MGT 5084 Materiel Acquisition Management 3
MGT 5100 Distribution Management 3
MGT 5211 Procurement and Contract Management 3
TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Concentration in Transportation Management (MS/M-TM)

(Code: 8408)

Program Prerequisites *(See Note 1)*

Required Courses (8 courses) 24
MGT 5000 Financial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5011 Management Theory and Thought* 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3

Directed Elective (1 course) 3
MGT 5020 Applied Management Project** 3

Electives (2 courses selected from concentration) 6
MGT 5060 Management of Assets 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5079 Traffic Management 3
MGT 5087 Management of Transportation Systems 3
MGT 5101 Leadership Theory and Effective Management 3
MGT 5138 Business Ethics 3
TOTAL CREDITS REQUIRED 33

**May substitute MGT 5013 or MGT 5015 with adviser's permission.*

***Serves as the capstone course for this program.*

Note 1: Prerequisite for all MS/M programs is College Algebra (MTH 1701).

MASTER OF SCIENCE IN MATERIEL ACQUISITION MANAGEMENT (MS/MAM)

(Code: 8320)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Materiel Acquisition Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive up to six hours of the program prerequisites in the MS/MAM program based on an evaluation of their undergraduate course work. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Materiel Acquisition Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in materiel acquisition management.

DEGREE REQUIREMENTS

The degree of Master of Science in Materiel Acquisition Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from several of the management or related academic disciplines by securing approval of both their faculty adviser and academic unit head.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MTH 1701 College Algebra

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College, or by completing a suitable computer course.

Required Courses (8 courses) 24
MGT 5001 Managerial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5006 Introductory Managerial Statistics 3
MGT 5017 Program Management 3
MGT 5033 Human Resources Management 3
MGT 5132 Basic Economics 3
MGT 5071 Decision Theory 3
or
ORP 5030 Decision Analysis 3
MGT 5084 Materiel Acquisition Management* 3
or
MGT 5211 Procurement and Contract Management 3

Electives (3 courses) 9
These electives can be chosen to emphasize the area of greatest interest and benefit to the student.
TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Note 1: Electives may be taken with approval of both the faculty adviser and the program head from other graduate-level offerings in other colleges or academic units.

Note 2: Seminar in Research Methodology (MGT 5010) will be selected as one of the electives for all fully funded U.S. Army officers at the Fort Lee site.

MASTER OF SCIENCE IN MECHANICAL ENGINEERING (MS/ME)

(Code: 8131)

All master of science options can be earned on either a full-time or a part-time basis. A two-year projection of course offerings is available on request. Course offerings are arranged to permit the master's program to be completed by full-time students in a maximum of two calendar years.

ADMISSION REQUIREMENTS

The undergraduate backgrounds of applicants for admission to the master's degree (MS/ME) programs vary considerably. For this reason, a variety of master's degree options are available. The applicant should have a bachelor of science or equivalent degree from a mechanical engineering program accredited by ABET. In evaluating an international application, consideration is given to academic standards of the school attended and the content of the courses leading to the degree obtained. Master's applicants are required to take the Graduate Record Examination (General Test).

Applicants whose bachelor's degrees are in other engineering fields, mathematics, or the physical sciences may be accepted, but will be required to remedy any deficiencies by satisfactorily completing a number of undergraduate courses in preparation for graduate study in mechanical engineering.

DEGREE REQUIREMENTS

The Master of Science in Mechanical Engineering is offered with both thesis and nonthesis options. Each option requires a minimum of 30 credit hours of approved graduate study; however, within each option, course choices vary considerably. Prior to the completion of nine credit hours, the student must submit for approval a master's degree program plan to indicate the path chosen and the specific courses to be taken.

The minimum program requirements consist of nine credit hours of core courses, six credit hours of mathematics and 15 credit hours of electives (which may include six credit hours of thesis). Within the 15 credit hours of electives, six credit hours of course work are restricted electives. The department maintains a list of restricted electives for each specialization.

CURRICULUM

Regardless of which degree path the student chooses, the degree candidate must choose one of three specialization fields. Listed below are required and elective courses for the master of science specializations.

Biomedical Engineering

Four core courses selected in consultation with the student's adviser from the list below:

BIO	5501	Cell and Molecular Biology
CHE	5103	Transport Processes in Bioengineering
CHE	5569	Biomaterials and Tissue Regeneration
ECE	5259	Medical Imaging
MAE	5710	Biomechanics
MAE	5720	Biomedical Instrumentation

Biomedical engineering applies engineering and science methodologies to the analysis of biological and physiological problems and the delivery of healthcare. The biomedical engineer serves as an interface between traditional engineering disciplines and living systems, and may focus on either, applying the patterns of living organisms to engineering design or engineering new approaches to human health. A biomedical engineer may use his/her knowledge of engineering to create new equipment or environments for such purposes as maximizing

human performance or providing non-invasive diagnostic tools. Students can choose elective courses in their area of interest offered by other engineering disciplines.

Dynamic Systems, Robotics and Controls
Three core courses selected in consultation with the student adviser from the list below:

MAE 5316 Mechatronics
MAE 5318 Instrumentation and Measurement Systems
MAE 5480 Structural Dynamics
MAE 5610 Advanced Dynamics
MAE 5630 Modeling and Simulation of Dynamic Systems
MAE 5650 Robotics
MAE 5660 Robot Control

The student's program of study in this area will be tailored to provide the background and training to pursue a career in a desired and related area of interest. Examples of related areas include design and control of dynamic systems, robotics, vibration, automotive engineering, energy and power systems, etc.

Structures, Solid Mechanics and Materials Specialization
Three core courses selected in consultation with the student adviser from the list below:

MAE 5050 Finite Element Fundamentals
MAE 5060 Applications in Finite Element Methods
MAE 5410 Elasticity
MAE 5420 Advanced Mechanical Design
MAE 5460 Fracture Mechanics and Fatigue of Materials
MAE 5470 Principles of Composite Materials

Specialization in this area focuses on analytical and computational techniques as they apply in design. Each student plans a program of study in consultation with a member of the faculty whose professional field is related to the student's interests.

Thermal-Fluid Sciences Specialization
Three core courses selected in consultation with the student adviser from the list below:

MAE 5130 Viscous Flows
MAE 5210 Conduction Heat Transfer
MAE 5220 Convection Heat Transfer
MAE 5230 Radiation Heat Transfer

Specialization in this area focuses on heat transfer, combustion and energy systems. Analytical, computational and experimental techniques are emphasized.

MASTER OF SCIENCE IN OPERATIONS RESEARCH (MS/OR)

(Code: 8074)

Operations research is a scientific approach to analyzing problems and making decisions. It uses mathematics and mathematical modeling on computers to forecast the implications of various choices and identify the best alternatives.

Operations research methodology is applied to a broad range of problems in both the public and private sectors. These problems often involve designing systems to operate in the most effective way. Many problems deal with the allocation of scarce human resources, money, materials, equipment or facilities. Applications include staff scheduling, vehicle routing, warehouse location, product distribution, quality control, traffic light phasing, police patrolling, preventive maintenance scheduling, economic forecasting, design of experiments, power plant fuel allocation, stock portfolio optimization, cost-effective environmental protection, inventory control and university course scheduling.

Operations research is interdisciplinary and draws heavily from the mathematics program. It also uses courses from computer science, engineering management and other engineering programs.

The Master of Science in Operations Research offers concentrations that emphasize those areas of application most in demand in today's job market. Graduates have skills that include probability and statistics, deterministic and stochastic models, optimization methods, computation and simulation, decision analysis and the ability to effectively communicate with clients and managers. In addition, graduates have a breadth of knowledge that allows them to work in teams, interacting with people who bring different expertise to a problem. All areas involve expertise with standard computer software packages.

ADMISSION REQUIREMENTS

An applicant for the master's program in operations research should have an undergraduate major in a science or engineering discipline that requires a significant amount of mathematics. Business majors with strong quantitative backgrounds are also encouraged to apply. A proficiency in mathematics covering topics in calculus and linear algebra, and computer literacy must be demonstrated by testing or suitable course work.

General admission requirements and the process for applying are presented in *Section 1* of this catalog.

DEGREE REQUIREMENTS

The master of science degree can be pursued with either a thesis or nonthesis option; each requires 30 credit hours. Under the thesis option, up to six credit hours of thesis may be granted in place of electives toward the required 30 credit hours and an oral defense is required. The nonthesis option requires a final program examination. Courses taken to satisfy admission prerequisites cannot be counted toward the degree requirements.

CURRICULUM

The program's curriculum is designed to provide breadth with some flexibility to accommodate the diversity of backgrounds typically found in an operations research program. Greater flexibility is provided for the elective courses beyond the core. A student has the choice of developing greater depth in one area of specialization, aiming at eventual research in that area, or continuing to develop breadth across more than one area. By choosing courses in a related field of application, students can prepare for careers in specialty areas such as management science, actuarial science or economic modeling in addition to conventional areas of operations research.

Each student will complete a program plan that satisfies the requirements listed below, subject to approval of the department head. Substitutions are sometimes permitted.

Core Courses (12 credit hours)
MTH 5411 Mathematical Statistics 1
ORP 5001 Deterministic Operations Research Models
ORP 5002 Stochastic Operations Research Models
ORP 5003 Operations Research Practice
or
ORP 5010 Mathematical Programming

Restricted Electives (9 credit hours from the following)
MTH 5051 Applied Discrete Mathematics
MTH 5102 Linear Algebra
MTH 5401 Applied Statistical Analysis
MTH 5412 Mathematical Statistics 2
ORP 5020 Theory of Stochastic Processes
ORP 5021 Queuing Theory

Computation Elective (3 credit hours from the following)
MTH 5301 Numerical Analysis
MTH 5305 Numerical Linear Algebra
MTH 5320 Neural Networks
ORP 5050 Discrete System Simulation

Free Electives (6 credit hours)

Nonthesis option: Three courses in areas of interest to the student as approved in the student's program plan.

Thesis option: At least one course plus up to six credit hours for a thesis. The thesis should be an in-depth study of some topic and/or problem in operations research, subject to the approval of the thesis committee.

MASTER OF SCIENCE IN PROJECT MANAGEMENT (MS/PM)

(Code: 8357)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Project Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields, especially mathematics, science and engineering, are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive up to 12 hours of the program prerequisites in the MS/PM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Project Management is to prepare individual for advanced leadership positions in the private, public and military sectors with specific skills and competencies in project management and identified concentration areas.

DEGREE REQUIREMENTS

The degree of Master of Science in Project Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from those listed below.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MGT 5132 Basic Economics (or two undergraduate economics courses)

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (8 courses) 24
MGT 5006 Introductory Statistics 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5088 Project and Program Risk Management 3
MGT 5089 Multiple Project Management 3
MGT 5090 Practicum for Project Management* 3
MGT 5131 Productivity Measurement and Improvement 3

Electives (3 courses) 9
Students without a concentration area may select their three open elective courses from any area of specialization approved by their faculty adviser.

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

CONCENTRATIONS

Students may elect to concentrate their studies within an area of specialization. If a concentration area is pursued, the specialization courses will replace the three (open) elective choices. Concentration area courses are approved by the student's faculty adviser from one of the following specialization areas:

Concentration in Information Systems (MS/PM-IS)

(Code: 8358)

Three courses from the list below 9
MGT 5070 Special Topics in Business 3
MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3
MGT 5153 Telecommunications Systems Management 3
MGT 5154 Advanced Management Information Systems 3

Concentration in Operations Research (MS/PM-OR)

(Code: 8359)

Three courses from the list below 9
MTH 5401 Applied Statistical Analysis 3
MTH 5411 Mathematical Statistics 3
ORP 5001 Deterministic Operations Research Models 3
ORP 5002 Stochastic Operations Research Models 3
ORP 5003 Operations Research Practices 3
ORP 5010 Mathematical Programming 3
ORP 5011 Discrete Optimization 3
ORP 5030 Decision Analysis 3
ORP 5040 Quality Assurance 3
ORP 5041 Reliability Analysis 3
ORP 5042 Reliability, Availability and Maintainability 3
ORP 5050 Discrete System Simulation 3

MASTER OF SCIENCE IN QUALITY MANAGEMENT (MS/QM)

(Code: 8409)

The program provides key courses that enable participants to refine their experience and prior academic background to provide a holistic focus on the philosophy and methodology of quality management.

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Quality Management program must have a bachelor's degree. However, the degree need not be in business administration. Students who are graduates from other fields, especially mathematics, science and engineering, are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive up to six hours of the program prerequisites in the MS/QM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies.

The Graduate Record Examination (GRE) or Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

The goal of the Master of Science in Quality Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in quality management.

DEGREE REQUIREMENTS

The degree of Master of Science in Quality Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from those listed below.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MTH 1701 College Algebra

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (9 courses) 27
ENM 5100 Quality Engineering 3
ENM 5200 Project Engineering 3
MGT 5024 Production and Operations Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5065 Supply Chain Management 3
MGT 5088 Project and Program Risk Management 3
MGT 5093 Practicum in Quality Management* 3
MGT 5131 Productivity Measurement and Improvement 3
ORP 5042 Reliability, Availability and Maintainability 3

Electives (2 courses) 6
ENM 5310 Systems Engineering Principles 3
MAE 4121 Manufacturing Environment 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5211 Procurement and contract Management 3
ORP 5030 Decision Analysis 3
TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

MASTER OF SCIENCE IN SOFTWARE ENGINEERING (MS/SWE)

(Code: 8050)

The master of science in software engineering serves students who have earned a bachelor's degree in software engineering, computer science or a related discipline, as well as working software engineers who want to broaden their perspective while deepening their skills in software development. The program also accepts students who are already competent programmers, who want to prepare for careers in software engineering. Courses in this program are taught at a level that assumes that all students have a technical undergraduate degree and significant programming experience.

ADMISSION REQUIREMENTS

Applicants must have taken courses in differential and integral calculus, discrete mathematics, statistics and data structures and algorithms, as well as at least 12 credit hours of advanced course work in undergraduate computer science. Admission may be granted with the stipulation that deficiencies are made up by taking necessary extra courses. Graduate Record Examination scores (General Test only) are recommended.

DEGREE REQUIREMENTS

The Master of Science in Software Engineering requires a minimum of 30 credit hours of approved graduate study. Students are required to complete and successfully defend a thesis or pass a final program examination. The curriculum includes four required courses:

SWE 5001 Software Engineering 1
SWE 5002 Software Engineering 2
SWE 5411 Software Testing 1
SWE 5621 Software Metrics and Modeling

All students are required to register for Computer Science Seminar (CSE 5500) or Computer Sciences Internship (CSE 5501) twice during the degree program. The internship is completed with an information technology business or industrial organization and is available only for students without prior experience in a practical information technology setting.

Each student selects elective courses to fulfill their credit hour requirements. One elective must be selected from courses that require significant programming and another must be a fundamental course in computer science. A list of courses fulfilling these requirements is available from the department.

The department excels in several specializations of software engineering and students are encouraged to concentrate in one of these areas by careful selection of elective courses.

SOFTWARE TESTING

Software testing is the process of technical investigation of a software product, usually to discover quality-related information (such as defects or product state data) about the product. This subfield of software engineering is undergoing rapid change, demanding more technical knowledge and more insight into the product and its risks. Florida Tech offers unusual breadth and depth of course work and research opportunities in software testing. A specialization in software testing is best suited for those who have already worked in the field and want to

become leaders in the testing community, perhaps as consultants, test automation architects or managers. Software engineering students who do not have significant experience should plan to take at least one, and preferably two, internships.

The specialization in software testing requires completion of both Human-Computer Interaction (AHF 5302) and Software Testing 2 (SWE 5415).

Additionally, the student must either complete a thesis on a software-testing-related topic or must take two optional courses that address software test related issues.

MASTER OF SCIENCE IN SPACE SYSTEMS (MS/SPC)

(Code: 8137)

The graduate space systems (SPC) program provides its graduates with the knowledge and capability to perform in a wide variety of technical and managerial areas, in industry, academia, and government agencies involved in the space program. It is for the student who expects to plan, design, build, integrate, test, launch, operate or manage space systems, subsystems, launch vehicles, spacecraft, payloads or ground systems.

The program is offered at Florida Tech sites at NASA Kennedy Space Center and Rockledge in Florida.

The goal of the Master of Science in Space Systems is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in space systems.

ADMISSION REQUIREMENTS

Admission to the Master of Science in Space Systems (MS/SPC) program requires a bachelor's degree in a recognized field of engineering or physical science from an accredited curriculum. Course work must have included mathematics through differential equations and at least one year of calculus-based physics. In the case of a marginal undergraduate record (GPA less than 3.0), letters of recommendation and results of recent GRE Tests, both General (verbal and quantitative) and Subject (engineering or physics) are required and could be deciding factors. Holders of the Professional Engineer license (or Engineering Intern status for those less than five years past the Baccalaureate) need not take the GRE Subject Test.

General admission requirements and the application process are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

DEGREE REQUIREMENTS

The degree of Master of Science in Space Systems is conferred upon students who have successfully completed 33 credit hours of core and elective courses as listed on the student's graduate program plan. It includes 24 hours of required space systems courses and nine hours of elective courses. Additional prerequisite courses may be required depending on the applicant's undergraduate preparation. With written permission from the director of space systems graduate studies, a student may substitute six semester hours of thesis credits in place of six elective credit hours.

Required Courses (8 courses) 24

SPC	5001	Introduction to Space Systems	3
SPC	5004	Space Propulsion Systems	3
SPC	5005	Space Power Systems	3
SPC	5006	Space Communications and Data Systems	3
SPC	5012	Spacecraft Environment	3

SPC 5013 Space Systems Astrodynamics 3
SPC 5014 Spacecraft Dynamics and Control 3
SPC 5080 Space Missions* *(See Note 1)* 3

Electives (3 courses) *(See Note 2)* 9
MGT 5134 Commercial Enterprise in Space 3
SPC 5009 Space Structures and Materials 3
SPC 5010 Spacecraft Guidance, Navigation and Control 3
SPC 5011 Human Space Systems 3
SPC 5017 Aerospace Remote Sensing Systems 3
SPC 5018 Launch and Space Mission Operations 3
SPC 5065 Space Systems for Remote Operations 3
SPC 5066 Spaceflight Human Physiology 3
SPC 5090 Special Topics in Space Systems 3
SPC 5999 Thesis 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Note 1: Four-person student teams compete to develop the best proposal to carry out a specific mission in response to a Request for Proposals issued by the instructor acting as the Source Selection Official. Each team member's grade is partially determined by the team's competitive standing.

Note 2: Electives may be selected with the academic program chair's approval from the appropriate graduate-level offerings in University College or other academic units (e.g., business, engineering, science).

MASTER OF SCIENCE IN SPACE SYSTEMS MANAGEMENT (MS/SSM)

(Code: 8315)

This program meets the professional needs of technical graduates who are, or are looking forward to, assuming more and more managerial responsibility in some aspect of space systems and need to enhance both managerial and technical skills.

The program is offered at Florida Tech sites at NASA Kennedy Space Center and Rockledge in Florida.

The goal of the Master of Science in Space Systems Management is to prepare individuals for advanced leadership positions in the private, public and military sectors with specific skills and competencies in space systems management.

ADMISSIONS REQUIREMENTS

Admission to the Master of Science in Space Systems Management program requires a bachelor's degree in a recognized field of engineering or physical science from an accredited curriculum. Course work must have included mathematics through differential equations and at least one year of calculus-based physics. Proficiency at the undergraduate level in financial accounting and statistics is also required. In the case of a marginal undergraduate record (GPA less than 3.0), letters of recommendation and results of recent GRE Tests, both General (verbal and quantitative) and Subject (engineering or physics) are required and could be deciding factors. Holders of the Professional Engineer license (or Engineering Intern status for those less than five years past the Baccalaureate) need not take the GRE Subject Test. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

DEGREE REQUIREMENTS

The degree of Master of Science in Space Systems Management is conferred upon students who have successfully completed 36 credit hours of graduate work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites listed below.

CURRICULUM

Program Prerequisites.....0

Required Courses: Management (6 courses).....18

Six courses with a clear focus on management are required. These course may be from the foundation, core or elective courses offered by the College of Business, via distance learning from University College, or from courses with a management emphasis from other academic units at Florida Institute of Technology. Students must submit a program plan to the academic unit head outlining the six management courses to fulfill the curriculum requirement. Also, students must meet all management course prerequisites as stated in the current catalog.

Required Courses: Space Systems (5 courses).....15

SPC 5001 Introduction to Space Systems
SPC 5004 Space Propulsion Systems
SPC 5005 Space Power Systems
SPC 5012 Spacecraft Environment
SPC 5013 Space Systems Astrodynamics

Directed Elective (1 course).....3

MGT 5020 Applied Management Project* 3

TOTAL CREDITS REQUIRED 36

**Serves as the capstone course for this program.*

MASTER OF SCIENCE IN SYSTEMS MANAGEMENT (MS/SM)

(Code: 8330)

ADMISSION REQUIREMENTS

The applicant to the Master of Science in Systems Management program must have a bachelor's degree; however, the degree need not be in business administration. Students who are graduates from other fields, especially mathematics, science and engineering, are encouraged to apply. Students with an undergraduate business degree or courses may be able to waive up to 12 hours of the program prerequisites in the MS/SM program based on an evaluation of their undergraduate academic transcripts. Prerequisite courses are required of a student whose undergraduate major is outside the business area or who has not previously completed the courses in these prerequisite areas. The exact number of needed prerequisite courses depends on courses completed during the student's undergraduate studies. The Graduate Record Examination (GRE) or Graduate Management Admissions Test (GMAT) may be required for admission evaluation purposes. General admission requirements and the process for applying are discussed in *Section 1* of this catalog. Individuals who do not meet the stated requirements for regular admission may petition to take graduate courses for credit as a continuing education applicant.

DEGREE REQUIREMENTS

The degree of Master of Science in Systems Management is conferred upon students who have successfully completed 33 credit hours of graduate course work plus other course requirements as listed on the student's approved graduate program plan. Students without adequate undergraduate background will be required to complete all or part of the program prerequisites. Students may choose elective courses from those listed below.

Students with undergraduate credits for courses that they believe are equivalent to the program prerequisites should consult with their adviser concerning waiver of those prerequisites.

Program Prerequisites (noncredit for this program)
MGT 5000 Financial Accounting (or two undergraduate accounting courses)
MGT 5006 Introductory Managerial Statistics
MGT 5022 Analytical Methods of Management
MGT 5132 Basic Economics (or two undergraduate economics courses)

Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by the applicant's undergraduate course work, passing a proficiency examination offered by University College or by completing a suitable computer course.

Required Courses (8 courses) 24
MGT 5002 Corporate Finance 3
MGT 5007 Intermediate Managerial Statistics 3
MGT 5013 Organizational Behavior 3
MGT 5014 Information Systems 3
MGT 5066 Systems Analysis and Modeling 3
MGT 5067 Systems Management* 3
MGT 5133 Advanced Analytical Methods for Management 3
MGT 5149 Economics for Business 3

Directed Electives (2 courses) 6
MGT 5017 Program Management 3
MGT 5024 Production and Operations Management 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5062 Logistics Policy 3
MGT 5064 Cost and Economic Analysis 3
MGT 5068 Systems Engineering Management 3
MGT 5084 Materiel Acquisition Management 3
MGT 5137 Management of Engineering and Technology 3
MGT 5145 Technology and Business Policy 3
MGT 5146 Management of Innovation 3
MGT 5147 Management of Technology Research Seminar 3
MGT 5148 Design and Analysis of Experiments 3

Elective (1 course) 3
An elective can be chosen from those courses offered to emphasize the area of greatest interest and benefit to the student.

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Concentration in Information Systems (MS/SM-IS)

(Code: 8402)

Program Prerequisites (noncredit for this program)

Required Courses (8 courses) 24
MGT 5002 Corporate Finance 3
MGT 5007 Intermediate Managerial Statistics 3
MGT 5013 Organizational Behavior 3
MGT 5014 Information Systems 3
MGT 5066 Systems Analysis and Modeling 3
MGT 5067 Systems Management* 3
MGT 5133 Advanced Analytical Methods 3
MGT 5149 Economics for Business 3

Directed Electives (3 courses) 9
MGT 5070 Special Topics in Business 3
MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3
MGT 5153 Telecommunications Systems Management 3
MGT 5154 Advanced Management Information Systems 3

TOTAL CREDITS REQUIRED 33

**Serves as the capstone course for this program.*

Concentration in Operations Research (MS/SM-OR)

(Code: 8331)

Program Prerequisites (noncredit for this program)

Required Courses (8 courses)			24
MGT	5002	Corporate Finance	3
MGT	5013	Organizational Behavior	3
MGT	5014	Information Systems	3
MGT	5066	Systems Analysis and Modeling	3
MGT	5067	Systems Management*	3
MGT	5149	Economics for Business	3
MTH	5401	Applied Statistical Analysis	3
ORP	5001	Deterministic Operations Research Models	3
Directed Electives (3 courses)			9
MTH	5411	Mathematical Statistics	3
ORP	5002	Stochastic OR Models	3
ORP	5003	Operations Research Practices	3
ORP	5010	Mathematical Programming	3
ORP	5011	Discrete Optimization	3
ORP	5030	Decision Analysis	3
ORP	5040	Quality Assurance	3
ORP	5041	Reliability Analysis	3
ORP	5042	Reliability, Availability and Maintainability	3
ORP	5050	Discrete System Simulation	3
		TOTAL CREDITS REQUIRED	33

**Serves as the capstone course for this program.*

Note: Electives may be taken with approval of both the faculty adviser and program head from other graduate-level offerings in University College or other colleges or academic units (e.g., computer science, operations research, psychology). Any other deviation requires specific approval of the program head.

Graduate Certificate Programs

ADMISSION

Individuals seeking admission for purposes of attaining a graduate certificate, but not degree seeking, will be evaluated for admission using the same procedures as outlined for continuing education for credit students, with the written approval of the head of the academic center offering the program. Applicants must submit the requisite application for continuing education (Code: 0102), with fee payment made, and be certified by the approving official as being capable of performing to graduate course standards. Specific admission criteria include the following:

- Applicants must have a bachelor's degree from a regionally accredited university.
- An undergraduate GPA of at least 2.5 is generally sufficient for admission for a graduate certificate program. An undergraduate GPA that is less than 2.5 will require that the applicant provide a GMAT, GRE and/or special documentation including letters of reference, résumé, postbaccalaureate credits, certificates of training, etc., to be admitted by exception for a graduate certificate program.

Individuals currently enrolled in a graduate degree program may also qualify for award of a graduate certificate by making a formal request to the local center director, upon satisfaction of the requisite certificate curriculum.

COMPLETION REQUIREMENTS

All courses must be completed with a minimum grade of C. A minimum cumulative grade point average of 3.0 will be required for certificate award. Students will be allowed to attempt seven courses to meet the GPA requirement. If the minimum GPA is not met after seven courses, and the student would like to continue, he/she may appeal to the dean.

TRANSFER CREDIT

A possible three-semester hours of transfer credit will be allowed and is consistent with current university policy regarding transfer credit. The transfer course must be from a regionally accredited university or an approved military equivalent and must have an earned grade of B or better.

Current or past members of the Defense Acquisition, Technology and Logistics (AT&L) workforce, or contractor employees who have attained a minimum level of professional certification in at least one AT&L career area, may be eligible for as many as six hours of transfer credits to be applied toward a Florida Tech Graduate Certificate. Consult with a faculty adviser or academic unit head for further information about current transfer credit policies.

SECOND OR SUBSEQUENT GRADUATE CERTIFICATE AWARDS

A second or subsequent graduate certificate program must consist of no less than three courses not previously used to earn a prior graduate certificate at Florida Tech. Up to two courses from any prior earned graduate certificate at Florida Tech may be applied toward the completion requirements for a second or subsequent graduate certificate award, provided the grade(s) earned was a B or better and the prior course(s) satisfies a required or elective requirement in the second or subsequent graduate certificate program.

CURRICULUM

Graduate Certificate in Business Management

Required Course

MGT 5013 Organizational Behavior 3

Elective Courses (4 required)

MGT 5000 Financial Accounting 3
MGT 5001 Managerial Accounting 3
MGT 5002 Corporate Finance 3
MGT 5014 Information Systems 3
MGT 5017 Program Management 3
MGT 5019 Marketing 3
MGT 5024 Production Management 3
MGT 5033 Human Resources Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Contract Management

Required Course

MGT 5211 Procurement and Contract Management 3

Elective Courses (4 required)

MGT 5212 Advanced Procurement and Contract Management 3
MGT 5213 Contract Changes, Terminations and Disputes 3
MGT 5214 Cost Principles, Effectiveness and Control 3
MGT 5217 Contract and Subcontract Formulation 3
MGT 5218 Contract Negotiations and Incentive Contracts 3
MGT 5220 Contract Management Research Seminar 3
MGT 5270 Special Topics in Contract Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in eBusiness

Required Course

MGT 5160 Introduction to eBusiness 3

Elective Courses (4 required)

MGT 5070 Special Topics in Business: eLaw 3
MGT 5161 Policy and Organizational Strategies for eBusiness 3
MGT 5162 Survey of Information Technologies for eBusiness 3
MGT 5163 Marketing in an Internet-based Environment 3
MGT 5165 Special Topics in eBusiness 3
MGT 5166 Projects in eBusiness 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Human Resources Management

Required Course

MGT 5033 Human Resources Management 3

Elective Courses (4 required)

MGT 5015 Organizational Planning and Development 3
MGT 5016 Employee Relations 3
MGT 5017 Program Management 3
MGT 5101 Leadership Theory and Effective Management 3
MGT 5105 Interpersonal Relations and Conflict Resolution 3
MGT 5106 Organizational Communication 3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Information Systems Management

Required Course

MGT 5014 Information Systems 3

Elective Courses (4 required)

MGT 5150 Management of Software Systems 3
MGT 5151 Database Systems Management 3
MGT 5152 Computer Systems Administration 3
MGT 5153 Telecommunications Systems Management 3
MGT 5154 Advanced Management Information Systems 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Logistics

Required Course

MGT 5017 Program Management 3

Elective Courses (4 required)

MGT 5024 Production and Operations Management 3
MGT 5060 Management of Assets 3
MGT 5061 Systems and Logistics Support Management 3
MGT 5062 Logistics Policy 3
MGT 5063 Inventory Control and Management 3
MGT 5066 Systems Analysis and Modeling 3
MGT 5084 Materiel Acquisition Management 3
MGT 5100 Distribution Management 3
MGT 5211 Procurement and Contract Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Materiel Acquisition Management

Required Course

MGT 5084 Materiel Acquisition Management 3

Elective Courses (4 required)

MGT 5017 Program Management 3
MGT 5062 Logistics Policy 3
MGT 5067 Systems Management 3
MGT 5068 Systems Engineering Management 3
MGT 5100 Distribution Management 3
MGT 5133 Advanced Analytical Methods for Management 3
MGT 5500 Integrated Logistics Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Program Management

Required Course

MGT 5017 Program Management 3

Elective Courses (4 required)

MGT 5020 Applied Management Project 3
MGT 5040 Public Program Policy and Evaluation 3
MGT 5062 Logistics Policy 3
MGT 5070 Special Topic (Project Management) 3
MGT 5084 Materiel Acquisition Management 3
MGT 5100 Distribution Management 3
MGT 5137 Management of Engineering Technology 3
MGT 5500 Integrated Logistics Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Quality Management

Required Course

MGT 5170 Quality Management 3

Elective Courses (4 required)

MGT 5065 Supply Chain Management 3
MGT 5069 Advanced Supply Chain Management 3
MGT 5131 Productivity Measurement and Improvement 3
MGT 5141 Implementing Statistical Process Control 3
MGT 5145 Technology and Business Strategy 3
MGT 5146 Management of Innovation 3
ORP 5040 Quality Assurance 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Systems Management

Required Course

MGT 5067 Systems Management 3

Elective Courses (4 required)

MGT 5017 Program Management 3
MGT 5064 Cost and Economic Analysis 3
MGT 5066 Systems Analysis and Modeling 3
MGT 5068 Systems Engineering Management 3
MGT 5084 Materiel Acquisition Management 3
MGT 5087 Management of Transportation Systems 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Graduate Certificate in Transportation Management

Required Course

MGT 5087 Management of Transportation Systems 3

Elective Courses (4 required)

MGT 5067 Systems Management 3
MGT 5068 System Engineering Management 3
MGT 5079 Traffic Management 3
MGT 5084 Materiel Acquisition Management 3
MGT 5100 Distribution Management 3

TOTAL CREDITS REQUIRED 15

Note: An elective course may be substituted with the permission of the Academic Unit Head.

Course Descriptions

COMPUTER INFORMATION SYSTEMS

CIS 5000 FUNDAMENTALS OF INFORMATION SYSTEMS (3 credits). Introduces problem-solving techniques for information systems. Includes alternative methods, logic problems and methods specifically for component-based systems with integration issues. Also includes new technologies, products, tools, hardware architectures and languages. Encourages think-tank and out-of-the-box discussion formats.

CIS 5080 PROJECTS IN COMPUTER INFORMATION SYSTEMS (3 credits). A capstone course that entails the student designing and implementing a significant project within the purview of information systems. Students propose a project and have it approved by the instructor.

CIS 5100 DATA STRUCTURES AND PROGRAMMING (3 credits). Introduces programming in an object-oriented language. Includes data structures. Aims to turn students with little or no programming experience into comfortable programmers. Also includes algorithms for use with stacks, queues and lists. Required for CIS majors.

CIS 5200 ADVANCED PROGRAMMING (3 credits). Follows CSE 5100 and covers advanced programming techniques and methodologies for engineering the same. Encourages algorithm exploration and comparison, and demonstration of a superior level of programming expertise in an object-oriented language. Covers advanced data structures. Required for CIS majors.

CIS 5210 INTEGRATION OF DATABASE SYSTEMS (3 credits). Studies database systems as an essential organization resource. Includes data architecture components and data storage configurations, and compares normalized and denormalized methods. Covers relational databases and the use of SQL for information retrieval. Also covers object databases.

CIS 5220 COMPUTER ORGANIZATION (3 credits). Introduces system architecture including the specifics of computer arithmetic, memories, the CPU, input/output and peripherals. Includes hardware elements and how they fit into a complete computer system along with combination logic, gates and Boolean algebra. Required for CIS majors.

CIS 5230 OPERATING SYSTEMS (3 credits). Explores the algorithms, protocols and mechanisms representing traditional single processor and multi-user operating systems. Emphasizes process management and synchronization, threads, memory management, virtual memory and process scheduling. May require a research paper and/or programming assignments. Required for CIS majors. Prerequisites: CIS 5200, CIS 5220.

CIS 5300 MODELING AND SIMULATION (3 credits). Introduces modeling and simulation (M&S). Includes verification, validation, construction and implementation for engineering and business, use of stochastics and probability distribution. Compares event-driven and continuous M&S to distributed M&S. Requires proficiency in a programming language (Java, C++, Perl) and a semester project.

CIS 5310 LEGAL AND ETHICAL ASPECTS OF IS (3 credits). Investigates legal and ethical foundations of information systems. Discusses intellectual property, copyrights, patents, trademarks/domains, privacy, free speech, the Fifth Amendment, contracts and employment law. Requires a semester project on research and presentation of case law and precedents.

CIS 5400 TOPICS IN COMPUTER INFORMATION SYSTEMS (3 credits). Current topics in computer information systems at the introductory graduate level. Topics vary and the course may be repeated for credit toward the CIS degree. (Requirement: Instructor approval.)

CIS 5410 COMPUTER NETWORKS FOR INFORMATION SPECIALISTS 1 (3 credits). Provides a broad set of fundamental topics related to computer networks including network layers, topologies, technologies, services and methods useful for the typical information systems specialists; TCP/IP; transmission protocols and client-server models. Introduces management and security of networks. Prerequisites: CIS 5100.

CIS 5420 COMPUTER NETWORKS FOR INFORMATION SPECIALISTS 2 (3 credits). Continues CIS 5410. Focuses on the more advanced topics of network security design and management including cryptography, LANs and WANs, and application and network layers.

CIS 5500 MODERN COMPUTER INFORMATION SYSTEMS (3 credits). Defines state-of-the-art information systems and how they support key corporate functions such as telecommunications, electronic commerce, intranets and enterprise-wide functionality in a group or organization. Also explores information technology at every level.

CIS 5510 COMPUTER INFORMATION SYSTEMS DESIGN (3 credits). Introduces software and system design techniques with a

non-proprietary view of common design paradigms. Familiarizes users or integrators of systems with the phases of software development and some associated methodologies that may be encountered within their field. Prerequisites: CIS 5100.

CIS 5520 KNOWLEDGE AND INFORMATION REPRESENTATION (3 credits). Covers many of the modern data, information and knowledge representations to give the CIS professional formats, methods and mechanisms for representing, understanding and using data-driven systems that may or may not have a database component. (Requirement: Prerequisite course or instructor approval.) Prerequisites: CIS 5100 or CIS 5500.

CIS 5530 SYSTEMS ADMINISTRATION (3 credits). Explores the administration and maintenance of operating systems such as Windows, Linux or Unix to supply the typical CIS professional help with system administration. May include shell programming, command line programming, common maintenance procedures, network maintenance, backups, and methods of file processing and file system structure. Prerequisites: CIS 5100.

CIS 5720 PROJECT AND CHANGE CONTROL (3 credits). Covers managing and delivering a software project from inception to delivery. Includes initial and detail planning, the project life cycle, risk assessment, resource planning, project monitoring and timeliness, cost and customer management, change control, configuration control and version control. Uses project and configuration management software.

CIS 5740 WEB PROGRAMMING (3 credits). Studies HTML and Java features that facilitate Web-based programming. Covers Web servers, Web-based systems and XML. May include other scripting and interface languages. Explores characteristics of good Web site design and organization. Requires creation of Web pages and knowledge of the Java programming language. Prerequisites: CIS 5200.

CIS 5810 ADVANCED INFORMATION STRUCTURING TECHNIQUES (3 credits). Explores multilevel data-driven systems and techniques such as data warehousing, metadata and object-oriented databases. Integrates physical media and the architecture of complex data-driven systems for maximum simplicity and efficiency of design. (Requirement: Prerequisite course or instructor approval.) Prerequisites: CIS 5100 or CIS 5500.

CIS 5890 INDEPENDENT STUDY IN COMPUTER INFORMATION SYSTEMS (1–3 credits). Individual projects under the direction of a member of the computer information systems faculty. May require deliverables such as a software system or product, or a comprehensive paper. May be repeated for a maximum of six credits. (Requirement: Instructor approval.)

COMPUTER SCIENCE

CSE 5210 FORMAL LANGUAGES AND AUTOMATA THEORY (3 credits). Presents abstract models of computers (finite automata, pushdown automata and Turing machines) and the language classes they recognize or generate (regular, context-free and recursively enumerable). Also presents applications in compiler design, algorithms and complexity theory. Prerequisites: CSE 2010.

CSE 5211 ANALYSIS OF ALGORITHMS (3 credits). Presents time and space complexity of computer algorithms. Includes algorithm classes, such as divide-and-conquer, greedy, dynamic programming and backtracking; techniques for solving recurrence equations; graph algorithms; searching and sorting; and deterministic and nondeterministic polynomial time problem classes. Prerequisites: CSE 2010 or CIS 5200, MTH 1002.

CSE 5231 COMPUTER NETWORKS (3 credits). Covers theory, design and analysis of computer communication systems. Includes TCP/IP, Internet, the World Wide Web, ISO-OSI network architecture, LANs (Ethernet, Fast Ethernet, Token Ring, Token Bus, etc.) FDDI, ATM, SONET, wireless communications, satellite networks, DNS, firewalls, network modeling and simulation. Prerequisites: CSE 2400, MTH 1002.

CSE 5232 NETWORK PROGRAMMING (3 credits). Covers design and implementation of programs that communicate with other programs across a computer network. Includes streams, server-side networking, client-side networking, multithreading, exceptions and remote method invocation. Prerequisites: CSE 2010.

CSE 5233 COMPUTER FORENSICS (3 credits). Introduces concepts and techniques for the seizure and examination of digital evidence, along with the legal and ethical issues related to reporting on the results. Covers forensic tools and investigative procedures and includes a survey of current literature. Prerequisites: CSE 3101, CSE 4001.

CSE 5240 PARALLEL PROCESSING (3 credits). Investigates architectures for parallel computers and parallel algorithms for computational problems. Discusses performance evaluation metrics for the performance of parallel processing.

CSE 5241 DISTRIBUTED COMPUTING (3 credits). Studies the fundamental concepts in software systems that support and work in a distributed computing environment. Includes discussion of network communication mechanisms, distributed operating systems, services supporting distributed systems, distributed database systems, fault-tolerant systems and distributed algorithms. Prerequisites: CSE 4001.

CSE 5250 PROGRAMMING LANGUAGES (3 credits). Surveys programming language concepts including language features, implementation issues and language groups. Prerequisites: CIS 5200 or CSE 2010.

CSE 5251 COMPILER THEORY AND DESIGN (3 credits). Covers extensively the major topics of compiler design. Includes lexical analysis, scanner-generator tools, parsing, syntax-directed translation, static semantic checking, storage organizations, code generation and code optimization. Prerequisites: CSE 2010, CSE 3101.

CSE 5260 DATABASE SYSTEMS (3 credits). Introduces the analysis and design of typical database systems. Includes theoretical and practical aspects of designing database systems and a substantial project. Prerequisites: CIS 5200 or CSE 2010.

CSE 5261 INFORMATION RETRIEVAL (3 credits). Overviews key models (vector space, Boolean, probabilistic) and utilities (relevance ranking, relevance feedback, n-gram processing) for information retrieval. Also describes additional models and utilities based on current trends in the field. Presents benchmarking efforts and case studies. Corequisites: CSE 5260.

CSE 5271 OBJECT-ORIENTED DESIGN (3 credits). A study of techniques used in both the design and implementation of object-oriented programs. A major project in an object-oriented language is required.

CSE 5280 COMPUTER GRAPHICS (3 credits). Presents the graphics pipeline for polygonal-based models. Includes mathematical concepts and data structures for graphics, coordinate systems, clipping, scan conversion, hidden-object detection, rendering, color models and graphics programming standards. Prerequisites: CSE 2050 or CIS 5200, MTH 1002.

CSE 5281 GRAPHICAL USER INTERFACES (3 credits). Studies the theories and techniques of human-computer interaction and the design of direct manipulation graphical-user interfaces that support menus, buttons, sliders and other widgets for input, text and graphics for output. Students design, implement and evaluate a graphical-user interface.

CSE 5283 COMPUTER VISION (3 credits). Develops computational methods that model the capacity of the human vision system. Develops main concepts of computer vision research and its applications including robot navigation and interaction, autonomous exploration, traffic monitoring, biometrics identification and building 3-D images. Prerequisites: CSE 2010.

CSE 5290 ARTIFICIAL INTELLIGENCE (3 credits). Introduces the theoretical foundations of artificial intelligence, focusing on the areas of automated reasoning, search and heuristics. Introduces an AI language to implement concepts. Prerequisites: CIS 5200 or CSE 2010.

CSE 5294 THEORY AND APPLICATIONS OF NEURAL NETWORKS (3 credits). Includes learning in a single neuron, single and multi-layer perceptrons, recurrent neural networks, structured neural networks, neural networks to perform principal component analysis, principal component regression and partial least squares regression. (Requirement: Instructor approval or prerequisite course.) Prerequisites: ECE 5201 or MTH 5102.

CSE 5400 TOPICS IN COMPUTER SCIENCE (3 credits). Current topics in computer science at the introductory graduate level. Topics vary and the course may be repeated for credit. (Requirement: Instructor approval.)

CSE 5401 INDEPENDENT STUDY IN COMPUTER SCIENCE (1–3 credits). Working closely with a faculty member, the student probes a subject in greater depth than is normally possible in a regular class. Requires a comprehensive paper or an applied research project. (Requirement: Instructor approval.)

CSE 5402 PROJECTS IN COMPUTER SCIENCE (1–3 credits). Working closely with a faculty member, the student develops a project in computer science to a greater depth than is normally possible in a regular class. Requires an applied research project. (Requirement: Instructor approval.)

CSE 5500 COMPUTER SCIENCE SEMINAR (0 credits). Presentations by faculty, graduate students and guest speakers on topics of current interest. May be repeated for credit.

CSE 5501 COMPUTER SCIENCES INTERNSHIP (0 credits). Industry-based internship experience under the supervision of a graduate faculty member, to provide professional experience for graduate students without prior experience in a practical information technology setting. (Requirement: At least nine graduate credit hours in computer sciences completed with at least a 3.0 GPA, and permission of the instructor.)

CSE 5610 COMPUTATIONAL COMPLEXITY (3 credits). Reviews problems, algorithms, Turing machines and computability. Studies Boolean and first-order logic, leading to undecidability results; and relations among complexity classes using reductions and completeness. Presents approximate and randomized algorithms. Prerequisites: CSE 5210, CSE 5211.

CSE 5615 COMPUTATIONAL MOLECULAR BIOLOGY (3 credits). Introduces important computational problems related to molecular biology. Includes motif finding, approximate sequence alignment, phylogeny construction and system biology. Requires knowledge in programming,

discrete mathematics, data structures and algorithms. Does not require prerequisite biological sciences (BIO) course.

CSE 5620 ADVANCED COMPUTER ARCHITECTURE (3 credits). Covers design of interleaved memory systems and multiprocessor caches; linear and nonlinear pipelines; data-flow and reduction machines; Vector computers, multiprocessors and array processors. Includes performance, scheduling and scalability of parallel machines. Prerequisites: ECE 4551.

CSE 5630 ADVANCED OPERATING SYSTEMS (3 credits). Studies in detail the design and implementation of an operating system. Discusses various data structures and algorithms for process, memory and input/output device management. Investigates issues in distributed operating systems. Prerequisites: CSE 4001.

CSE 5631 ADVANCED COMPUTER NETWORKS (3 credits). Covers computer network design and analysis topics. Includes network management, distributed network environments, bridges, routers, gateways, congestion control, ATM application program interface, multimedia and network applications. Prerequisites: CSE 5231.

CSE 5632 SURVIVABLE NETWORK OBJECTS (3 credits). Covers theory, design and analysis of secure computer communication systems. Includes encryption, authentication, digital signature, digital certificate, secure socket layer, agent-based network applications and development of distributed applications over the Internet using CORBA and Java. Prerequisites: CSE 5631 or ECE 5535.

CSE 5636 NETWORK SECURITY (3 credits). Covers network intrusion detection, statistical anomaly detection and network perimeter security, and traffic monitoring including tools (Ethereal, TCPDUMP) used to analyze captured traffic streams. Overviews methods and tools used by hackers. Includes statistical anomaly detection and its role in detecting previously unseen attacks. Prerequisites: CSE 5231 or ECE 5535.

CSE 5650 ADVANCED PROGRAMMING LANGUAGES (3 credits). Presents theoretical topics in programming languages. Includes the lambda-calculus, functional programming, type interface and different approaches to the semantics of programming languages. Prerequisites: CSE 5250.

CSE 5660 DATABASE MANAGEMENT SYSTEMS (3 credits). Studies the internal components of a database management system (DBMS). Includes data organization, query optimization, transaction processing, concurrency control, logging and recovery, security and distributed DBMS. Prerequisites: CSE 5260.

CSE 5661 ADVANCED INFORMATION RETRIEVAL (3 credits). Includes among other topics integration of multiformat data, parallel processing, grammar processing, information filtering and integration of learning techniques into information processing. Research papers are read, presented, evaluated and extended. Prerequisites: CSE 5261.

CSE 5670 SOFTWARE DESIGN METHODS (3 credits). Technical aspects of software design and development. Topics include techniques to decompose a system into objects, methods for designing an object's data structure and techniques for writing and verifying code. Prerequisites: CSE 5270.

CSE 5672 INTRODUCTION TO MALICIOUS MOBILE CODE (3 credits). Introduces the underlying concepts of viruses, Trojans and worms. Includes low-level virus structure, buffer overruns, viral epidemiology, virus/worm countermeasures, and new and novel algorithms for virus detection. Overviews practical, safe computing. Requires a signed ethics statement. (Requirement: Prerequisite course or equivalent.) Prerequisites: CSE 3101.

CSE 5673 CRYPTOLOGY (3 credits). Focuses on making and breaking codes. Students learn how to crack enciphered messages without knowing the enciphering keys. Covers modern encryption and its application to digital signatures, digital cash, voting and cryptographic protocols. Prerequisites: CSE 2010, CSE 2400.

CSE 5680 ADVANCED COMPUTER GRAPHICS (3 credits). Covers image synthesis using textures, shadows, ray tracing and radiosity methods. Includes animation, solid modeling fractals, nonuniform rational B-splines, antialiasing and advanced graphical data structures. Prerequisites: CSE 5280.

CSE 5683 ADVANCED COMPUTER VISION (3 credits). Reviews recent technologies and trends of computer vision and image analysis. Research oriented for graduate computer science and engineering students. Prerequisites: CSE 5283.

CSE 5692 CONSTRAINT REASONING (3 credits). Covers foundations of constraint satisfaction and constraint-based reasoning; problem representation and characterization; consistency checking, heuristics and search; deterministic and stochastic solving methods; and applications such as scheduling, timetabling and temporal reasoning. (Recommended: CSE 5211 and CSE 5290.)

CSE 5693 MACHINE LEARNING (3 credits). Covers computational paradigms and techniques in learning and adaptation. Includes tree learning, rule learning, genetic algorithms, neural networks, case-based learning, Bayesian learning, analytical learning and reinforcement learning. Prerequisites: CSE 5290.

CSE 5780 PATTERN RECOGNITION IN BIOMEDICAL APPLICATIONS (3 credits). Introduces the fundamentals of statistical pattern recognition with examples from different biomedical application areas. Studies techniques for analyzing

multidimensional data of various types and scales. Also covers algorithms for projections, and clustering and classification of data.

CSE 5800 ADVANCED TOPICS IN COMPUTER SCIENCE (3 credits). Current topics in computer science at the advanced graduate level. Topics vary and the course may be repeated for credit. (Requirement: Instructor approval.)

CSE 5801 INDEPENDENT RESEARCH IN COMPUTER SCIENCE (1–3 credits). Working closely with a faculty member, the student studies a research topic and writes a research paper. May be repeated for credit. (Requirement: Instructor approval.)

CSE 5802 RESEARCH PROJECTS IN COMPUTER SCIENCE (1–3 credits). The student works closely with a faculty member on a well-defined research project. May be repeated for credit. (Requirement: Instructor approval.)

CSE 5810 ADVANCED TOPICS IN COMPUTER SCIENCE THEORY (3 credits). Current topics in computer science theory at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5210.

CSE 5820 ADVANCED TOPICS IN COMPUTER ARCHITECTURE (3 credits). Current topics in computer architecture at the graduate level. Topics vary and the course may be repeated for credit.

CSE 5830 ADVANCED TOPICS IN OPERATING SYSTEMS (3 credits). Current topics in operating systems at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 4001.

CSE 5835 ADVANCED TOPICS IN COMPUTER NETWORKS (3 credits). Current topics in computer networks at the advanced graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5231.

CSE 5840 ADVANCED TOPICS IN PARALLEL AND DISTRIBUTED COMPUTING (3 credits). Current topics in parallel and distributed computing at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5240, CSE 5241.

CSE 5850 ADVANCED TOPICS IN PROGRAM LANGUAGES (3 credits). Current topics in program languages at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5250.

CSE 5860 ADVANCED TOPICS IN DATABASE SYSTEMS (3 credits). Current topics in database systems at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5260.

CSE 5880 ADVANCED TOPICS IN COMPUTER GRAPHICS (3 credits). Current topics in computer graphics at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5280.

CSE 5890 ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE (3 credits). Current topics in artificial intelligence at the graduate level. Topics vary and the course may be repeated for credit. Prerequisites: CSE 5290.

CSE 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval of Office of Graduate Programs.)

CSE 5999 THESIS (3–6 credits). Research and preparation of a thesis under the direction of a member of the graduate faculty. A maximum of six credit hours may be applied toward the master of science degree requirements. (Requirement: Thesis supervisor approval.)

ELECTRICAL/COMPUTER ENGINEERING

ECE 5111 RADIO FREQUENCY PROPAGATION (3 credits). Link budgets, free space antenna radiation patterns, multipath, fading, interference, propagation, antenna radiation patterns, multipath, fading, interference, reflection, refraction, rain attenuation, indoor propagation and RF safety. Considers applications to radar and terrestrial as well as satellite communication systems. Real world affects and impairment reduction methods. Prerequisites: ECE 3442, ECE 4221, MTH 2401.

ECE 5112 INTRODUCTION TO WIRELESS SYSTEMS AND APPLICATIONS (3 credits). Develops principles, fundamental equations and functional components that use RF propagation for various applications. Describes a broad variety of applications (e.g., communications, radar) including the functions and interconnection of subsystems required for these applications. System design considerations for applications. Prerequisites: ECE 3442, ECE 4221, MTH 2401.

ECE 5113 WIRELESS LOCAL AREA NETWORKS (3 credits). Provides the basics of wireless networking and WLAN technologies, the leading WLAN standards, WLAN configurations, WLAN implementation considerations, the benefits and applications of WLANs, WLAN trends and case studies.

ECE 5115 MODERN WIRELESS DESIGN CONCEPTS (3 credits). Key design criteria, techniques and component technologies of major components or sub-systems for wireless applications are treated, including transmitters and power amplifiers, receivers, modems, synthesizers, mixers, and duplexers. Prerequisites: ECE 3442, ECE 4221.

ECE 5117 MULTIMEDIA COMMUNICATIONS (3 credits). Introduces multimedia, continuous and discrete media, multimedia data compression, image coding and video coding basics, JPEG and MPEG standards, multimedia networking, multimedia

over Internet, multimedia over wireless networks. (Requirement: Graduate standing.) Prerequisites: ECE 3222.

ECE 5118 WIRELESS SENSOR NETWORKS (3 credits). Pervasive networks and network embedded systems, power-aware issues in wireless sensor networks, collaborative signal and information processing, routing and MAC protocols in sensor networks, clustering and coordination in sensor networks, sensor networks applications. (Requirement: Graduate standing.)

ECE 5201 LINEAR SYSTEMS 1 (3 credits). Studies linear spaces, linear operators and matrix calculus; mathematical description of linear dynamic systems, the relation between state variable descriptions and system transfer functions; controllability and observability of systems, realization of rational transfer function matrices and introduces nonlinear analysis. Prerequisites: ECE 4231 or MTH 2201.

ECE 5202 LINEAR SYSTEMS 2 (3 credits). Continues study of linear spaces, linear operators and matrix calculus; mathematical description of linear dynamic systems, the relation between state variable descriptions and system transfer functions; controllability and observability of systems, realization of rational transfer function matrices and the introduction to nonlinear analysis. Prerequisites: MTH 5201.

ECE 5221 PERSONAL COMMUNICATION SYSTEMS (3 credits). Overviews the principles of operation, general architectures, access methods, modulation schemes and performance of cellular and personal communications systems. Presents design criteria for modern systems and use of real world tools to demonstrate design concepts. Prerequisites: ECE 4221.

ECE 5223 DIGITAL COMMUNICATIONS (3 credits). Covers physical media, digital modulation, detection, intersymbol interference, adaptive equalization, spectrum control, error control and synchronization. Prerequisites: ECE 4221, MTH 5425.

ECE 5231 OPTIMAL SYSTEMS (3 credits). Includes optimization of dynamic systems, calculus of variations, necessary conditions for optimality; the study of constrained systems using the maximum principle and development of cost functions; Hamilton-Jacobi theory, Pontryagin's principle and dynamic programming; linear optimal deterministic optimal tracking systems; and robust control. Prerequisites: ECE 5201. Corequisites: MTH 5425.

ECE 5233 SATELLITE COMMUNICATIONS (3 credits). A comprehensive study of the systems aspects of satellite communications, with emphasis on digital communications. Includes an analysis of AWGN channels, performance degradation caused by band limiting, nonlinearities, phase noise, etc. Presents a survey of existing operational satellite systems. Prerequisites: ECE 4221.

ECE 5234 COMMUNICATION THEORY (3 credits). Covers theory of signal spaces; dimensionality and distance; optimum methods of statistical detection and estimation; characteristics of noise; introduction to information theory, including channel capacity, source coding and channel coding; and time-bandwidth limitations and rate-distortion theory. Prerequisites: ECE 4221.

ECE 5238 ERROR CONTROL CODING (3 credits). Introduces algebra, linear block codes, Galois fields, cyclic codes, circuits for cyclic codes, BCH codes, spectral techniques for encoding and decoding, and convolutional codes.

ECE 5245 DIGITAL SIGNAL PROCESSING 1 (3 credits). Describes discrete-time signals in the time and frequency domains; z-transform, discrete Fourier transform, FFT algorithms; introduction to classical digital filter design techniques; and filter banks.

ECE 5246 DIGITAL SIGNAL PROCESSING 2 (3 credits). Modern methods of data compression, signal modeling spectral estimation and linear prediction; Wiener filtering and an introduction to Kalman filtering and adaptive filtering; and other topics from the current literature. Prerequisites: ECE 5245, MTH 5425.

ECE 5248 ADVANCED FILTERING (3 credits). Bayesian estimation theory; filtering, smoothing and prediction for linear and nonlinear systems, Gaussian and non-Gaussian models, and for known or unknown models; fast algorithms for filter design and implementation; linear, nonlinear and adaptive filters; applications. Prerequisites: ECE 5201, MTH 5425.

ECE 5251 RADAR SYSTEMS (3 credits). Covers characteristics of radar, prediction of range and performance, types of radar (pulse-Doppler, MTI, CW, etc.); modern radar technologies, phased-array systems, clutter, jamming; and introduces signal processing methods.

ECE 5256 DIGITAL IMAGE PROCESSING (3 credits). Investigates image processing by machine for such purposes as robotics, biomedicine, remote sensing and photogrammetry. Includes image enhancement and analysis, transform techniques including wavelet transform, feature extraction, segmentation, compression and morphology.

ECE 5258 PATTERN RECOGNITION (3 credits). Includes Bayes decision theory; optimal pattern recognition algorithms; feature extraction criteria and algorithms; adaptive pattern recognition; supervised and unsupervised learning; applications to failure detection; and target, image and speech recognition. Prerequisites: ECE 5201, MTH 5425.

ECE 5259 MEDICAL IMAGING (3 credits). Presents the interdisciplinary principles of medical imaging techniques such as diagnostic, ultrasound, radiography, x-ray computer tomography (CT) and magnetic resonance imaging (MRI). Includes the physical principles, noise modeling and signal processing for each imaging modality. Prerequisites: MTH 2201, MTH 2401.

ECE 5268 THEORY AND APPLICATIONS OF NEURAL NETWORKS (3 credits). Includes learning in a single neuron, single- and multi-layer perceptrons, recurrent neural networks, structured neural networks, neural networks to perform principal component analysis, principal component regression and partial least squares regression. (Requirement: Instructor approval or prerequisite course.) Prerequisites: ECE 5201 or MTH 5102.

ECE 5270 SPECIAL TOPICS IN SYSTEMS (3 credits). Topics of current interest in the technical literature on systems.

ECE 5272 SPECIAL TOPICS IN COMMAND, CONTROL, COMMUNICATION AND INTELLIGENCE IN SYSTEMS ENGINEERING (3 credits). Treats different C3I topics in different semesters, depending on student interest and topic timeliness. Topics come from broad C3I areas such as sensor data fusion, estimation, tracking, probability and statistical models and optimization. Explores state-of-the-art techniques and algorithms.

ECE 5301 SEMICONDUCTOR DEVICE THEORY (3 credits). Reviews basic semiconductor physics and band theory; development of detailed theory of p-n junctions; Schottky barrier diodes, bipolar transistors and heterojunctions. Introduction of field effect transistor theory include JFETs, MOSFETs and VLSI technologies. Prerequisites: ECE 3331.

ECE 5310 VLSI PROCESSING (3 credits). Presents VLSI fabrication theory. Includes silicon material properties, growth techniques and defects; details of chemical vapor deposition (CVD), thermal oxidation, solid-state diffusion, ion implantation, VLSI lithography and metallization. Prerequisites: ECE 3331.

ECE 5311 MICROELECTRONICS FABRICATION LAB (3 credits). Hands-on fabrication and testing of integrated circuits including oxidation, diffusion, photolithography, metallization and etching. Students perform all process steps required, beginning with polished silicon wafers and ending with completed integrated circuits that are tested and characterized.

ECE 5330 ESD DESIGN AND ANALYSIS (3 credits). Covers electrostatic discharge (ESD) events and provides the tools and knowledge necessary to design and debug on-chip ESD protection networks. (Requirement: Instructor approval of equivalent background or graduate standing.) Prerequisites: ECE 5335.

ECE 5331 IC COMPUTER-AIDED ANALYSIS (3 credits). Presents the fundamentals of CAD techniques for the IC design verification including the hierarchy of simulation tools. Emphasizes the mathematical and numerical techniques used for circuit level simulation. Prerequisites: ECE 2551, ECE 3111.

ECE 5333 ANALOG IC DESIGN (3 credits). Design of analog integrated circuits using bipolar, CMOS and related technologies. Includes bipolar and MOS DC/AC models, fundamental single-stage amplifier topologies, current sources and bias networks, power amplifier topologies and opamp circuit design. Prerequisites: ECE 3111, ECE 3331.

ECE 5335 ADVANCED IC DESIGN AND SIMULATION (3 credits). Design of advanced analog circuit and system ICs using opamps and transconductance amplifiers as the core component. Includes opamp modeling, fully differential opamp considerations and noise limitations. Filter approximation and active network synthesis using switched-capacitor techniques. A/D and D/A conversion. Prerequisites: ECE 5333.

ECE 5350 OPTICAL ELECTRONICS (3 credits). Principles of stimulated emission; electromagnetic field modes in optical resonators; ray tracing techniques in laser resonators and beam delivery systems; Gaussian beam profiles and laser linewidths; noise in lasers and optical amplifiers; excitation methods; mode locking and Q-switching techniques; picosecond and femtosecond laser pulse generation; optical bistable devices.

ECE 5351 FIBER-OPTIC COMMUNICATION SYSTEMS (3 credits). Includes optical fiber links, comparison between optical and electronic communication links; data encoding and bit error rates; properties of single, multimode and polarization preserving optical fibers, including attenuation, pulse spreading, bandwidth and maximum bit rate; transmitter and receiver design considerations, link design.

ECE 5352 FIBER-OPTIC SENSOR SYSTEMS (3 credits). Studies fundamental theory and state-of-the-art fiber-optic sensor systems; comparison with conventional sensors for strain, temperature, electric and magnetic fields; specialized fiber-optic components; use of multimode, singlemode, polarization preserving and high birefringence optical fibers, interferometric- and intensity-based sensor architectures.

ECE 5354 ACOUSTOOPTIC AND ELECTRO-OPTIC DEVICES (3 credits). Theory of operation and system applications, including optical wave propagation through an anisotropic medium, electrooptic and acoustooptic effects; Raman-Nath and Bragg regimes of operation, acoustooptic and electrooptic material properties and selection criteria, operation of laser modulators, deflectors and frequency.

ECE 5355 ELECTROOPTICS LABORATORY (3 credits). Lectures and experiments in photonics with emphasis on fiber optics, and design, fabrication and testing of communications sensor systems.

ECE 5356 OPTICAL WAVEGUIDES AND DEVICES (3 credits). Applications of Maxwell's equations and time-harmonic electromagnetic waves to fiber-optical waveguides; ray trajectories; electromagnetic fields in single- and multimode fibers; attenuation and dispersion mechanisms; inelastic scattering and nonlinear propagation; erbium-doped ultra-broadband optical traveling wave amplifiers.

ECE 5370 SPECIAL TOPICS IN PHOTONICS (3 credits). Topics of current interest in the technical literature on photonics.

ECE 5371 SPECIAL TOPICS IN MICROELECTRONICS (3 credits). Topics of current interest in the technical literature on microelectronics.

ECE 5410 ELECTRODYNAMICS 1 (3 credits). Electrostatics and boundary value problems; solutions of Laplace's and Poisson's equations in Cartesian, spherical and cylindrical coordinates; electrostatic multipole fields; fields in dielectrics; magnetostatics; Maxwell's equations; plane electromagnetic waves; guided waves and resonant cavities; antennas and vector diffraction.

ECE 5411 ELECTRODYNAMICS 2 (3 credits). Special relativity; Lorentz transformations, relativistic kinematics, relativistic energy and momentum; covariance in electrodynamics; relativistic transformations of electromagnetic fields; Lagrangian and Hamiltonian formulations of relativistic particles and fields; the Lienard-Wiechert potentials; radiation from relativistically moving charges.

ECE 5418 FIELD THEORY OF GUIDED WAVES 1 (3 credits). Maxwell's equations; time-harmonic electromagnetic waves; vector and scalar wave equations, analysis of electromagnetic field modes in rectangular and circular cylindrical waveguides using vector potential methods; phase and group velocity; transverse wave impedance; propagating waves and evanescent fields; resonant cavities.

ECE 5419 FIELD THEORY OF GUIDED WAVES 2 (3 credits). Hybrid field modes, longitudinal section electric (LSE) and magnetic (LSM) modes in partially filled waveguides; inhomogeneous boundary conditions and transcendental eigenvalue equations; dielectric waveguides and resonators; stripline and microstrip lines; ridged waveguides; spherical transmission lines and cavities.

ECE 5425 ANTENNAS 1 (3 credits). Reviews basic electromagnetic principles; radiation from infinitesimal electric and magnetic dipoles; antenna directivity and gain; the one-way and radar range equations; array theory and phased arrays; and wire antennas and broadband antennas.

ECE 5426 ANTENNAS 2 (3 credits). Equivalence principles; vector diffraction and its application to horn and reflector antennas; antenna pattern synthesis.

ECE 5431 COMPUTATIONAL ELECTROMAGNETICS (3 credits). Finite difference solutions of differential equations; moment method solutions of integral equations; FDTD, FEM and GTD in electrodynamics.

ECE 5450 AUTOMATED RF MEASUREMENT (3 credits). Operating principles of vector network analyzers and their use in measurement of active and passive two-port RF and microwave networks, including detailed treatment of scattering parameters; spectrum analyzers and their use in measuring two-port transfer functions and mixer signal responses.

ECE 5451 MICROWAVE CIRCUIT DESIGN (3 credits). Scattering matrix representation of two-port microwave networks; impedance matching networks and signal flow graphs; microwave transistor amplifier and oscillator design; synthesis of Butterworth and Tschebyscheff filters.

ECE 5470 SPECIAL TOPICS IN ELECTROMAGNETICS (3 credits). Topics of current interest in the technical literature on electromagnetics. (Requirement: Instructor approval.)

ECE 5495 SPECIAL PROJECT IN ELECTRICAL ENGINEERING (3 credits). Special graduate projects are undertaken on a cooperative basis between the student and a member of the graduate faculty. (Requirement: Instructor approval.)

ECE 5525 SPEECH PROCESSING (3 credits). Fundamentals of digital speech processing, digital models for speech signals, acoustic theory of speech production, speech perception, speech analysis, homomorphic speech processing, coding of speech signals, linear predictive coding, methods for speech recognition and digital speech processing for man-machine communication by voice. Prerequisites: ECE 3222.

ECE 5526 SPEECH RECOGNITION (3 credits). Basic approaches in speech recognition, dynamic time warping, hidden Markov models and neural networks. Prerequisites: ECE 5525.

ECE 5527 SEARCH AND DECODING IN SPEECH RECOGNITION (3 credits). Issues with searching for best answers from recognition hypotheses generated by the recognizer, including lattice networks, dictionaries, language modeling and its use in speech recognition, network search algorithms, word networks and standard lattice format, finite state grammars, Bi-grams, N-grams and other language modeling techniques. Prerequisites: ECE 5226.

ECE 5528 ACOUSTICS OF AMERICAN ENGLISH SPEECH (3 credits). American English phonemes, speech and sound analysis, static properties

of speech sounds; consonants, vowels, obsturent and vowel transitions, consonantal sonorant and vowels, consonant interactions; and acoustic variability.

ECE 5534 COMPUTER NETWORKS 1 (3 credits). Theory, design and analysis of computer communications systems. Topics include TCP/IP, Internet, the World Wide Web, ISO-OSI network architecture, LANs (Ethernet, Fast Ethernet, Token Ring, Token Bus, etc.), ATM, SONET, wireless communications, satellite networks, network modeling and simulation. Prerequisites: ECE 4561.

ECE 5535 COMPUTER NETWORKS 2 (3 credits). Continues ECE 5534. Includes computer network design and analysis topics: network security, network management, distributed network environment, bridges, routers, gateways, congestion control, UNIX network programming, multimedia and network applications. Prerequisites: ECE 5534.

ECE 5546 SURVIVABLE NETWORK OBJECTS (3 credits). Develops distributed applications capable of surviving and roaming throughout the Internet by adapting to new environments while protecting their states. Includes encryption, authentication, digital signature, digital certification, secure socket layer, agent-based network applications and object registry. Prerequisites: ECE 5534.

ECE 5547 PRACTICAL INTERNET (3 credits). Network planning and configuration, switches, routers, firewalls, intrusion detection systems, private networks and virtual private networks, network management, client-server applications. Prerequisites: CSE 5231 or ECE 4561 or ECE 5534.

ECE 5555 WAVELET TRANSFORMS FOR IMAGE PROCESSING (3 credits). Includes wavelet transforms, multiresolution analysis and wavelet design. Discusses applications to signal compression, denoising and feature detection. Prerequisites: ECE 5201 or ECE 5245.

ECE 5561 SWITCHING CONCEPTS (3 credits). The theory and logic design of combinational and sequential circuits. Includes Boolean algebra, combinational circuit analysis, synthesis, decomposition, symmetric functions, threshold functions and logical completeness; sequential circuit analysis, synthesis and state minimization; and linear sequential circuits. Prerequisites: ECE 1552.

ECE 5570 SPECIAL TOPICS IN COMPUTER ENGINEERING (3 credits). State-of-the-art topics in the current literature in computer engineering. Requirement: Instructor approval.)

ECE 5571 DIGITAL SYSTEM DESIGN 1 (3 credits). Applies techniques learned in switching theory to the hardware organization of digital systems. Includes organization and programming of a small computer; design convention; introduction to a hardware-design programming language and hardware programs; control unit microprogramming; intersystem communication; interrupt and input/output.

ECE 5572 DIGITAL SYSTEM DESIGN 2 (3 credits). Applies techniques learned in switching theory to the hardware organization of digital systems. Includes organization and programming of a small computer; design convention; introduction to a hardware-design programming language and hardware programs; control unit microprogramming; intersystem communication; interrupt and input/output. Prerequisites: ECE 5571.

ECE 5595 SPECIAL PROJECTS IN COMPUTER ENGINEERING (3 credits). Special graduate projects undertaken on a cooperative basis between the student and a member of the graduate faculty. (Requirement: Instructor approval.)

ECE 5683 POWER SYSTEMS OPERATION AND CONTROL (3 credits). An in-depth analysis of computer methods for power systems. Topics include system matrices, power-flow studies, optimal dispatch, fault studies and stability analysis with programming considerations for each topic. Prerequisites: ECE 4681.

ECE 5684 POWER SYSTEM RELIABILITY AND PLANNING (3 credits). An appraisal of modern techniques for assessing the adequacy of power systems and for evaluating expansion alternatives. Topics include reliability theory, the state-space method, assessment techniques for various system topologies and determination of feasible expansion. Prerequisites: ECE 4681.

ECE 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

ECE 5961 INTERNSHIP IN ELECTRICAL AND COMPUTER ENGINEERING (1 credit). Provides an opportunity to gain practical experience in industries related to electrical or computer engineering. Students are placed in an industrial environment under the supervision of a practicing engineer. (Requirement: Graduate standing.)

ECE 5999 THESIS IN ELECTRICAL OR COMPUTER ENGINEERING (3–6 credits). Individual work under the direction of a member or members of the graduate faculty on a selected topic.

ENGINEERING MANAGEMENT

ENM 5100 QUALITY ENGINEERING (3 credits). Principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality objectives and product/process engineering to improve system performance. (Requirement: Instructor approval.)

ENM 5200 PROJECT ENGINEERING (3 credits). Principles of project management to design and develop products and services within budget, on time and to specification. Includes work planning,

organization design, requirements analysis, project control and PERT/CPM. (Requirement: Instructor approval.)

ENM 5310 TOPICS IN SYSTEMS ENGINEERING (3 credits). Topics selected from the field of systems engineering, such as requirement analysis, function allocation, cost engineering, risk management and system-level design. (Requirement: Instructor approval.)

ENM 5320 TOPICS IN TECHNICAL MARKETING (3 credits). Topics such as technology diffusion, competitive advantage, innovation, product development and positioning of high-technology products and services. (Requirement: Instructor approval.)

ENM 5330 TOPICS IN ENGINEERING OPERATIONS AND LOGISTICS (3 credits). Topics such as forecasting, plant location, facility layout, inventory systems, maintenance, process engineering, supply chains, scheduling, manufacturing and materials handling. (Requirement: Instructor approval.)

ENM 5340 TOPICS IN TEAM DYNAMICS AND PRODUCTIVITY (3 credits). Topics selected from the areas of team building, communications, creative problem solving in engineering, work design and engineering ethics. (Requirement: Instructor approval.)

ENM 5350 TOPICS IN ENGINEERING MODELING AND DESIGN (3 credits). Topics such as simulation, visualization, animation, graphics, CAD, deterministic and probabilistic models, and data analysis. (Requirement: Instructor approval.)

ENM 5360 TOPICS IN PRODUCT DEVELOPMENT AND TECHNOLOGY STRATEGY (3 credits). Topics such as technology transfer, product strategy formulation, visioning, technology road maps and innovation. (Requirement: Instructor approval.)

ENM 5420 TECHNOLOGY COMMERCIALIZATION STRATEGIES (3 credits). Systematically covers state-of-the-art technical, marketing and business aspects of technology commercialization in 18 steps through three phases and the investigation, feasibility, development, introduction, growth and maturity stages. (Requirement: Graduate standing in engineering, science or mathematics, or instructor approval.)

ENM 5495 SPECIAL PROJECTS IN ENGINEERING MANAGEMENT (3 credits). Special graduate projects undertaken on a cooperative basis between the student and a member of the graduate faculty. May include a literature search in a selected area or research and development in one of the engineering management specialty areas. (Requirement: Instructor approval.)

ENM 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

ENM 5900 ENGINEERING MANAGEMENT INTERNSHIP (3 credits). Industry-based internship experience undertaken under the supervision of a member of the graduate faculty. Provides industrial experience to students without prior experience in a practical engineering setting. Requires industrial presentations. (Requirement: Instructor approval.)

ENM 5999 THESIS RESEARCH (3–6 credits). Individual research work under the direction of a member of the graduate faculty on a selected topic. (Requirement: Instructor approval.)

MECHANICAL/AEROSPACE ENGINEERING

MAE 5050 FINITE ELEMENT FUNDAMENTALS (3 credits). Includes finite element formulation of a continuum, virtual work and energy principles, one- and two-dimensional problems; Ritz method, weighted residuals; time-dependent problems; isoparametric formulations and recent developments utilizing elementary finite element methods and existing software. Prerequisites: MAE 2082, MAE 3083, MTH 2201.

MAE 5060 APPLICATIONS IN FINITE ELEMENT METHODS (3 credits). Emphasizes finite element simulation methods for problems in mechanical design; static solutions; eigenvalue techniques in stability and dynamic analysis; direct and reduced basis formulation of dynamical equations; analyses of structures; use of commercially available software. Prerequisites: MAE 2082, MAE 3083, MTH 2201.

MAE 5110 CONTINUUM MECHANICS (3 credits). Mathematical preliminaries, kinematics of motion, equation of conservation mass, equations for the rates of change of translational momentum, rotational momentum, and energy; the entropy inequality; models of material behavior including the linearly viscous fluid and the linearly elastic solid. Prerequisites: MTH 2001, MTH 2201.

MAE 5120 AERODYNAMICS OF WINGS AND BODIES (3 credits). Approximate analytic solution of nonlinear problems in aerodynamics (including those associated with the effects of compressibility) by iterative methods that exploit the smallness of small parameter; flow about slender wings and bodies; flow about wings with high-aspect ratio. Prerequisites: MAE 5110.

MAE 5130 VISCOUS FLOWS (3 credits). Theory of Navier-Stokes equations; exact solutions for steady and unsteady plane, duct, jet and stagnation point flows; Stokes and Oseen approximations; the

Prandtl concept of the boundary layer and similarity solutions Blasius, Hiemenz, Faulkner and Skan, Hartree, etc.; approximate solutions for nonsimilar boundary layers. Prerequisites: MAE 5110.

MAE 5140 EXPERIMENTAL FLUID DYNAMICS (3 credits). Introduces students to test facilities such as wind tunnels and water tanks. Includes measurements of force and pressure distribution on airfoil principles and applications of laser Doppler velocimetry, hot-wire anemometry, flow visualization methods and modern data acquisition systems (LabView). Prerequisites: MAE 5110.

MAE 5150 COMPUTATIONAL FLUID DYNAMICS (3 credits). Elliptic, parabolic and hyperbolic PDEs; finite-difference formulations; explicit and implicit methods, stability analysis; operator splitting, multistep methods; boundary conditions; grid generation techniques; applications involving Euler boundary layer and full Navier-Stokes equations. Prerequisites: MAE 5110, MTH 3201.

MAE 5160 GAS DYNAMICS (3 credits). Differential conservation equations; one-dimensional steady flows; unsteady wave motion; small perturbations and linearized flows; bodies of revolution, conical flows, and slender body theory; blunt-body flows; three-dimensional supersonic flows; transonic flows; the method of characteristics and numerical computation for supersonic flows; real gas effects. Prerequisites: MAE 5110, MAE 5150.

MAE 5180 TURBULENT FLOWS (3 credits). General introduction, isotropic, homogeneous and shear-flow turbulence, transport processes in turbulent flows, wall and free turbulent shear flows, atmospheric turbulence. Prerequisites: MAE 5110 or MAE 5130.

MAE 5190 SELECTED TOPICS IN FLUID DYNAMICS (3 credits). Selected topics reflecting the current research interests of the faculty and visiting scholars.

MAE 5210 CONDUCTION HEAT TRANSFER (3 credits). Conservation of energy in a deformable continuous medium, the thermal conductivity tensor, superposition, Duhamel's theorem and product solutions; heat flow in one dimension, similarity, Sturm-Liouville theory, the Laplace transform and variable conductivity; generalized Fourier series and Green function techniques. Prerequisites: MAE 4171.

MAE 5220 CONVECTION HEAT TRANSFER (3 credits). Reviews the principle of energy conservation, heat conducting fluid; boundary-layer approximations for large Reynold's number; exact and approximate treatment of laminar internal and external forced convection; turbulent forced convection; and buoyancy-induced convection. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MAE 5210.

MAE 5230 RADIATION HEAT TRANSFER (3 credits). Development of radiative properties from electromagnetic theory; theory and analysis of shape factors; enclosure radiative transfer with diffuse-gray and nongray surfaces; and an introduction to radiative transfer within participating media and semitransparent solids. Prerequisites: MAE 4171.

MAE 5240 SOLAR ENERGY ANALYSIS (3 credits). Studies solar radiation principles, data estimation and prediction. Reviews heat transfer principles, and radiation and optical properties of surfaces. Includes flat plate solar collector analysis and analysis of concentrating collectors, solar energy storage, and solar heating/air conditioning and refrigeration systems. Prerequisites: MAE 4171.

MAE 5290 SELECTED TOPICS IN HEAT TRANSFER AND ENERGY (3 credits). Advanced topics reflecting the current research interests of the faculty and visiting scholars. (Requirement: Instructor approval.)

MAE 5310 COMBUSTION FUNDAMENTALS (3 credits). Includes equilibrium chemical thermodynamics and thermochemistry, chemical kinetics, transport phenomena and conservation equations; Rankine-Hugoniot theory, Chapman-Jouguet waves and detonation and deflagration; diffusion flames and premixed flames; flammability, ignition and quenching. Prerequisites: MAE 3062.

MAE 5316 MECHATRONICS (3 credits). Studies microprocessor-based control of electromechanical systems, sensors and actuators, assembly programming, microprocessor architecture, serial/parallel input/output, programmable peripherals, interrupts, signal interfacing, standard interface protocols, analog to digital conversion, real-time control, and design of microprocessor-based systems. Prerequisites: MAE 4014.

MAE 5318 INSTRUMENTATION AND MEASUREMENT SYSTEMS (3 credits). Studies the fundamentals of sensors and measurements for engineering applications, and software/hardware tools for development of computer-based instrumentation systems. Includes analog signals, signal conditioning, programming virtual instruments, communication standards, data acquisition and process control.

MAE 5320 INTERNAL COMBUSTION ENGINES (3 credits). Investigates the applications of thermodynamic, fluid dynamic and combustion principles to spark- and compression-ignition engines, and direct-injection stratified charge engines; ideal and actual cycle analyses; exhaust emissions, air pollution and control; engine heat transfer; and engine modeling. Prerequisites: MAE 5310.

MAE 5350 GAS TURBINES (3 credits). Introduces characteristics, performance analyses and design methodologies for stationary aircraft gas turbines. Topics include gas turbine cycle analyses, component design of combustors, compressors, turbines and nozzles, fluid dynamics and heat transfer, gas turbine fuels and emissions. Prerequisites: MAE 5310.

MAE 5360 HYPERSONIC AIR-BREATHING ENGINES (3 credits). Introduces the analysis of hypersonic aerospace vehicles, with emphasis on air-breathing propulsion concepts and systems. Topics include performance behavior and cycle analysis of ramjets and scramjets, supersonic mixing and combustion processes, and component design. Prerequisites: MAE 5310.

MAE 5390 SELECTED TOPICS IN COMBUSTION AND PROPULSION (3 credits). Addresses selected topics reflecting the current research interests of the faculty and visiting scholars. (Requirement: Instructor approval.)

MAE 5410 ELASTICITY (3 credits). Analyzes stress and strain in two and three dimensions, equilibrium, compatibility and constitutive equations, energy methods, flexure, stretching, torsion and contact stress formulations, axially symmetric problems. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 5201.

MAE 5420 ADVANCED MECHANICAL DESIGN (3 credits). Covers essential aspects of elasticity-plasticity, kinematics, dynamics, tribology and materials science. Prerequisites: MAE 4024, MAE 4194 or MAE 4292.

MAE 5430 DESIGN OF AEROSPACE STRUCTURES (3 credits). Applications of mechanics to lightweight structures. Considers designing with monolithic and advanced composite materials; stiffened shell structures; buckling instability; failure analysis; variable section beams subjected to nonuniform loads; and computer formulations used in solving structural problems. Prerequisites: MAE 4281.

MAE 5460 FRACTURE MECHANICS AND FATIGUE OF MATERIALS (3 credits). Static and dynamic design and maintenance to prevent structural failure; presence of cracks, stress intensity factor, linear elastic and elastic-plastic fracture mechanics, fracture tests, fatigue crack initiation and propagation, environmental and corrosion effects, fatigue life prediction. Prerequisites: CHE 3260, CHE 3265, MAE 3083.

MAE 5462 INTRODUCTION TO NANOMECHANICS (3 credits). Introduces nanostructures, including carbon nanotubes, semiconductor quantum dots, bio-cells and nanocomposites, and their various applications to novel nanodevices. Fabrication and mechanical behaviors of the nanostructures will be discussed. Students identify, examine and solve mechanical problems at the nanoscale level. Prerequisites: MAE 3083.

MAE 5470 PRINCIPLES OF COMPOSITE MATERIALS (3 credits). Particulate and fiber composites; forms, properties and processing of constituent materials; manufacture of composites, interaction of constituents, micro- and macromechanics and design of composite materials; stress-strain tensors and their transformation; laminate theory of orthotropic materials; strength properties. Prerequisites: CHE 3260, CHE 3265, MAE 3083.

MAE 5480 STRUCTURAL DYNAMICS (3 credits). Principles of dynamics applied to structural analysis, analysis of continuous media and discretized models, free vibration and forced response of structures, modal analysis, energy methods and approximate methods, applications in structural design and experimentation.

MAE 5486 CRASHWORTHINESS (3 credits). Introduces the design of vehicles to protect occupants during collision. Includes trauma biomechanics, crash mechanics, structural crashworthiness, computer simulation of occupant motion and dynamic structural behavior. Draws examples from aeronautical and automotive applications. (Requirement: Instructor approval.)

MAE 5490 SELECTED TOPICS IN SOLID MECHANICS, STRUCTURES AND MATERIALS (3 credits). Addresses selected topics reflecting the current research interests of the faculty and visiting scholars.

MAE 5610 ADVANCED DYNAMICS (3 credits). Newtonian and analytical mechanics; rigid-body dynamics, Euler's equations and spinning bodies; Lagrange's equations, Routhian and Hamiltonian mechanics, canonical transformations and Hamilton-Jacobi theory; dissipative, gyroscopic and circulatory systems; applications of numerical methods to complex dynamics problems. Prerequisites: MAE 2082.

MAE 5630 MODELING AND SIMULATION OF DYNAMIC SYSTEMS (3 credits). Studies theoretical, experimental and computer methods for characterizing dynamic behavior of various physical systems, including generalized approaches to modeling complex interactions between mechanical, electrical, fluid and thermal systems.

MAE 5640 ADVANCED KINEMATICS (3 credits). Provides a uniform presentation of the mathematical foundations for studying spatial motion. Specific topics include general rigid body motion invariants, instantaneous kinematics, finite position theory, bivectors and multivectors, screw theory, theory of Clifford Algebras, quaternions and dual quaternions and exponential coordinates.

MAE 5650 ROBOTICS (3 credits). Introduces the study of robotic manipulators. Includes spatial rigid body displacement, Euler angles, Denavit-Hartenberg coordinate convection for kinematic

analysis, forward and inverse kinematic analyses of serial and parallel chain manipulators, manipulator Jacobians and trajectory generation.

MAE 5660 ROBOT CONTROL (3 credits). Introduces the control of robotic manipulators. Includes Lyapunov control theory, independent joint control, set point and trajectory tracking control, inverse dynamics control, impedance control, force control, hybrid position/force control and robust control.

MAE 5665 ROBOTICS FOR BIOMEDICAL APPLICATIONS (3 credits). Introduces the design of robotic mechanical systems for biomedical applications. Includes mechanical design of robotic surgical and telesurgery systems and automated surgical assistance devices. Addresses the surgical suite requirements for materials, ergonomics, sterilization, regulation and liability.

MAE 5670 SPATIAL MECHANISM DESIGN (3 credits). Advanced topics in spherical and spatial mechanisms. Approximate motion synthesis and quasi-position synthesis methodologies. Includes analysis techniques with respect to force transmission, order, singularity avoidance and solution branching. Uses computer-aided design and visualization software.

MAE 5690 SELECTED TOPICS IN SYSTEMS AND DYNAMICS (3 credits). Addresses selected topics reflecting the current research interests of the faculty and visiting scholars. (Requirement: Instructor approval.)

MAE 5710 BIOMECHANICS (3 credits). Introduces the mechanical and structural aspects of the human skeletal system. Includes the analysis and design of orthopedic implants such as hip and knee replacements. Prerequisites: MAE 3083.

MAE 5720 BIOMEDICAL INSTRUMENTATION (3 credits). Includes concepts and techniques of instrumentation in bioengineering. Emphasizes the effects of instrumentation on the biological system under investigation, transducers and couplers, data conversion, conditioning and transmission, and experimental problems in acute and chronic procedures with static and dynamic subjects. Prerequisites: MTH 2201.

MAE 5730 BIOPHOTONICS AND MICROSCOPY (3 credits). Introduces optical phenomena and the optical properties of biological tissue, basic elements of optics and optical sources. Emphasizes lasers in the context of biomedical applications. Also includes engineering principles of various microscopy modalities. Prerequisites: MTH 2201.

MAE 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

MAE 5900 MAE SEMINAR (0 credits). Presents current research by university faculty, visiting speakers and graduate students. Required of all full-time MAE graduate students.

MAE 5997 INDEPENDENT STUDY (1–3 credits). Individual study under the direction of a member of the MAE graduate faculty.

MAE 5998 NONTHESIS PROJECT (1–3 credits). A directed-study project under the direction of the student's committee. Upon satisfactory completion of the nonthesis project, a maximum of three credits may be applied as part of the requirements for the master's degree (nonthesis option). Requires attendance at the weekly MAE seminar.

MAE 5999 THESIS (3–6 credits). Individual work under the direction of a member of the MAE graduate faculty on a selected topic.

MANAGEMENT

MGT 5000 FINANCIAL ACCOUNTING (3 credits). Studies accounting concepts, the accounting model, measurement processes, financial statements, financial analysis, the accounting cycle, monetary and fixed assets, inventory, current and long-term liabilities, and equity structures of partnerships, proprietorships and corporations.

MGT 5001 MANAGERIAL ACCOUNTING (3 credits). Focuses on internal reporting to managers for use in planning and control, making nonroutine decisions and formulating major plans and policies. Includes cost-volume-profit relationships, flexible budgets and standards, job order and process cost, and cost allocation and accumulation. Prerequisites: MGT 5000.

MGT 5002 CORPORATE FINANCE (3 credits). Covers concepts and tools of corporate financial management including corporate financial planning, forecasting, budgeting, quantitative techniques and practices. Considers the importance of ethics and the international aspects in financial decision-making. Prerequisites: MGT 5000.

MGT 5003 PUBLIC FINANCE (3 credits). Covers concepts and methods of financial management in federal, state and local governments including the analysis of the theory and practice of public finance through taxation, debt instruments, intergovernmental funds and other revenue sources. Reviews financial planning, forecasting, budgeting and financial management practices. Prerequisites: MGT 5000.

MGT 5006 INTRODUCTORY MANAGERIAL STATISTICS (3 credits). Studies methods of collecting, analyzing and interpreting data for managerial decision making. Includes data presentation, measures of central tendency, dispersion and skewness; discrete and continuous probability distributions; sampling methods and sampling distributions; and confidence interval estimation of parameters and tests of hypotheses.

MGT 5007 INTERMEDIATE MANAGERIAL STATISTICS (3 credits). Applies statistical theory to managerial problems, particularly methods of statistical inference for management decision-making. Includes F- and Chi-square distributions, nonparametric tests, analysis of variance, regression and correlation analysis. Prerequisites: MGT 5006.

MGT 5008 FINANCE SEMINAR (3 credits). Discusses advanced topics in finance including current activity, and financial tools and strategy. Blends financial theory with current practices in finance. Prerequisites: MGT 5002.

MGT 5010 SEMINAR IN RESEARCH METHODOLOGY (3 credits). Reviews research methods in managerial disciplines. Includes nature and sources of secondary data, primary data collection techniques, design of research projects, sample selection, model building, etc. Requires a research proposal and presentation of a fully documented research report on the results of the study.

MGT 5011 MANAGEMENT THEORY AND THOUGHT (3 credits). Overviews classical and contemporary management philosophies and theories. Focuses on managing enterprises in a rapidly changing global economy. Includes developing strategic vision, planning, organizing, directing and controlling, social responsibility and international management.

MGT 5013 ORGANIZATIONAL BEHAVIOR (3 credits). Covers the contributions to management theory made by the behavioral sciences. Gives a better understanding of the human being and why he acts as he does. Studies individual and group behavior. Extensively uses current periodicals and case materials.

MGT 5014 INFORMATION SYSTEMS (3 credits). Studies information systems design associated with business organizations. Includes development life cycles, requirements analysis, systems design and performance considerations. Views information systems as strategic tools to provide competitive advantage.

MGT 5015 ORGANIZATIONAL PLANNING AND DEVELOPMENT (3 credits). Studies the concepts, theory, research and operational problems of modern organizations. Includes classical and modern organizational theory, emphasizing the latter. Covers recent research findings and the theory of human relations in industry. Involves students in case studies.

MGT 5016 EMPLOYEE RELATIONS (3 credits). Analyzes, synthesizes and evaluates the major federal and state laws that impinge on the modern work environment. Draws on new insights in the human resources management discipline to abstract, summarize and evaluate the impact of legislation and laws regulating the employee/employer relationship.

MGT 5017 PROGRAM MANAGEMENT (3 credits). Addresses responsibility and authority of a program manager and the integration of program functions in complex organizational structures. Discusses interpersonal relationships within matrix organizations, as well as program conflict resolution and organizational priorities.

MGT 5018 POLICY AND STRATEGY FOR BUSINESS (3 credits). Covers the formulation and implementation of competitive strategies, emphasizing the role of top management. Employs case analyses to expose the multifunctional nature of decision-making at the top management level. Recommended for the graduating semester. May serve as the capstone for certain majors. Prerequisites: MGT 5002, MGT 5019.

MGT 5019 MARKETING (3 credits). Approaches the marketing function from the point of view of the marketing manager. Examines the role of marketing in the firm, the economy and society. Introduces marketing concepts and operational approaches for marketing decision-making. Employs the case method to apply theory to the development of a marketing mix.

MGT 5020 APPLIED MANAGEMENT PROJECT (3 credits). Covers concepts, tools and techniques for evaluation of research proposals and studies. Involves designing, conducting, evaluating and presenting oral and written forms of research. Assignments build on quantitative and qualitative research methods. Recommended for the graduating semester. May serve as the capstone for certain majors.

MGT 5021 BUSINESS LAW (3 credits). Studies how to understand, analyze and effectively deal with issues such as jurisprudence, contracts, property, agency, partnerships, corporations, sales, commercial paper and secured transactions. Also studies aspects of the Uniform Commercial Code.

MGT 5022 ANALYTICAL METHODS FOR MANAGEMENT (3 credits). Introduces the fundamental concepts in business mathematics. Includes linear systems, linear programming (graphical method), matrices and logarithms; and differential calculus and its applications. Noncredit for graduate management programs except to meet foundation requirements.

MGT 5023 MANAGEMENT AND ADMINISTRATION OF CONTRACTS (3 credits). Offers a comprehensive analysis of the procurement process and the resulting contractual relationships. Topics range from a history of procurement through considerations dealing with applicable laws, policies, regulations, methods of contracting, types of contracts and cost-pricing principles.

MGT 5024 PRODUCTION AND OPERATIONS MANAGEMENT (3 credits). Introduces the translation of product and service requirements into facilities, procedures and operating organizations.

Includes product design, production alternatives, facilities location and layout, resource requirements planning and quality control.

MGT 5026 COMPUTER APPLICATIONS FOR BUSINESS (3 credits). Emphasizes a hands-on approach to solving business applications using computer applications. Includes discussion of the most recent developments in computer hardware, software, programming techniques, computer ethics and security. Noncredit for graduate management programs except to meet foundation requirements.

MGT 5031 SEMINAR IN INTERNATIONAL MANAGEMENT (3 credits). Focuses on the problems of the senior executive in the management of the multinational firm. Examines executive decision making within the scope of international concerns relative to various economic, political and cultural environments.

MGT 5033 HUMAN RESOURCES MANAGEMENT (3 credits). Explores issues surrounding the employment of human resources in various organizational settings using lectures/guided discussions and case studies. May include recruitment/selection, job analyses/evaluation, equal employment opportunity, training/development, compensation/benefits, appraisal, labor relations, health and safety, and separation/retirement.

MGT 5034 LAW, TECHNOLOGY AND SOCIETY (3 credits). Critically examines the impact of technology on the legal system and social organization, origin and methodology of the common law. Provides a framework for analyzing social change caused by advancing technology. Analyzes legal concepts from the standpoint of societal reaction to technology. Uses the case study method.

MGT 5035 PUBLIC ADMINISTRATION AND MANAGEMENT (3 credits). Focuses on the problems of administrative management in public agencies and presents methods and strategies to remedy administrative management problems. Uses case studies to apply principles of effective public administrative management.

MGT 5037 GLOBAL ECONOMIC ENVIRONMENT OF BUSINESS (3 credits). Focuses on the importance and impact of foreign trade for the world economies. Emphasizes balance of trade, technology transfer and service economies, and trade barriers, GATT, NAFTA, the World Bank and other issues related to global trade. Prerequisites: MGT 5149.

MGT 5039 ECONOMETRICS (3 credits). Studies construction of econometric models with application in business and economic analyses. Includes single equation regression models, autoregressive and distributed-lag models, dummy variables, simultaneous-equation models and methods. Covers problems and remedies for violations of classical model assumptions. Prerequisites: MGT 5007, MGT 5132, MGT 5133.

MGT 5040 PUBLIC PROGRAM POLICY AND EVALUATION (3 credits). Provides techniques for evaluating public policies and programs. Discusses analytical and other methods in the context of federal, state and local government applications. Includes case studies to reinforce the practical application of evaluation techniques in public sector organizations. As program capstone, requires significant research activity.

MGT 5041 FEDERAL INCOME TAX (3 credits). Covers federal income taxes for individuals, corporations and partnerships. Includes procedure and administration of federal tax law and federal tax research. Prerequisites: MGT 5000.

MGT 5042 INTERNATIONAL BUSINESS (3 credits). Addresses world environments and specific international business activities such as foreign investment and international marketing. Examines the decision-making process for going abroad, along with current issues in international business. Prerequisites: MGT 5002, MGT 5019.

MGT 5047 NEW VENTURE DEVELOPMENT (3 credits). Introduces the new venture development process, including all the steps in the process, the behaviors and characteristics of entrepreneurs, creating the business concept, the business plan, financing and growth management. Prerequisites: MGT 5002, MGT 5019.

MGT 5048 MARKETING ANALYSIS AND STRATEGY (3 credits). Includes advanced analysis of current marketing opportunities and problems stemming from the changing social, economic and political environments. Entails preparation of detailed marketing programs for all or part of an organization's marketing effort, consistent with its financial and managerial resources. Prerequisites: MGT 5019.

MGT 5049 INTERNATIONAL MARKETING (3 credits). Studies formulation of marketing strategies and techniques within the framework of the world marketplace. Examines and adapts fundamental marketing concepts to various economic, cultural, political, legal and business environments. Prerequisites: MGT 5000, MGT 5019.

MGT 5050 ADVANCED INTERNATIONAL MARKETING (3 credits). Covers the environment of international marketing and the need for organization marketing on a global basis to investigate the various economic, social, political, cultural and legal dimensions of marketing concepts. Includes emerging issues that create new problems and opportunities for international marketing managers. Prerequisites: MGT 5019.

MGT 5060 MANAGEMENT OF ASSETS (3 credits). Includes determination of requirements for management of major and secondary items.

Reviews the needs and techniques for accurate asset reporting and analysis of demand data for customers' requirements. Emphasizes problems related to unstable items and management methods required to integrate asset acquisition and management into the life cycle program.

MGT 5061 SYSTEMS AND LOGISTICS SUPPORT MANAGEMENT (3 credits). Addresses the management of evolving systems. Emphasizes planning and support requirements of the system during its life cycle. Includes maintenance planning, physical distribution, manpower requirements, facilities and equipment needs, documentation, systems integration and other support requirements.

MGT 5062 LOGISTICS POLICY (3 credits). Analyzes logistics as a science and provides a comparative analysis of different policy considerations. Reviews the role of logistics in organizational policy and problems, and future trends in ogistics. Involves a significant research paper or challenging capstone project designed to demonstrate mastery over the complete curriculum.

MGT 5063 INVENTORY CONTROL AND MANAGEMENT (3 credits). Includes management techniques and methods related to the life cycle management of material. Addresses material management systems and concepts of standardization, modernization, material reserve, cataloguing, pro-ordering, storage and distribution.

MGT 5064 COST AND ECONOMIC ANALYSIS (3 credits). Covers cost effectiveness, trade-off analysis, system effectiveness model structure, criteria for evaluation of alternative systems, principles of cost accounting and cost estimating for system life cycle. Includes basic math for cost-effective analysis, computer tools for economic modeling and risk assessment. Prerequisites: MGT 5006.

MGT 5065 SUPPLY CHAIN MANAGEMENT (3 credits). Combines lectures, class discussions on assigned topics and case analyses. Includes the role of SCM in the economy and organizations; customer service; SCM information systems; inventory management; managing materials flow and handling; transportation; warehousing; computerization and packaging issues; purchasing; global logistics; organizing for effective SCM; methods to control SCM performance; and implementing SCM strategy.

MGT 5066 SYSTEMS ANALYSIS AND MODELING (3 credits). Applies case analysis and modeling tools to a business environment. Discusses systems analysis and constructs computer models. Includes system classification, problem formulation, decision/risk analysis, modeling techniques, discrete event simulation and evaluation of information. Requires a design project. Prerequisites: MGT 5006.

MGT 5067 SYSTEM MANAGEMENT (3 credits). Includes systems science and general system theory; strategic concepts and process management; systematic decision-making and technical disciplines; and communications theory. Recommended for the graduating semester. May serve as the capstone for certain majors.

MGT 5068 SYSTEM ENGINEERING MANAGEMENT (3 credits). Includes system technical management concepts and methods as applied to the management of system engineering activities. Covers the general principles and requirements of system engineering and application of system management techniques to manage multidiscipline technical teams engaged in development programs. Prerequisites: MGT 5067.

MGT 5069 ADVANCED TECHNIQUES IN SUPPLY CHAIN MANAGEMENT (3 credits). Covers advanced theory and practice of supply chain management including operational and logistics support. Provides an understanding of strategy, organizational structure and new technologies in SCM. Includes the Internet and its effect on SCM, and the concepts and tools used in SCM. Examines requirements, specifications, planning, program design, and maintenance and quality assurance of SCM systems. Prerequisites: MGT 5065.

MGT 5070 SPECIAL TOPICS IN BUSINESS (3 credits). Independent study with a faculty member in some area of business in greater depth than is normally possible in a regular class. Requires a comprehensive term paper.

MGT 5071 DECISION THEORY (3 credits). Examines the normative and empirical dimensions of judgment analysis. Introduces the use of management science techniques and mathematical modeling as a methodology for understanding and facilitating the decision-making process. Prerequisites: MGT 5006.

MGT 5079 TRAFFIC MANAGEMENT (3 credits). Examines the various means of directing, controlling and supervising functions involved in furnishing transportation services and facilities. Examines in detail service support to the customer and the principles and problems involved.

MGT 5084 MATERIEL ACQUISITION MANAGEMENT (3 credits). Examines the life cycle process of acquisition of materiel and materiel systems. Examines systems management and its application from acquisition to termination. Studies need requirements, cost and schedule considerations and procurement procedures. May serve as the capstone for certain majors.

MGT 5087 MANAGEMENT OF TRANSPORTATION SYSTEMS (3 credits). Studies various contemporary carrier modes, emphasizing management problems common to all modes of domestic and international transportation. Investigates and

discusses transportation engineering, use of transportation facilities and materiel, and economic, personnel, labor and union aspects.

MGT 5088 PROJECT AND PROGRAM RISK MANAGEMENT (3 credits). Systematically approaches risk management from project initiation to project planning, implementation, control and closeout. Discusses various techniques and models for qualitative/quantitative risk assessment and risk management in areas such as cost, schedule and outputs. Prerequisites: MGT 5006, MGT 5017.

MGT 5089 MULTIPLE PROJECT MANAGEMENT (3 credits). Examines alternative methods to plan, schedule and control multi-projects within an organizational setting. Includes the role of multiple projects within an organization and the impact on conventional day-to-day workflow. Prerequisites: MGT 5017.

MGT 5090 PRACTICUM FOR PROJECT MANAGEMENT (3 credits). Formulates and applies the knowledge and skills of project management principles and practices in an integrative fashion within a project team environment. Requires a written project plan. Involves a significant research paper or challenging capstone project designed to demonstrate mastery over the complete curriculum. Prerequisites: MGT 5088, MGT 5089.

MGT 5091 RESEARCH SEMINAR IN MANAGEMENT 1 (1 credit). Independent study with a faculty member in some area of management in greater depth than is normally possible in a regular class. Requires a comprehensive term paper.

MGT 5092 RESEARCH SEMINAR IN MANAGEMENT 2 (2 credits). Independent study with a faculty member in some area of management in greater depth than is normally possible in a regular class. Requires a comprehensive term paper.

MGT 5093 PRACTICUM OF QUALITY MANAGEMENT (3 credits). Formulates and applies the knowledge and skills of quality management principles and practices in an integrative fashion within a project environment. Requires a written quality project plan. Involves a significant research paper or challenging capstone project designed to demonstrate mastery over the complete curriculum. Prerequisites: MGT 5024, MGT 5088, MGT 5131.

MGT 5100 DISTRIBUTION MANAGEMENT (3 credits). Distribution systems and management from a cost vs. return view. U.S. and world transportation systems' impact on distribution centers, automated order processing, warehousing techniques and layout, organization for physical distribution management, total systems approach, government regulation, distribution components and management of distribution resources.

MGT 5101 LEADERSHIP THEORY AND EFFECTIVE MANAGEMENT (3 credits). Introduces and examines historical development of leadership theory and supporting research. Considers past and contemporary theory in self-analysis by students to define their own leadership styles. Prerequisites: MGT 5013.

MGT 5105 INTERPERSONAL RELATIONS AND CONFLICT RESOLUTION (3 credits). Covers interpersonal behavior in two-person relationships, emphasizing interpersonal communication and conflict resolution. Also covers group processes, development and how group norms and culture influence interpersonal relationships. Prerequisites: MGT 5013.

MGT 5106 ORGANIZATIONAL COMMUNICATION (3 credits). Includes basic communication theory and the effects of communication on human behavior and organizational effectiveness. Provides a basic understanding of organizational communication theory. Uses case studies and experiential exercises to improve communications skills

MGT 5112 SEMINAR IN CONTEMPORARY ISSUES IN HUMAN RESOURCES MANAGEMENT (3 credits). Surveys significant socio-political, legal, technological and economic issues in contemporary organizations and member work-life quality. Uses current events and personal experiences within organizations. May serve as the capstone for certain majors. Prerequisites: MGT 5033.

MGT 5113 PROJECT MANAGEMENT FOR INFORMATION TECHNOLOGY (3 credits). Examines the components and management process of complex projects from the information technology (IT) perspective. Introduces project management tools and techniques useful to the IT professional. Studies the formation and leadership requirements of project management.

MGT 5114 INTRODUCTION TO INFORMATION SECURITY MANAGEMENT (3 credits). Examines the fundamental principles of computer security as applied to information technology (IT). Covers foundations, psychology, prevention, detection, human factors, technical considerations, management processes and future considerations for the security of information technology.

MGT 5115 GLOBAL INFORMATION TECHNOLOGY MANAGEMENT (3 credits). Covers theory, development and impacts of national and international policy on information technology (IT). Explores how frequent shifts in public policy require IT businesses to adjust rapidly to adhere to regulations. Requires development of sophisticated strategies including new technologies, global transfer and analysis to be able to adapt to the changing environment.

MGT 5119 ACCOUNTING FOR NONPROFIT ENTITIES (3 credits). Covers accounting systems employed by universities and other nonprofit entities. Includes fund accounting used by municipalities and county, state and federal government, and financial management cycle from planning through evaluation. Prerequisites: MGT 5001.

MGT 5131 PRODUCTIVITY MEASUREMENT AND IMPROVEMENT (3 credits). Covers the productivity and quality improvement process, organizing for successful implementation of the Deming philosophy, organizational structure and implementing teams. Includes productivity, profit and quality, organizational anxieties, measurement problems, partial/total firm productivity, JIT and TQM. Prerequisites: MGT 5006.

MGT 5132 BASIC ECONOMICS (3 credits). Covers market forces of supply and demand, concept of utility, firm and production, production function and costs of production, and various market structures. Introduces macroeconomics, the issues of aggregation, circular flow model, monetary sector and the government stabilization policies.

MGT 5133 ADVANCED ANALYTICAL METHODS FOR MANAGEMENT (3 credits). Quantitative models using management science, operations research and decision science techniques with business applications. Includes linear and integer linear programming (graphical and simplex methods), inventory models, queuing models and Markov processes. Prerequisites: MGT 5006, MGT 5022.

MGT 5134 COMMERCIAL ENTERPRISE IN SPACE (3 credits). Includes economic considerations of space processing and Earth resources observation; history of in-space experimentation and developments; definition of Earth's orbital environment and its attendant commercial advantages; launch operations and landing/retrieval; financial/profit considerations of operating in space; and current commercial space opportunities and risks.

MGT 5136 INVESTMENT ANALYSIS (3 credits). Includes portfolio design, analysis and management including the Markowitz approach to portfolio design; the simplified model of William Sharpe; and the capital asset pricing model. Covers the management of bond and equity portfolios, portfolio optimization, arbitrage and hedging techniques. Prerequisites: MGT 5002, MGT 5006.

MGT 5137 THE MANAGEMENT OF ENGINEERING AND TECHNOLOGY (3 credits). Explores relationships between technology, innovation, management and business operations. Studies technology strategy in terms of the discovery-product-market path. Relates the management functions of planning, organizing and controlling to life cycles. Uses case studies.

MGT 5138 BUSINESS ETHICS (3 credits). Covers concepts of moral philosophy and their relevance to decision making, and applies this understanding in a wide variety of practical management settings. Extensively uses case analyses.

MGT 5139 INTERNATIONAL FINANCIAL ANALYSIS (3 credits). Focuses on understanding the problems associated with international financial management. Includes the environment of international financial management, foreign exchange risk management, multinational working capital management, foreign investment analysis and financing foreign operations. Prerequisites: MGT 5002.

MGT 5140 INTERNATIONAL FINANCE (3 credits). Covers international financial systems and methods needed to adapt to the international setting. Includes international monetary system, foreign exchange markets and international trade, international accounting and taxation, foreign direct financial investment, international capital markets, multinational capital budgeting, exchange exposure and risk management. Prerequisites: MGT 5002.

MGT 5141 IMPLEMENTING STATISTICAL PROCESS CONTROL (3 credits). Implements an overall SPC program, emphasizing how to manage a process throughout the entire organization with the aid of tools and methods for the improvement of quality. Includes how to target processes for SPC, conduct process capability studies and maintain ongoing process control. Prerequisites: MGT 5006.

MGT 5142 BUSINESS, GOVERNMENT AND PUBLIC POLICY (3 credits). Covers the legal basis of the relationship of business and government, dimensions of federal regulation of business through Congressional action, administrative oversight by executive department agencies, regulatory power of independent agencies (Federal Reserve, SEC and FTC) and importance of political action committees in the influencing of public policy.

MGT 5145 TECHNOLOGY AND BUSINESS STRATEGY (3 credits). Focuses on the process of developing a technology strategy and integrating it with business strategy. Involves technology situation analysis, technology portfolio development, technology and corporate strategy integration and establishing technology investment priorities. Extensively uses case studies.

MGT 5146 MANAGEMENT OF INNOVATION (3 credits). Considers innovation in a historical context, organizing organizational culture and innovation, managing cross-functional teams, venturing and organization learning, intra- and entrepreneurship, managing R&D resources, executive leadership and the management of innovation and change, and designing innovative organizations. Prerequisites: MGT 5013.

MGT 5147 MANAGEMENT OF TECHNOLOGY RESEARCH SEMINAR (3 credits). Overviews past and current MOT research. Systematically explores adaptation of scientific methodology to the analysis and solution of technology management problems. Requires a written proposal and a formal oral defense.

MGT 5148 DESIGN AND ANALYSIS OF EXPERIMENTS (3 credits). Covers productivity measurement and improvement and quantitative methods used in the management of technology. Includes analysis of means, multifactor analysis of variance, factorial experiments and orthogonal arrays, including personal computer software applications for the design and analysis of experiments. Prerequisites: MGT 5007.

MGT 5149 ECONOMICS FOR BUSINESS (3 credits). Covers advanced economics including economic modeling and forecasting; economic efficiency and allocation of resources in product markets and the public sector; macroeconomics; and open economy, foreign exchange and international trade. Prerequisites: MGT 5006, MGT 5022, MGT 5132.

MGT 5150 MANAGEMENT OF SOFTWARE SYSTEMS (3 credits). Explores management's consideration of functional requirement specifications, design, development, implementation and maintenance of computer-based software systems that provide information technology-related services to organizations. (Requirement: Prerequisite course or equivalent.) Prerequisites: MGT 5014.

MGT 5151 DATABASE SYSTEMS MANAGEMENT (3 credits). Investigates how database management system techniques are used to design, develop, implement and maintain modern database applications in organizations. (Requirement: Prerequisite course or equivalent.) Prerequisites: MGT 5014.

MGT 5152 COMPUTER SYSTEMS ADMINISTRATION (3 credits). Covers a chief information officer's multiple role in management of computer-based resources, both centralized and networked data center operations with wide-area networks and local-area networks; computer-based systems development/maintenance/security. (Requirement: Prerequisite course or equivalent.) Prerequisites: MGT 5014.

MGT 5153 TELECOMMUNICATIONS SYSTEMS MANAGEMENT (3 credits). Explores the legal and technical operation environment of telecommunications in organizations. Assesses organizational ramifications of government telecommunications laws, policies and deregulatory activities. (Requirement: Prerequisite course or equivalent.) Prerequisites: MGT 5014.

MGT 5154 ADVANCED MANAGEMENT INFORMATION SYSTEMS (3 credits). Covers the relationship between information technology and the strategic operational and functional areas of organizations in both global and domestic environments. May serve as the capstone for certain majors. Prerequisites: MGT 5014.

MGT 5160 INTRODUCTION TO eBUSINESS (3 credits). Introduces the concept of eBusiness and how it affects businesses, governments and people. Identifies the major building blocks of an eBusiness organizational system, such as marketing, information technology, product/services distribution and strategic policy/planning. (Requirement: Undergraduate course work in business fundamentals or marketing.)

MGT 5161 POLICY AND ORGANIZATIONAL STRATEGIES FOR eBUSINESS (3 credits). Discusses the various organizational strategies for eBusiness including business-to-business, business-to-consumer, business-to-government and government-to-government, and how they impact the organization's policy-making process. Analyzes in depth various business models. Prerequisites: MGT 5160.

MGT 5162 SURVEY OF INFORMATION TECHNOLOGIES FOR eBUSINESS (3 credits). Surveys information technologies available for an organization's eBusiness enterprise. Covers the role of the Internet; use of search engines for business promotions; strategies for evaluation of effectiveness of eBusiness sites; cost estimation for eBusiness site design, development and implementation; and maintenance technologies. Prerequisites: MGT 5014, MGT 5160.

MGT 5163 MARKETING IN AN INTERNET-BASED ENVIRONMENT (3 credits). Develops the organization's marketing function in an expanded, multi-channel capacity to conduct eBusiness in an Internet-based environment. Discusses barriers to eBusiness market entry and their impact on the organization's decision making. Analyzes sources of product/service availability and cost reduction strategies in eBusiness. Prerequisites: MGT 5019, MGT 5160.

MGT 5165 SPECIAL TOPICS IN eBUSINESS (3 credits). Employs case studies to analyze organizations that plan, design, develop and implement eBusiness operations. Studies the characteristics that make eBusiness successful or unsuccessful in a dynamic environment. Requires written evaluation reports of the eBusiness case studies. Prerequisites: MGT 5160.

MGT 5166 PROJECTS IN eBUSINESS (3 credits). Students work closely with a faculty member to develop an eBusiness project, such as a business plan for a start-up company or an acquisition/merger of existing companies. Requires an applied research project report. Prerequisites: MGT 5160.

MGT 5170 QUALITY MANAGEMENT (3 credits). Introduces principles and techniques for establishing quality goals, identification of customer

needs, measurement of quality objectives and development of process features and controls for improving overall system performance.

MGT 5171 MANAGERIAL DECISION MODELING (3 credits). Covers solving problems with decision trees, decision models based on expected value/uncertainty, forecasting, PERT/CPM, utility-based decision-making, and decision support systems. Uses case studies and computer software, and emphasizes practical applications. Features decision scenarios, decision criteria and decision states. Prerequisites: MGT 5006.

MGT 5211 PROCUREMENT AND CONTRACT MANAGEMENT (3 credits). Overviews in depth the federal acquisition process and introduces the basic concepts, policies and procedures incident to government contracting through the FAR and supplementing directives.

MGT 5212 ADVANCED PROCUREMENT AND CONTRACT MANAGEMENT (3 credits). Covers principles, policies, concepts and procedures in management of contracts and subcontracts. Includes rules of interpretation, subcontracting terms and conditions, in-depth examination of significant contract clauses, patent/data provisions, risk allocation and assumption, impossibility of performance, product liability, warranties and claims. Prerequisites: MGT 5211.

MGT 5213 CONTRACT CHANGES, TERMINATIONS AND DISPUTES (3 credits). Uses case studies and lectures to examine in depth the post-award management problems associated with contract administration. Covers contract changes, terminations, disputes and other issues. Prerequisites: MGT 5211.

MGT 5214 COST PRINCIPLES, EFFECTIVENESS AND CONTROL (3 credits). Includes financial and accounting overviews of government acquisition policy and procedures. Requires completion of foundation requirements. Prerequisites: MGT 5001, MGT 5211.

MGT 5217 CONTRACT AND SUBCONTRACT FORMULATION (3 credits). Studies in depth the pre-award phase of the federal acquisition process. Uses class discussions and case studies to examine the management problems from the perspective of the contracting office, requiring activity, courts, Congress and the contractors. Prerequisites: MGT 5211.

MGT 5218 CONTRACT NEGOTIATIONS AND INCENTIVE CONTRACTS (3 credits). Explores, analyzes and discusses negotiation concepts and techniques, and places them into practice using mock negotiations. Examines all types of contracts. Prerequisites: MGT 5211.

MGT 5220 CONTRACT MANAGEMENT RESEARCH SEMINAR (3 credits). Advanced study and research of topical government contract management issues. Involves a significant research paper or challenging capstone project designed to demonstrate mastery over the complete curriculum. Prerequisites: MGT 5211.

MGT 5231 GOVERNMENT CONTRACT LAW (3 credits). Focuses on the method rather than the material. Uses the case method of study and basic source material to cover all facets of procurement law. Emphasizes legal methods, logic and the developmental concepts of procurement law.

MGT 5240 BUSINESS AND LEGAL ASPECTS OF INTELLECTUAL PROPERTY (3 credits). Examines patents, trademark, copyright and trade secret law.

MGT 5270 SPECIAL TOPICS IN CONTRACTS MANAGEMENT (3 credits). Independent study with a faculty member in an area of contract management in greater depth than is normally possible in a regular class. Requires a comprehensive term paper. (Requirement: Instructor approval.) Prerequisites: MGT 5211.

MGT 5500 INTEGRATED LOGISTICS MANAGEMENT (3 credits). Provides the framework for integrated logistics support (ILS). Discusses the management tools available to logistics managers and places ILS in perspective within the acquisition process. Includes understanding of all elements of ILS, the relationship of ILS elements to ILS planning and current systems acquisition practices.

MGT 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

MGT 5999 THESIS (3–6 credits). Individual research under the direction of a member of the graduate faculty on a selected topic. After satisfactorily completing the thesis, a maximum of six credits can be applied as part of the requirements for certain master's programs.

MATHEMATICS

MTH 1701 COLLEGE ALGEBRA (3 credits). Real-number system; arithmetic operations with polynomials, special products and factoring; linear, fractional and quadratic equations; inequalities, exponents, radicals and absolute values; functions and graphs; and complex numbers, logarithms, logarithmic and exponential functions. Credit cannot be applied toward any Florida Tech degree except business, communication, humanities, management and psychology.

MTH 1702 APPLIED CALCULUS (3 credits). Elements of differential and integral calculus with application to business, economics, management and the social and life sciences, as well as maxima, minima, rates, exponential growth and decay, and some techniques of integration. Prerequisites: MTH 1701.

MTH 2051 DISCRETE MATHEMATICS (3 credits). Formulation of precise definitions and their negations using propositional and predicate logic; argument analysis and proof techniques including induction; number theory; and sets, relations, functions, directed graphs and elementary counting arguments. (Requirement: Passing score on placement test or prerequisite course.) Prerequisites: MTH 1000 or MTH 1001 or MTH 1702.

MTH 5007 INTRODUCTION TO OPTIMIZATION (3 credits). An applied treatment of modeling, analysis and solution of deterministic (e.g., nonprobabilistic) problems. Topics include model formulation, linear programming, network flow, discrete optimization and dynamic programming. (Requirement: At least one upper-level undergraduate math course.)

MTH 5009 INTRODUCTION TO PROBABILISTIC MODELS (3 credits). An applied treatment of modeling, analysis and solution of problems involving probabilistic information. Topics chosen from decision analysis, inventory models, Markov chains, queuing theory, simulation, forecasting models and game theory. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 2401.

MTH 5050 SPECIAL TOPICS (3 credits). Contents may vary depending on the needs and interests of the students and the fields of expertise of the faculty. (Requirement: Instructor approval.)

MTH 5051 APPLIED DISCRETE MATHEMATICS (3 credits). Logic fundamentals, induction, recursion, combinatorial mathematics, discrete probability, graph theory fundamentals, trees, connectivity and traversability. Applications from several fields of science and engineering, including computer science, operations research, and computer and electrical engineering. Prerequisites: MTH 2051.

MTH 5070 EDUCATIONAL STATISTICS (3 credits). Includes sampling procedures, frequency distributions, measures of central tendency, estimation of variability, the normal distribution, differences between two groups, analysis of variance and correlation. Also includes nonparametric techniques, multivariate techniques and computer analysis of educational data.

MTH 5101 INTRODUCTORY ANALYSIS (3 credits). Rigorous treatment of calculus. Includes sequences and series of real numbers, limits of functions, topology of the real line, continuous functions, uniform continuity, differentiation, Riemann integration, sequences and series of functions, Taylor's theorem, uniform convergence and Fourier series. Prerequisites: MTH 2001, MTH 2201.

MTH 5102 LINEAR ALGEBRA (3 credits). Linear algebra, systems of linear equations and Gauss elimination method; inverses, rank and determinants; vector spaces; linear transformations, linear functional and dual spaces; eigenvalues, eigenvectors; symmetric, Hermitian and normal transformations; and quadratic forms. (Requirement: Undergraduate course in multivariable calculus or linear algebra.)

MTH 5107 OPTIMIZATION MODELS AND METHODS (3 credits). Surveys popular optimization models and algorithms. Topics chosen from linear, integer, nonlinear, dynamic and combinatorial optimization. (Requirement: At least one upper-level undergraduate math course.)

MTH 5111 REAL VARIABLES 1 (3 credits). Studies basic topology, continuous and semicontinuous functions, metric spaces, differentiation, measures, product measure, Lebesgue integration, Radon-Nikodym Theorem, Lp-spaces and measures on topological spaces. Prerequisites: MTH 5101.

MTH 5112 REAL VARIABLES 2 (3 credits). Studies basic topology, continuous and semicontinuous functions, metric spaces, differentiation, measures, product measure, Lebesgue integration, Radon-Nikodym Theorem, Lp-spaces and measures on topological spaces. Prerequisites: MTH 5111.

MTH 5115 FUNCTIONAL ANALYSIS (3 credits). Banach spaces, Hilbert spaces, topological vector spaces, bounded and unbounded linear operators, spectral theory. Prerequisites: MTH 5101.

MTH 5125 APPLIED COMPLEX VARIABLES (3 credits). Analytic functions, Cauchy-Reimann equations, contour integration, Cauchy theorem, Cauchy integral formula, Taylor and Laurent series, residue theorem and applications, linear fractional transformations, conformal mapping, Schwarz-Christoffel transformation. Inversion integral for Laplace transform with complex argument; inverse Laplace transforms. Prerequisites: MTH 2001, MTH 2201.

MTH 5130 THEORY OF COMPLEX VARIABLES (3 credits). Topology of the complex plane, analytic functions, Cauchy's integral formula, Liouville's theorem, maximum modulus theorem, Taylor and Laurent series, singularities, residue theorem, analytic continuation, entire functions, infinite product representation and conformal mapping. Prerequisites: MTH 2201, MTH 4101.

MTH 5201 MATHEMATICAL METHODS IN SCIENCE AND ENGINEERING 1 (3 credits). Fourier series and their convergence properties; Sturm-Liouville eigenfunction expansion theory; Bessel and Legendre functions; solution of heat, wave and Laplace equations by separation of variables in Cartesian coordinates. Prerequisites: MTH 2001, MTH 2201.

MTH 5202 MATHEMATICAL METHODS IN SCIENCE AND ENGINEERING 2 (3 credits). Solution of heat, wave and Laplace equations by separation of variables in cylindrical and spherical coordinates. Associated Legendre functions, hypergeometric functions and spherical harmonics.

Fourier transforms and separation of variables for heat and wave equations on infinite intervals. Vector integral calculus. Prerequisites: MTH 5201.

MTH 5203 MATHEMATICAL METHODS IN SCIENCE AND ENGINEERING 3 (3 credits). General perturbation techniques for linear and nonlinear ordinary differential equations, boundary layer theory, WKB methods, multiple scale analysis, approximate methods of solution, asymptotic expansion of integrals, asymptotic power series solutions of linear ODEs near irregular singular points. Prerequisites: MTH 5125, MTH 5201.

MTH 5220 THEORY OF ORDINARY DIFFERENTIAL EQUATIONS (3 credits). Includes basic existence theory, differential and integral inequalities, qualitative and quantitative theory, and Lyapunov's second method. Prerequisites: MTH 2201, MTH 4101.

MTH 5230 PARTIAL DIFFERENTIAL EQUATIONS (3 credits). Includes the Hamilton-Jacobi equation; and elliptic, parabolic and hyperbolic problems, Green function methods, transform methods, maximum principle. Prerequisites: MTH 2001, MTH 2201, MTH 4101.

MTH 5301 NUMERICAL ANALYSIS (3 credits). Includes Gaussian elimination and solution of linear systems of equations, root finding methods, systems of nonlinear equations, interpolation, numerical integration, initial value problems for ODEs and fast Fourier transform. Prerequisites: CSE 1502 or CSE 1503 or CSE 2050, MTH 2201.

MTH 5305 NUMERICAL LINEAR ALGEBRA (3 credits). Covers iterative methods of solution of systems of linear equations, numerical methods for computing eigenvalues and eigenvectors, and singular value methods for least squares problems. Prerequisites: MTH 5301.

MTH 5310 NUMERICAL METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS (3 credits). Numerical methods for initial value problems, boundary value problems and eigenvalue problems for ordinary differential equations. Runge-Kutta methods, multistep and adaptive methods, stiff equations and A-stable methods, collocation. Prerequisites: MTH 5301.

MTH 5315 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (3 credits). Covers finite difference and finite element methods for partial differential equations. Prerequisites: MTH 3201, MTH 5301.

MTH 5320 NEURAL NETWORKS (3 credits). Introduces architectures, algorithms and applications. Includes single and multilayer perceptrons, counterpropagation, Kohonen self-organization, adaptive resonance theory, neocognition, probabilistic neural networks and Boltzmann machines with and without learning, recurrent neural networks. Prerequisites: CSE 1502 or CSE 1503 or CSE 2050, MTH 2201.

MTH 5401 APPLIED STATISTICAL ANALYSIS (3 credits). Covers statistical distributions, statistical tests for data, least squares and regression, estimations, tests of hypotheses, analysis of variance, planning and designing research experiments, randomized blocks, Latin and Graeco-Latin squares and data reduction, analysis using ANOVA (analysis of variance) and other methods. Prerequisites: MTH 2001.

MTH 5411 MATHEMATICAL STATISTICS 1 (3 credits). Covers discrete and continuous random variables, generating and moment generating functions, multivariate distributions, covariance and correlation, sums of independent random variables, conditional expectation, Central Limit Theorem, Markov and Chebyshev inequalities and the Law of Large Numbers. (Requirement: Undergraduate courses in multivariable calculus and linear algebra.)

MTH 5412 MATHEMATICAL STATISTICS 2 (3 credits). Includes maximum likelihood and Bayes estimators, confidence intervals, testing hypotheses, uniformly most powerful tests, nonparametric methods (chi-square and Kolmogorov-Smirnov goodness-of-fit tests) and regression analysis . Prerequisites: MTH 5411.

MTH 5420 THEORY OF STOCHASTIC PROCESSES (3 credits). Includes discrete- and continuous-time stochastic processes, point and counting processes and Poisson counting process; as well as compound Poisson process, nonstationary Poisson process, renewal theory, regenerative processes and Markov chains. Prerequisites: MTH 5411.

MTH 5425 THEORY OF STOCHASTIC SIGNALS (3 credits). Covers univariate and multivariate distributions, generating and moment generating functions; autocorrelation, wide-sense, strict-sense stationary, voltage, Poisson, Wiener, random telegraph signal and white noise processes; Dirac delta function, Fourier transform, system response, transfer function and spectral analysis. (Requirement: Instructor approval.)

MTH 5430 QUEUING THEORY (3 credits). Includes queuing processes; imbedded and continuous time parameter processes; Markov, semi-Markov and semi-regenerative processes; single-server and multiserver queues; and processes of servicing unreliable machines. Controlled stochastic models. Prerequisites: MTH 5411.

MTH 5434 STOCHASTIC ANALYSIS OF FINANCIAL MARKETS 1 (3 credits). Lays the foundation for mathematical concepts widely applied in financial markets. Uses economical theory with stochastics (martingales, Wiener, Markov, Ito processes, stochastic differential equations) to derive fair option prices and to hedge call options. Also uses fluctuation theory to predict stocks' crossing of critical levels. Prerequisites: MTH 5411 or MTH 5425.

MTH 5436 STOCHASTIC ANALYSIS OF FINANCIAL MARKETS 2 (3 credits). Offers multidimensional stochastics applied to financial markets. Continues with multivariate Ito processes and multidimensional Feynman-Kac theorems, hedging of American and exotic call options and forward exchange rates. Introduces time-sensitive analysis of stocks, and risk theory. Prerequisites: MTH 5434 or ORP 5025.

MTH 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

MTH 5999 THESIS (3–6 credits). Individual work under the direction of a member of the graduate faculty on a selected topic in the field of mathematics. (Requirement: Instructor approval.)

OPERATIONS RESEARCH

ORP 5001 DETERMINISTIC OPERATIONS RESEARCH MODELS (3 credits). An applied treatment of modeling, analysis and solution of deterministic operations research problems. Includes model formulation, linear programming, network flow and transportation problems and algorithms, integer programming and dynamic programming. (Requirement: At least one upper-level undergraduate math course.)

ORP 5002 STOCHASTIC OPERATIONS RESEARCH MODELS (3 credits). An applied treatment of modeling, analysis and solution of probabilistic operations research problems. Topics chosen from decision analysis, game theory, inventory models, Markov chains, queuing theory, simulation, forecasting models. (Requirement: At least one upper-level undergraduate math course, preferably probability and statistics.)

ORP 5003 OPERATIONS RESEARCH PRACTICE (3 credits). Includes OR methodology, how an OR analyst interacts with clients, and preparation and presentation of oral reports. Students form teams to analyze real cases where each student gets an opportunity to be a team leader and present oral reports. Prerequisites: ORP 5001, ORP 5002.

ORP 5010 MATHEMATICAL PROGRAMMING (3 credits). Surveys popular optimization techniques. Topics chosen from linear, integer, nonlinear, dynamic and network flow programming; combinatorial graph algorithms. (Requirement: Prerequisite course or instructor approval.) Prerequisites: MTH 5102 or ORP 5001.

ORP 5011 DISCRETE OPTIMIZATION (3 credits). Studies combinatorial optimization and integer programming. Prerequisites: MTH 5051, ORP 5001.

ORP 5020 THEORY OF STOCHASTIC PROCESSES (3 credits). Introduces stochastic models, discrete- and continuous-time stochastic processes, point and counting processes, Poisson counting process, compound Poisson processes, nonstationary Poisson processes, renewal theory, regenerative processes and Markov chains. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 5411.

ORP 5021 QUEUING THEORY (3 credits). Includes queuing processes; imbedded and continuous time parameter processes; Markov, semi-Markov and semi-regenerative processes; single-server and multiserver queues; processes of servicing unreliable machines and computer applications; and controlled stochastic models. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 5411.

ORP 5025 STOCHASTIC ANALYSIS OF FINANCIAL MARKETS 1 (3 credits). Lays the foundation for mathematical concepts widely applied in financial markets. Uses economic theory with stochastics (martingales, Wiener, Markov, Ito processes, stochastic differential equations) to derive fair option prices and hedge call options. Also uses fluctuation theory to predict stocks' crossing of critical levels. Prerequisites: MTH 5411 or MTH 5425.

ORP 5026 STOCHASTIC ANALYSIS OF FINANCIAL MARKETS 2 (3 credits). Offers multidimensional stochastics applied to financial markets. Continues with multivariate Ito processes and multidimensional Feynman-Kac theorems, hedging of American and exotic call options and forward exchange rates. Introduces time-sensitive analysis of stocks, and risk theory. Prerequisites: MTH 5435 or ORP 5025.

ORP 5030 DECISION ANALYSIS (3 credits). Covers normative models of decisions under certainty, risk and uncertainty; assessment of subjective probability and utility functions; Bayesian decision analysis and the value of information; influence diagrams; and descriptive aspects of decision making. (Requirement: Undergraduate statistics course.)

ORP 5031 MULTIOBJECTIVE DECISION ANALYSIS (3 credits). Covers normative models of decisions considering multiobjective and multiattribute models. Includes multiattribute utility theory, the analytical hierarchy process, linear multiobjective programming and goal programming. Prerequisites: ORP 5001, ORP 5030.

ORP 5040 QUALITY ASSURANCE (3 credits). Covers the principles and application of statistical quality control and statistical process control. (Requirement: Undergraduate statistics course.)

ORP 5041 RELIABILITY ANALYSIS (3 credits). Covers the principles of reliability analysis and assessment; reliability probability models; combinatorial and system reliability; and reliability estimation. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 5411.

ORP 5042 RELIABILITY, AVAILABILITY AND MAINTAINABILITY (3 credits). Discusses maintainability concepts relating to system effectiveness and support-system design. Includes basic mathematical concepts, design concepts and data analysis used in quantifying availability, maintainability and reliability as measures of operational readiness and system effectiveness. Prerequisites: ORP 5041.

ORP 5050 DISCRETE SYSTEM SIMULATION (3 credits). Covers the principles of building and using a discrete event simulation; construction and statistical testing of random variate generators; statistical analysis and validation of results; design of simulation projects; and variance reduction methods. (Requirement: Instructor approval or prerequisite course.) Prerequisites: MTH 5411.

ORP 5051 APPLIED EXPERT SYSTEMS (3 credits). Covers the concepts and methods of rule-based expert systems; methods of knowledge representation; and use of an expert system shell to build a small expert system. Noncredit for CS majors.

ORP 5070 SEQUENCING AND SCHEDULING (3 credits). Bridges the gap between scheduling theory and its application in manufacturing and service environments. Emphasizes basic scheduling principles and uses selected readings and case studies to illustrate the use of these concepts in industrial environments.

ORP 5090 SPECIAL TOPICS IN OPERATIONS RESEARCH 1 (3 credits). Content variable depending on the fields of expertise of the faculty and the desire and needs of the students.

ORP 5091 SPECIAL TOPICS IN OPERATIONS RESEARCH 2 (3 credits). Content variable depending on the fields of expertise of the faculty and the desire and needs of the students. Prerequisites: ORP 5090.

ORP 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

ORP 5999 THESIS RESEARCH (3–6 credits). Individual research under the direction of a major adviser approved by the chair of the program. A maximum of six credits may be credited toward the master's degree.

SPACE SYSTEMS

SPC 5001 INTRODUCTION TO SPACE SYSTEMS (3 credits). Includes systems engineering, space flight history, space environment, astrodynamics, rocket propulsion, launch vehicle selection, space telecommunications, remote sensing, spacecraft configuration, structures, materials, power and thermal systems, launch and space mission operations, spacecraft navigation, guidance, control and military space applications.

SPC 5002 INTRODUCTION TO SPACE ENVIRONMENT (3 credits). Introduces properties of the space environment, particularly those important to space system design and operations. Includes microgravity, high vacuum, excited molecular species, space debris, the heliosphere, solar and cosmic radiation, solar-planetary interactions, planetary magnetospheres, trapped radiation and planetary ionospheres and thermal plasmas.

SPC 5004 SPACE PROPULSION SYSTEMS (3 credits). Includes principles of rocket propulsion, liquid and solid chemical rockets, throttling and thrust vectoring, electric and electromagnetic propulsion, solar sailing, space tethers and nuclear radioisotope, fission reactor and fusion propulsion systems. Prerequisites: SPC 5001.

SPC 5005 SPACE POWER SYSTEMS (3 credits). Includes energy conversion and storage in space; chemical, mechanical and thermal energy storage; fuel cell types; photovoltaic cells, thermionic, thermoelectric and radioisotope thermoelectric generators; power generators; space nuclear technology; and space station energy system design. Prerequisites: SPC 5001.

SPC 5006 SPACE COMMUNICATIONS AND DATA SYSTEMS (3 credits). Reliable spacecraft telecommunication systems via radio frequency links with small performance margins. Digital modulation techniques, noise temperature, channel capacity and data/waveform coding techniques for BER improvement. Methods of data acquisition, storage and processing. Prerequisites: SPC 5001.

SPC 5009 SPACE STRUCTURES AND MATERIALS (3 credits). Design of structures of adequate strength and stability with little weight margin. Tension, torsion, compound stresses, simple and composite beams, thin- and thick-walled cylinders and buckling. Properties of space-qualified materials, deterioration, damage, outgassing, oxidation, radiation resistance. Prerequisites: SPC 5001.

SPC 5010 SPACECRAFT GUIDANCE, NAVIGATION AND CONTROL (3 credits). The principles and practice of electronic, inertial and stellar navigation, onboard and ground-controlled; attitude control methods and systems; and orbital guidance technology and systems. Prerequisites: SPC 5001.

SPC 5011 HUMAN SPACE SYSTEMS (3 credits). The role of astronauts in space. Astronaut and cosmonaut achievements in space research, extravehicular activity, long-duration space flight and lunar exploration. The space shuttle, space stations, future space habitats, lunar bases and expansion into heliocentric space. Prerequisites: SPC 5001.

SPC 5012 SPACECRAFT ENVIRONMENT (3 credits). The pre- and post-launch interactions between a space vehicle and its environment, including atmospheric density and composition; gravity and free-fall; mechanical, thermal

electromagnetic field and energetic particle stresses; space debris impacts; and conducting space tether applications.

SPC 5013 SPACE SYSTEMS ASTRODYNAMICS (3 credits). Includes two- and three-body orbital problems, sun-synchronous mapping orbits, geostationary orbit and perturbations, out-of-plane orbital transfers, orbital rendezvous, ballistic missile problems and patched conic and gravity-assist interplanetary trajectories.

SPC 5014 SPCACRAFT DYNAMICS AND CONTROL (3 credits). Studies the dynamics of spacecraft attitude motion and pointing controls. Includes coordinate conversions, spacecraft principle axes, attitude control thrusters, spin and momentum exchange devices. Also includes spacecraft control transfer functions, disturbance torques and stability.

SPC 5017 AEROSPACE REMOTE SENSING SYSTEMS (3 credits). Principles and applications of remote sensing from the atmosphere and space; sensors for various wavelengths, imaging systems, data handling, image reconstruction and processing; contemporary remote sensing applications; geographic information systems and nonterrestrial atmospheres. Prerequisites: SPC 5001.

SPC 5018 LAUNCH AND SPACE MISSION OPERATIONS (3 credits). Overviews typical mission operations, from prelaunch through launch, tracking, orbit modification, spacecraft deployment and checkout. Range tracking, telemetry, safety instrumentation, transition to on-orbit communications, and tracking and data relay satellite system. Prerequisites: SPC 5001.

SPC 5065 SPACE SYSTEMS FOR REMOTE OPERATIONS (3 credits). Principles of robotics, artificial intelligence and remotely controlled exploration, operation, observation and manipulation. Design of equipment for processing, manufacturing, maintaining and repairing equipment in space, and in lunar and planetary environments. Prerequisites: SPC 5001.

SPC 5066 SPACEFLIGHT HUMAN PHYSIOLOGY (3 credits). Emphasizes the physiologic capabilities and limitations of astronauts. Reviews data for each phase of space flight from the U.S. and Russian space programs. Previews human participation in long-duration space station, lunar and planetary missions. (Requirement: Graduate standing.)

SPC 5080 SPACE MISSIONS (3 credits). The competitive design, by student teams, of a space mission specified by the instructor. Candidate mission subjects include astronomy, communications, human space missions, planetary and interplanetary robotic exploration and remote sensing. (Requirement: Satisfactory completion of six required space systems courses with a GPA of at least 3.0.)

SPC 5090 SPECIAL TOPICS IN SPACE SYSTEMS (3 credits). Individual study of specific problems in space systems. (Requirement: Department head approval.)

SPC 5091 SPECIAL TOPICS IN SPACE SYSTEMS (1 credit). Individual study of specific problems in space systems. (Requirement: Department head approval.)

SPC 5092 SPECIAL TOPICS IN SPACE SYSTEMS (2 credits). Individual study of specific problems in space systems. (Requirement: Department head approval.)

SPC 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

SPC 5999 THESIS (3–6 credits). Individual work under the direction of a member of the graduate faculty on a selected topic in the field of space systems. (Requirement: Completion of 18 semester hours in space systems and department head approval.)

SPACE SCIENCES

SPS 1010 INTRODUCTION TO ASTRONOMY (3 credits). A descriptive survey of astronomical topics suitable for both majors and nonmajors in the space sciences. Includes properties of light, astronomical instrumentation, stellar structure and evolution, the interstellar medium, galactic formation and evolution, large scale structure and cosmology.

SPS 1020 INTRODUCTION TO SPACE SCIENCES (3 credits). Studies the solar system and its member planets, moons, rings and small bodies; their formation, dynamic, chemistry, atmospheres, surface features, interiors and magnetic fields. Presents results of recent space probes in a comparative study of the solar system's members.

SPS 2010 OBSERVATIONAL ASTRONOMY (3 credits). Combines lecture and observational labs to provide an introduction to the techniques of observational astronomy. Includes celestial coordinate systems, time, apparent stellar motions, constellations, the use of star charts and catalog, and visual CCD photometry. Prerequisites: MTH 1001, SPS 1010.

SPS 3010 GEOPHYSICS (3 credits). Introduces the structure, internal constitution, deformation and dynamics of the solid Earth as revealed by surface geophysical manifestations (gravity, magnetic, electrical, seismic). Includes heat flow, electromagnetic induction, tides, the gravitational field and magnetic field. Prerequisites: MTH 2001, PHY 2002.

SPS 3020 METHODS AND INSTRUMENTATION (3 credits). Detailed introduction to the techniques and instrumentation used in modern observational astronomy and space science. Includes astronomical sources, observational limits, telescopes, atmospheric effects, spectrographs, single-channel detectors and advanced solid-state detectors of all types. Prerequisites: PHY 2002.

SPS 3030 ORBITAL MECHANICS (3 credits). Provides the foundations of basic gravitation and orbital theory. Includes coordinate and timekeeping systems, the two-body problem, particle dynamics and motion under inverse square forces, particularly as applied to spacecraft orbit determinations, trajectories, time of flight and maneuvers. Prerequisites: PHY 3011.

SPS 3040 FUNDAMENTALS OF REMOTE SENSING (3 credits). History, measurement philosophy, orbits, vehicles, the nature of electromagnetic radiation (EMR), blackbodies, Maxwell's equations, interaction of EMR with matter, polarization, radiance, irradiance, radiative transfer and an overview of ultraviolet, visible, infrared and microwave radiometry and instrumentation. Prerequisites: PHY 2002.

SPS 3901 RESEARCH EXPERIENCE IN SPACE SCIENCES (1 credit). Individual research directed by a faculty member. May not be used in place of any named courses in the major program. Requires the preparation and presentation of a report on the research. May be repeated for a maximum of four credits. (Requirements: GPA of 3.0 or higher, sophomore or higher standing, and instructor and department head approval.)

SPS 4010 ASTROPHYSICS 1: INTRODUCTION TO STELLAR STRUCTURE AND EVOLUTION (3 credits). Introduces the physics of the sun and stars. Includes properties of E&M radiation, stellar distances and magnitudes, radiative transfer, the sun, the ISM and star formation, stellar evolution, stellar endpoints and variable stars. Prerequisites: MTH 2201, PHY 3060.

SPS 4020 ASTROPHYSICS 2: GALACTIC STRUCTURE AND COSMOLOGY (3 credits). Includes galactic coordinates, galactic rotation curve, N-body concepts and the virial theorem, Galactic formation and evolution, external galaxies, galaxy cluster evolution, Hubble's law and the distance scale, large-scale structure, cosmology and the particle physics connection. Prerequisites: SPS 4010.

SPS 4025 INTRODUCTION TO SPACE PLASMA PHYSICS (3 credits). Introduces the physics of ionized gases beginning with the subjects of single-particle motion, collection of particles, fluid description of plasmas and magnetohydrodynamics. Emphasizes the role of plasmas in solar-terrestrial space physics. Includes heliospheric, magnetospheric and ionospheric topics. Prerequisites: PHY 3440.

SPS 4030 PHYSICS OF THE ATMOSPHERE (3 credits). Studies the behavior of Earth's lower atmosphere, including an introduction to comparative planetology, atmospheric evolution, thermodynamics, dynamics, waves and turbulence, clouds, hurricanes, global circulation and global change. Prerequisites: MTH 2201, PHY 3060.

SPS 4035 COMPARATIVE PLANETOLOGY (3 credits). Comprehensively surveys observations from both space-based and Earth-based experimentation, incorporated with the major planetary bodies, asteroids, comets and other small orbitals. Discusses both planetary interiors surface features and atmospheres. Prerequisites: PHY 3060, SPS 1020.

SPS 4110 SENIOR LABORATORY (2 credits). Students conduct experiments in optics, atomic structure, nuclear and solid state physics that are basic to observations in space sciences. (Requirement: Senior standing in space sciences.)

SPS 4200 SENIOR SEMINAR 1 (1 credit). Includes reports and discussions on selected topics in contemporary, experimental and theoretical physics and space sciences. (Requirement: Student must be within three semesters of graduation.)

SPS 4201 SPECIAL TOPICS IN SPACE SCIENCES (3 credits). Studies specific problems of space sciences. (Requirement: Department head approval.)

SPS 4210 SENIOR SEMINAR 2 (1 credit). Includes reports and discussions on selected topics in contemporary, experimental and theoretical physics and space sciences. (Requirement: Student must be within three semesters of graduation.) Prerequisites: SPS 4200.

SPS 4301 INDEPENDENT STUDIES (3 credits). Individual study of specific problems in space sciences. (Requirement: Department head approval.)

SPS 4400 SPACE LAUNCH SYSTEMS (3 credits). The assembly, preparation and checkout for launch of several space-launch systems built by different manufacturers. Students review the actual procedures, hardware and facilities used. (Requirement: Instructor approval or senior standing.)

SPS 4403 SMALL SATELLITE/PAYLOAD INTEGRATION AND MISSION ANALYSIS (3 credits). Covers payload integration in conjunction with actual shuttle payload activities at NASA/KSC. Classes center on vehicle and payload systems as they are being prepared for launch, including spacecraft power, attitude control, communications, etc. (Requirement: Instructor approval or senior standing.)

SPS 4901 UNDERGRADUATE RESEARCH (3 credits). Individual research directed by a faculty member. (Requirement: Department head approval.)

SPS 4902 UNDERGRADUATE RESEARCH (3 credits). Individual research directed by a faculty member. (Requirement: Department head approval.)

SPS 5010 ASTROPHYSICS 1: STELLAR STRUCTURE AND EVOLUTION (3 credits). Introduces basic interior structural equations, energy generation processes, opacity, energy transport, radiation transport in stellar atmospheres, star formation, late stages of stellar evolution, stellar binaries and clusters. Special emphasis on analytic and numerical models relevant to the sun. Prerequisites: PHY 3060, SPS 1010.

SPS 5011 ASTROPHYSICS 2: GALACTIC STRUCTURE AND COSMOLOGY (3 credits). Includes formation and evolution of the Galaxy, including stellar populations and kinematics, spiral density theory; extragalactic astronomy, active galactic nuclei, Hubble's law, large-scale structure; and cosmology, including inflationary cosmology and the particle physics connection. Prerequisites: SPS 5010.

SPS 5020 SPACE PHYSICS 1: THE LOW-ENERGY UNIVERSE (3 credits). Introduces low-energy space plasma physics including the statistical behavior of plasmas, kinetic theory and magnetohydrodynamics. Emphasizes solar system space plasma physics and the sun-Earth connection including magnetospheric physics. Prerequisites: PHY 3440.

SPS 5021 SPACE PHYSICS 2: THE HIGH-ENERGY UNIVERSE (3 credits). The theoretical background and methods for observing gamma rays, x-rays, high energy electrons and heavy particles, cosmic rays, neutrons and gravitational waves from both spacecraft and Earth. (Requirement: Prerequisite course or instructor approval.) Prerequisites: SPS 4025.

SPS 5030 PLANETARY SCIENCE 1: INTERIORS (3 credits). Mechanical and thermal processes governing the interior structure and surfaces of the major and minor planetary bodies of the solar system. Includes the planetary crust, mantle, core, core-mantle interface, seismicity, density and elastic constants. (Requirement: Prerequisite course or instructor approval.) Prerequisites: SPS 3010.

SPS 5031 PLANETARY SCIENCE 2: ATMOSPHERES (3 credits). Principles governing the evolution, composition and retention of planetary atmospheres and the interplanetary environment. Includes the neutral atmosphere, photochemical processes, diffusion dynamics and planetary ionospheres and magnetospheres. Prerequisites: SPS 4030.

SPS 5050 ASTRODYNAMICS (3 credits). Includes the gravitational force, circular restricted three-body problem, many-bodies problem, perturbation theory, rocket dynamics, transfer orbits, motion of an artificial satellite and interplanetary trajectories. Prerequisites: SPS 3030.

SPS 5088 SPECIAL TOPICS IN SPACE SCIENCES (3 credits). Investigates specific problems in the space sciences. (Requirement: Department head approval.)

SPS 5090 SPECIAL TOPICS IN OBSERVATIONAL ASTRONOMY 1 (3 credits). Participation in advanced observing programs at the university's observatories. (Requirement: Department head approval.)

SPS 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

SPS 5999 THESIS (3–6 credits). Individual work under the direction of a member or members of the graduate faculty on a selected topic in space sciences. (Requirement: Department head approval.)

SOFTWARE ENGINEERING

SWE 5001 SOFTWARE ENGINEERING 1 (3 credits). The application of engineering rigor to all phases of the software development life cycle; requirements elicitation and analysis, software architecture, software design and construction, software integration and test, and software maintenance. Students work individually to develop a software system from an initial problem statement through release of the completed product.

SWE 5002 SOFTWARE ENGINEERING 2 (3 credits). The application of engineering rigor and team coordination to develop a software product. Provided with an initial problem statement, teams create and document their own disciplined procedures for each phase of the software development life cycle, then develop the software according to their own documented processes and finally provide in-depth critiques of the processes they followed. Prerequisites: SWE 5001.

SWE 5110 REQUIREMENTS ENGINEERING (3 credits). Provides an in-depth study of software requirements, engineering tools and techniques. Includes gathering user requirements, formal specification of system behavior, system interfaces, end-user and system documentation and validation techniques. Emphasizes the end-user aspect of gathering and formalizing or user requirements. Prerequisites: SWE 5001.

SWE 5320 WINDOWS SYSTEMS PROGRAMMING (3 credits). Focuses on programming for Windows 32- and 64-bit operating systems. Windows handling of processes, threads and memory management with emphasis on writing programs to optimally use these resources. Use of and programming for UNICODE, dynamic link libraries and the WIN32 API. Students write substantial programs in Visual C++.

SWE 5411 SOFTWARE TESTING 1 (3 credits). Explores functional (black box) methods for testing software systems, reporting problems effectively

and planning testing projects. Students apply what they have learned throughout the course to a sample application that is commercially available or under development. The choice of sample application changes from term to term. Prerequisites: CSE 2410 or SWE 5000, CSE 1400, CSE 2400.

SWE 5415 SOFTWARE TESTING 2 (3 credits). Explores structural (glass box) methods for testing software. Testing of variables in simultaneous and sequential combinations, application programmer interfaces, protocols, design by contract, coverage analysis, testability, diagnostics, asserts and other methods to expose errors, regression test frameworks, test-first programming. Prerequisites: CSE 3411 or SWE 5411.

SWE 5430 SOFTWARE TESTING TOOLS (3 credits). This project-oriented course requires students to perform a survey of existing testing tools and to test a featured software product. Students are responsible for assessing functionality of testing tools and working with tool vendors to acquire and deploy a number of tools to test a real software application.

SWE 5440 INTRODUCTION TO SOFTWARE ARCHITECTURE (3 credits). Presents the role of software architecture in the software engineering life cycle. Covers techniques for design to meet functional requirements; analysis with respect to desired attributes such as performance, reliability and maintainability; and improvement to better satisfy desired attributes while still meeting functional requirements. Prerequisites: SWE 5001.

SWE 5460 COMPUTER AND INFORMATION SECURITY (3 credits). Examines concepts of modern computer security from a practical point of view. Includes secure system design, system vulnerability, threat assessment, intrusion detection, cryptography, and legal and ethical issues in computer security. Emphasizes software engineering applications of security and implementation of a secure computer system.

SWE 5510 SOFTWARE MAINTENANCE (3 credits). Describes abstraction techniques to extract specifications and design from existing code. Discusses the use of these techniques in debugging, re-engineering and software enhancement. Prerequisites: SWE 5001.

SWE 5621 SOFTWARE METRICS AND MODELING (3 credits). Examines common software metrics, axiomatic foundations of measurement, validity of measurements and measurement dysfunction, and some statistical and modeling approaches to help students make their software measurements meaningful. Prerequisites: CSE 2410 or SWE 5001, CSE 2400.

SWE 5640 STATISTICAL METHODS FOR SE (3 credits). Statistical techniques with application in software engineering. Methods include multiple analysis of variance, multiple linear regression, factorial designs, logistic regression, Bayesian models and stratified testing. Prerequisites: CSE 2400.

SWE 5660 SECURE SOFTWARE DEVELOPMENT (3 credits). Examines the importance of building security into the design, implementation and testing phases of software development. Covers coding techniques that avoid known vulnerabilities and test strategies that can uncover previously unknown weaknesses. Includes a discussion of security policies and design principles. Prerequisites: SWE 5460.

SWE 5899 FINAL SEMESTER THESIS (0–2 credits). Variable registration for thesis completion after satisfaction of minimum registration requirements. (Requirements: Accepted petition to graduate and approval by Office of Graduate Programs.)

SWE 5900 SPECIAL TOPICS IN SOFTWARE ENGINEERING (1–3 credits). Selected topics of current interest in software engineering. Material varies according to faculty and student interest. May be repeated for credit. (Requirement: Instructor approval.)

SWE 5999 THESIS (3–6 credits). Individual work under the direct guidance of a faculty member, culminating in the formal defense of a written thesis. (Requirement: Instructor approval.)

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