

# Graduate and Professional Development Programs

School of Advanced Graduate Studies

Summer 2009 - 2014

*University of Illinois*



**General Information  
and Descriptions of  
FLORIDA INSTITUTE OF TECHNOLOGY  
Extended Graduate Studies Programs**

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## **School of Extended Graduate Studies Mission Statement**

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*The mission of the School of Extended Graduate Studies 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.*

## **SEGS Statement of Values and Beliefs**

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## **Section I General Information**

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### **INTRODUCTION**

This *Digest*



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**LOCATIONS**

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The university offers four-year and two-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 **School of Aeronautics** offers bachelor's degrees in aeronautical science, aviation management and aviation meteorology, with flight options available in each program, and aviation computer science; a master's degree in aviation with two options—airport development and management, and aviation science; and a master's degree in aviation human factors. The school consists of two divisions—aviation studies, which is responsible for all academic instruction and student advising; and flight training, which conducts the flight operations courses. Classroom instruction in pilot training is conducted on campus, while all flight training is conducted under the supervision of the flight training department in university-owned facilities located at the Melbourne International Airport.

The **School of Management** offers both bachelor's and master's degrees in business administration. School of Management 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 **School of Psychology** offers a bachelor's degree in psychology. The master's

Degree programs available in **D. a e Lea** . . . . can be found on our Web site at [www.segs.fit.edu](http://www.segs.fit.edu).

## **HISTORY**

Founded in 1958 as Brevard Engineering Institute by Dr. Jerome P. Keuper, Florida Institute of Technology 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 35,000 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 Institute of Technology 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 the associate of science, bachelor of arts, bachelor of science, master of science, master of business administration, master of public administration, educational specialist, doctor of psychology and doctor of philosophy 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 and the American Society for Engineering Education.

## **OPERATION AND CONTROL**

Florida Institute of Technology 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, creed, age, sex, color or disability. 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.

### **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 Institute of Technology was ruled tax-exempt under Section 501(c)(3) of the Internal Revenue Code 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 Federal Right to Privacy Act of 1974 (FERPA) as Amended established a set of regulations governing access to and the release of personal and academic information contained in student education records. FERPA applies to the education records of persons who are or have been in attendance in postsecondary institutions, including students in cooperative or correspondence study programs. FERPA does not apply to records of applicants for admission who have been denied acceptance or, if accepted, do not attend an institution.

Education records are all records that contain information directly related to a student and are maintained by an educational agency or institution, or a party acting for the institution. Exceptions to education records include Sole Possession Records, Law Enforcement Unit Records, Employment Records, Health Records and Alumni Records. Rights under FERPA are not given to students enrolled in one component of an institution who seek to be admitted in another component of the institution.

FERPA gives students who have reached the age of 18 or who attend a postsecondary institution the following rights:

1. The right to inspect their education records within 45 days of the day the university receives a request for access. Student should submit to the Registrar, dean, head of the academic unit or other appropriate officials, written requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be made.
2. The right to request amendment of the student's education records the student believes are inaccurate or misleading. A student should write the university official responsible for the record, clearly identify the part of the record they want changed and why it is felt to be 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.

If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosure of personally identifiable information contained in the student's educational records, except to the extent that FERPA authorizes disclosure without consent. 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); a person or company with whom the university has contracted (such as an attorney, auditor or collection agent); to officials of another school upon request, 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 a school official in performing his or her tasks. A school official has a legitimate educational interest in the official needs to review an educational record in order to fulfill his or her professional responsibility.

Disclosure is defined as permitting access to or the release, transfer or other communication of education records of the 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.

FERPA allows release of the following directory information to the public without student consent: student's name, address, telephone number, date and place of birth, major field(s) of study, E-mail address, class schedules, participation in officially recognized activities and sports, weight and height of athletic team members, dates of attendance, degrees and awards/honors received and the most recent educational institution attended other than Florida Tech.

Students may prevent the release of directory information by completing a Request to Prevent Disclosure of Directory Information Form, available in the Office of the Registrar.

Student consent is required for the release of personally identifiable information such as semester grades, academic record, current academic standing and social security number. The law allows disclosure of this information to certain government agencies/officials, sponsoring agencies, parents/guardians of dependent students and to selected university personnel determined to have a legitimate educational interest in such records.

Students may consent to release personally identifiable information to others by completing the Authorization for Release of Student Information Form, available in the Office of the Registrar.

Information about the provisions of the Family Educational Rights and Privacy Act of 1974 as Amended, and the full text of the law, may be obtained from the Registrar.

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 name and address of the office that administers FERPA is

Family Compliance Office  
U.S. Department of Education  
400 Maryland Ave., SW  
Washington, DC 20202-4605



## Section II Extended Graduate Studies Programs

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### **PURPOSE**

Florida Institute of Technology's Extended Graduate Studies 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 Director, Graduate Studies.

Management courses used to support School of Extended Graduate Studies' master's programs are identified by the prefix MGT. These courses are taught both on the main campus and at the extended graduate centers based upon enrollment demand. A description of the MGT courses appears in the "Course Descriptions" section of this *Digest* and is published separately in the official catalog for each graduate center.

### **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 Ft. 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 Ft. Lee.

Similarly, Florida Tech awards transfer credits for certain classes taken as part of the regular course at the Command and General Staff College, Ft. Leavenworth, Kansas.

## Section III Graduate Admission

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Admission to graduate study is granted to highly 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 Graduate Program office. Admission requires the approval of the Graduate Program office and the head of the appropriate academic unit. For those cases in which the student has acceptable undergraduate achievement but has course deficiencies, the

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 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 vice president for academic affairs. If the request is approved, the student can2np3 ISsrmull-timetudy

The GMAT is required for admission to the Professional M.B.A and M.B.A. In all other 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.



## **Admission Degree Program**

A continuing education student may seek admission to a degree program through the normal admission process. If a continuing education 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.

### **REQUEST TO STUDY AT ANOTHER INSTITUTION**

With special permission, a student who has matriculated at Florida Tech may take 4mFLO8seecho9idbducatech have a C7hTIQUEsr2at Floror cho9degree program. A copy

## Section IV Tuition and Fees Payment Policy

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It is the policy of Florida Institute of Technology 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. a Deferred Payment Contract may be accepted from a student for reimbursement in the amount of the course tuition. This privilege will be withheld from students who do not make payment within the time specified.

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 meet his or her financial obligations promptly.

### 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

Tuition costs for courses conducted by Florida Tech for School of Extended Graduate Studies 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. See individual site catalog for a complete breakdown of costs.

### 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.





the graduate center prior to the completion of 12 credit hours. Enrollment certification will not be submitted to the U.S. Department of Veterans Affairs beyond 12 hours without an approved program plan. Any change to the graduate program plan must be immediately reported to the graduate center. 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 than 1/4 time, less than 1/2 time .....	3, 4
1/4 or less .....	1, 2

Students receiving veterans' 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.

**See e e H C e ed M CGPA**



## **GRADING SYSTEM**

Graduate work is evaluated bM

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, Graduate Studies.

**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 will result 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**

A master's student must continue to demonstrate academic proficiency in course work and must show reasonable progress toward the 3.0 cumulative grade point average (GPA) required for graduation. Failure to have the minimum GPA specified below will result in academic probation. 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.

<b>Se e e H C e e d</b>	<b>M . . . . . CGPA</b>
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 semester hours of graduate work at Florida Tech before evaluation of the GPA. After completing nine semester 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 graduate student with fewer than nine semester 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. Upon completing nine credit hours of graduate courses, the graduate GPA will take precedence in probation and dismissal evaluations.

In addition, the following conditions will result in the academic dismissal of a student:

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

In all cases of academic probation and dismissal, the student will be so notified by the Graduate Program office. The academic dismissal can be waived for educationally sound reasons. A letter of appeal requesting reinstatement should be submitted

to the Graduate Program office. The student will be allowed to continue attending classes pending Graduate Council action on his or her 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 cancelled 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 misr,

2. Up to six semester hours of credit for 3000 and 4000 level undergraduate courses taken at Florida Tech while enrolled in the Graduate School. 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 the Graduate School 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 semester hours of graduate course work 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 no later than one month prior to the time that nine semester 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. An exception is made in the case of a change of major prior to completion of any graduate courses at Florida Tech.

### **CHANGE OF PROGRAM PLAN**

Request for Change of a Program Plan must be submitted through the Director, Graduate Studies, 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 MAJORPROGRAM PLAN**

The academic unit responsible for the new program has the prerogative to accept or reject the student, as well as to designate what courses are germane to the new program. All courses that are determined by the academic unit to be applicable in the new program must be included in the program plan. Because the student is changing programs, the number of courses in the plan may be more than the minimum required for graduation. The student will not be considered as enrolled in the new program until all actions specified above have been completed.

### **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 dean, 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 approval form to the graduate center during early registration. The tuition rate for a directed-study course is the standard undergraduate or graduate rate, plus an additional directed-study fee (see "Fees").

### **TRANSFER CREDIT**

If the courses constitute a logical part of the student's program, up to a maximum of 12 semester hours of transfer credit from regionally accredited institutions may be transferred to Florida Tech (for one master's degree only), under the following conditions.

1. These courses must be eligible for graduate credit at the institution where they were taken, and not previously applied to any undergraduate degree.
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.
4. All course work (including transfer credit) must be completed within seven years of elapsed time.
5. Subject to approval of Academic Unit head, and the Director, Graduate Programs.

Courses that have been applied toward a graduate degree at another institution may also be considered for transfer credit if they satisfy these criteria. Transfer credit from foreign universities will be considered on a case-by-case basis, subject to the same overall limitations. Transfer credits are not included in the computation of grade point average.

Some courses presented by certain military schools, plus the regular courses of the U.S. Army Command and General Staff College, Ft. 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 the School of Extended Graduate Studies 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 Twnc2P.Scfpcollege/



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 comprehensive exam. Notification shall include:

- Student name and contact information
- Anticipated examination date
- Where exam will be administered (off-campus site)
- Off-campus site point-of-contact

Every effort should be made to have comprehensive exams 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:

- **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.
- **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.
- **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.

Note: Faculty members are listed at: <http://www.fit.edu/AcadRes/graduate/facmenu.html>.

By clicking on the SEGS entry, all individuals appointed in SEGS will be listed. However, if there is a date after the name, they are other than **full time**, and therefore **can** be on the committee but **cannot** be the designated "outside member."

5. Only students with an overall GPA of 3.0 at the beginning of the term during which the comprehensive exams are administered are eligible to take the exam.
6. In the event of the student's failing part or parts of the comprehensive exam, the regulations as specified in the Graduate Programs 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 Director, Graduate Studies/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 for graduation no later than the dates shown in the *Academic Calendar* of the current catalog; otherwise, the student will be subject to a late fee. Generally, this date is during the first part of the semester



- c. If the student would rather not discuss the matter with the Director, Graduate Studies, he/she may contact, by telephone or letter, the Dean, School of Extended Graduate Studies 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 Vice President for Academic Affairs, 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 (Director of Human Resources, Mr. Gary Meiseles) at the main campus of Florida Tech in Melbourne, Florida, telephone (321) 674-8100.

## **DEFINITION**

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 graduate center, if at all possible.
2. Technical issues (student can't log on, etc.) should be handled by the student's graduate center, 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 Technologies staff of the Center for Distance Learning (CDL).
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 director of the Virtual Graduate Center (VGC)/CDL who will communicate this information to the director of the graduate center where the course originates. That graduate center director will discuss the situation with the instructor to see what, if anything, can be done to resolve the complaint. That graduate center director will relay what action(s) is (are) taken to the director of the VGC/CDL, who will relay the outcome(s) to the student(s).

## Section VI Virtual Graduate Center

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The purpose of the Virtual Graduate Center 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 Graduate Center 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 VIII 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 is discussed in Section VII 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 [www.segs.fit.edu](http://www.segs.fit.edu) to obtain information on current course schedules and technical requirements for participation in distance learning online courses.

Distance Learning online course fees are \$375 per credit or \$1,125 per 3-credit course, effective summer 2003. Directed study fees are \$100 per credit hour. Main campus (Melbourne, Fla.) students are charged at main campus tuition rates.

A two-year projection of online courses can be accessed on our homepage [www.segs.fit.edu](http://www.segs.fit.edu).

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## ACADEMIC CALENDAR

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### FALL 2003 SEMESTER (August 25–December 5)

- July 14 Registration begins
- Aug. 25 FALL SEMESTER BEGINS
- Aug. 29 Last day to file a Petition to Graduate for students who plan to complete their requirements by the end of Spring Semester 2004
- 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. 17 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 2004 SEMESTER (January 5–April 16)

- Nov. 17 Registration begins
- Jan. 5 SPRING SEMESTER BEGINS
- Jan. 9 Last day to file a Petition to Graduate for students who plan to complete their requirements by the end of Spring Semester 2005
- 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
- Feb. 27 Last day to withdraw from a class with a final grade of W
- April 9 Last day of classes
- April 12–16 Final Exams

### SUMMER 2004 SEMESTER (April 26–August 6)

- March 15 Registration begins
- April 26 SUMMER SEMESTER BEGINS
- April 30 Last day to file a Petition to Graduate for students who plan to complete their requirements by the end of Spring Semester 2004
- April 30 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
- June 18 Last day to withdraw from a class with a final grade of W
- July 30 Last day of classes
- Aug. 2–6 Final Exams

### FALL 2004 SEMESTER (August 30–December 10)

- July 12 Registration begins
- Aug. 30 FALL SEMESTER BEGINS
- Sep. 3 Last day to file a Petition to Graduate for students who plan to complete their requirements by the end of Spring Semester 2004
- Sep. 3 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. 22 Last day to withdraw from a class with a final grade of W
- Dec. 3 Last day of classes
- Dec. 6–10 Final Exams

# Section VII Degree Programs

	<b>C de</b>	<b>Pa e</b>
Professional Master of Business Administration (P.M.B.A.) .....	8391	36
Acquisition and Contract Management Concentration .....	8397	37
eBusiness Concentration .....	8356	37
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Information Systems Concentration .....	8396	38
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M.S. Computer Information Systems .....	*8072	42
M.S. Computer Science .....	*8071	43
M.S. Electrical Engineering .....	*8042	44
M.S. Engineering Management .....	*8075	47
M.S. Human Resources Management .....	8350	49
M.S. Logistics Management .....	8322	50
M.S. Management .....	8381	51
Acquisition and Contract Management Concentration .....	8403	52
eBusiness Concentration .....	8404	53
Human Resources Management Concentration .....	8305	53
Information Systems Concentration .....	8406	54
Logistics Management Concentration .....	8407	54
Transportation Management Concentration .....	8408	55
M.S. Materiel Acquisition Management .....	8320	56
M.S. Mechanical Engineering .....	*8131	57
M.S. Operations Research .....	8074	59
M.S. Project Management .....	8357	60
Information Systems Concentration .....	8358	62
Operations Research Concentration .....	8359	62
M.S. Software Engineering .....	*8050	62
M.S. Space Systems .....	*8137	63
M.S. Space Systems Management .....	*8315	65
M.S. Systems Management .....	8330	66
Information Systems Concentration .....	8403D0 Tc(5....)Tj18.2	





<b>C e Re . e e .</b> (9 courses) .....	27
MGT 5001 Managerial Accounting .....	3
MGT 5002 Corporate Finance .....	3
MGT 5011 Management Theory and Thought .....	3
<i>or</i>	
MGT 5013 Organizational Behavior .....	3
MGT 5014 Information Systems .....	3
MGT 5018 Policy and Strategy for Business .....	3
MGT 5019 Marketing Management .....	3
MGT 5071 Decision Theory .....	3
<i>or</i>	
MGT 5007 Intermediate Managerial Statistics .....	3
MGT 5133 Advanced Analytical Methods for Management .....	3
MGT 5149 Economics for Business .....	3
<b>E e . e</b> (3 courses) .....	9
<b>TOTAL CREDITS REQUIRED 36</b>	

### **GENERAL P.M.B.A.**

In addition to the nine core courses, students electing the P.M.B.A 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 in the School of Extended Graduate Studies.

#### **Concentration in Acquisition and Contract Management**

*(Code: 8397)*

In addition to the nine core courses, students electing the P.M.B.A. 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.

<b>C e Re . e e .</b> (9 courses) .....	27
<b>E e . e</b> (3 courses) .....	9
These electives must be selected from the MGT 52XX (MGT 5211 to MGT 5270) list of Contracts courses.	
<b>TOTAL CREDITS REQUIRED 36</b>	

#### **Concentration in eBusiness**

*(Code: 8356)*

In addition to the nine core courses, students electing the P.M.B.A. 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.

<b>C e Re . e e .</b> (9 courses) .....	27
<b>E e . e</b> (3 courses) .....	9
MGT 5160 Introduction to eBusiness .....	3
MGT 5161 Policy and Organizational Strategies for eBusiness3 courses)	3

## Concentration in Human Resources Management

(Code: 8400)

In addition to the nine core courses, students electing the P.M.B.A. 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.

<b>C e Re . e e .</b> (9 courses) .....	27
<b>E e . e</b> (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 Resolutions .....	3
MGT 5106 Organizational Communication .....	3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management ...	3
MGT 5138 Business Ethics .....	3
<b>TOTAL CREDITS REQUIRED 36</b>	

## Concentration in Information Systems

(Code: 8396)

In addition to the nine core courses, students electing the P.M.B.A. 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.

<b>C e Re . e e .</b> (9 courses) .....	27
<b>E e . e</b> (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
<b>TOTAL CREDITS REQUIRED 36</b>	

## 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 upon 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 the "Admissions" section

## **DEGREE REQUIREMENTS**

The M.P.A. degree 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. 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.

**P . . . a P e e . . . e**





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

If the applicant's background is deemed deficient in any of these areas, admission may be granted with the stipulation that deficiencies be made up by taking the necessary extra courses. Students may elect to take MTH 5051, Applied Discrete Mathematics, instead of MTH 2051, for which graduate credit is not awarded. Graduate Record Examination scores (General Test only) are required.

**DEGREE REQUIREMENTS**

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

CSE 5100	Data Structures and Algorithms .....	3
CSE 5230	Operating Systems .....	3
CSE 5250	Programming Languages .....	3
ECE 5536	Computer Hardware Design .....	3
	Electives (at least 12 credits in Computer Science) .....	18

All students who can verify competence in any required course may substitute an appropriate course with permission of the student's adviser and program chair. All electives that apply to the program must be similarly approved. The computer science office maintains a list of approved courses from which electives can be selected.

All students must pass a final program examination. The final program examination may be granted with the stipulation that deficiencies be made up by taking the

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

**A p p l i e d S o f t w a r e**

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

**F o u n d a t i o n s**

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

**S o f t w a r e a n d S y s t e m s**

- 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 list. A student can substitute a listed course with another appropriate course only with permission of the student’s adviser and department head.

The course requirements are

MTH 5051	Applied Discrete Mathematics .....	3
	Applied Software .....	3
	Foundations .....	3
	Software and Systems .....	3
CSE 5500	Computer Science Seminar .....	2
	Electives (at least 6 credits must be in Computer Science, numbered CSE 5600 or higher) .....	12
CSE 5999	Thesis in Computer Science or Advanced Electives (CSE 5600 or higher) .....	6

All electives that apply to the program must be approved by the student’s adviser. The computer science program 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.

**MASTER OF SCIENCE IN ELECTRICAL ENGINEERING (MS/EE)**

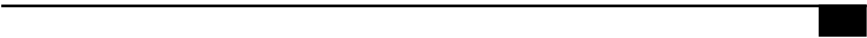
*(Code: 8042)*

All master of science areas of specialization in electrical engineering 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 (MS/EE) programs vary considerably. For this reason, a variety of master’s degree options are available. U.S. applicants should have a bachelor of science or equivalent degree from an electrical engineering program accredited by the Accreditation Board





**M e e C e L**

- ECE 5301 Semiconductor Device Theory
- ECE 5310 VLSI Processing
- ECE 5311 Microelectronics Fabrication Laboratory
- ECE 5333 Analog IC Design
- ECE 5335 Advanced IC Design and Simulation

**P C e L**

- ECE 5350 Optical Electronics
- ECE 5351 Fiberoptic Communication Systems
- ECE 5352 Fiberoptic Sensor Systems
- ECE 5353 Optical Computing
- ECE 5354 Acoustooptic and Electrooptic Devices
- ECE 5355 Electrooptics Laboratory
- ECE 5356 Optical Waveguides and Devices
- ECE 5418 Field Theory of Guided Waves 1

**Ma e a C e L**

- MTH 5201 Mathematical Methods in Science and Engineering 1
- MTH 5202 Mathematical Methods in Science and Engineering 2
- MTH 5301 Numerical Analysis
- MTH 5315 Numerical Methods for Partial Differential Equations
- MTH 5401 Applied Statistical Analysis

**S e a d I a P e S e a a**

ECE 5201	Linear Systems 1 .....	3
	<i>either</i>	
ECE 5234	Communication Theory .....	3
	<i>or</i>	
ECE 5223	Digital Communications .....	3
ECE 5245	Digital Signal Processing 1 .....	3
MTH 5425	Theory of Stochastic Signals .....	3
	Mathematics Elective .....	3
	Approved Electives, including up to 6 credits of thesis .....	15

TOTAL CREDITS REQUIRED 30

Within this area of specialization, courses may include systems, digital signal and image processing, neural networks and controls. Each student plans a program of study in consultation with a member of the faculty whose professional field is related to the student's interest.

**W e e S e a d Te S e a a**

The explosive growth of cellular phones and systems has prompted the notion that "wireless" is synonymous with pocket phones and pagers. Wireless in the context of this specialization refers to any system or device that relies on electromagnetic-wave propagation to perform one or more of its functions, including such diverse applications as radar, global positioning, location, sensing, etc., as well as the broader class of communications systems such as satellites, point-to-point/multipoint, WLAN, Wireless WAN, etc. This specialization provides students with a solid foundation in the broad array of disciplines that are common and fundamental to these disparate applications, while allowing flexibility to delve into specific application areas

All courses from core curriculum list ..... 15

## **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 also encouraged. Applicants should also take the Graduate Record Examination (GRE). General admission requirements and the process for applying are discussed in the "Admissions" section of this catalog.

## **DEGREE REQUIREMENTS**

The master of science degree requires a minimum of 36 credit hours. Courses taken to satisfy admission prerequisites cannot be counted toward the degree requirements. Students without adequate undergraduate courses in accounting, statistics, 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.

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

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*(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 the "Admissions" section 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 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.

<b>E e</b> (2 courses) .....	6
MGT 5016 Employee Relations .....	3
MGT 5101 Leadership Theory and Effective Management .....	3
MGT 5105 Interpersonal Relations and Conflict Resolution .....	3
MGT 5112 Seminar in Contemporary Issues in Human Resources Management ....	3
	TOTAL CREDITS REQUIRED 33
MGT(who hanagsucces fullyyuesee et)d 33ncr	

<b>Required Core (9 courses)</b> .....	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
<b>Elective (2 courses)</b> .....	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

## 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.

### Prerequisite (noncredit for this program)

MTH 1701 College Algebra

*Note: In addition, computer literacy is required as a prerequisite. It can be demonstrated by 1) the applicant's undergraduate course work or 2) passing a proficiency exam offered by the School of Extended Graduate Studies, or 3) completing a suitable computer course.*

### Required Course (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 5019	Marketing	3
MGT 5033	Human Resources Management	3
MGT 5132	Basic Economics	3

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

### Elective (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

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

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

(Code: 8403)

### Prerequisite (See Note 1)

### Required Course (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

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



<b>E e</b>	(3 courses selected from concentration)	9
MGT 5070	Special Topics in Business	3
MGT 5084	Material 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 5220	Contract Management Research Seminar	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

**Concentration in eBusiness (MS/M-eBUS)**

<b>Elective</b> (3 courses selected from concentration) .....	9
MGT 5016 Employee Relations .....	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 5112 Seminar in Contemporary Issues in Human Resources Management ....	3
MGT 5138 Business Ethics .....	3
<b>TOTAL CREDITS REQUIRED 33</b>	

**Concentration in Information Systems (MS/M-IS)**

*(Code: 8406)*

**Prerequisite** (See Note 1)

<b>Required Course</b> (8 courses) .....	24
MGT 5000 Financial Accounting .....	3

<b>E e</b> (3 courses selected from concentration) .....	9
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 5064 Cost and Economic Analysis .....	3
MGT 5065 Supply Chain Management .....	3
MGT 5069 Advanced Supply Chain Management .....	3
MGT 5066 Systems Analysis and Modeling .....	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
<b>TOTAL CREDITS REQUIRED 33</b>	

### **Concentration in Transportation Management (MS/M-TM)**

*(Code: 8408)*

**P a P e e** (See Note 1)

<b>Re ed C e</b> (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
<i>*May substitute MGT 5013 or MGT 5015 with adviser's permission.</i>	
<b>E e</b> (3 courses selected from concentration) .....	9
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
<b>TOTAL CREDITS REQUIRED 33</b>	

*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 the "Admissions" section 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 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.

### Prerequisite (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 1) the applicant's undergraduate course work or 2) passing a proficiency exam offered by the School of Extended Graduate Studies, or 3) completing a suitable computer course.*

### Required Course (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
<i>or</i>	
MGT 5211 Procurement and Contract Management .....	3
<b>Elective</b> (3 courses) .....	9

These electives can be chosen to emphasize the area of greatest interest and benefit to the student.

TOTAL CREDITS REQUIRED 33

*Note 1: Electives may be taken with approval of both the faculty adviser and the program head from other graduate-level offerings in other schools or academic units.*  
*Note 2: MGT 5010 Seminar in Research Methodology will be selected as one of the electives for all fully funded U.S. Army officers at the Fort Lee Graduate Center.*

## **MASTER OF SCIENCE IN MECHANICAL ENGINEERING (MS/ME)**

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~~ADMISSION REQUIREMENTS~~ MS2ENT

## CURRICULUM

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

### **S e , S d M e a a d M a e a S e a a**

Three core courses selected in consultation with the student adviser from the list below ... 9

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	
	Mathematics.....	6
	Approved electives, which may include 6 credit hours of thesis .....	15
		<b>TOTAL CREDITS REQUIRED 30</b>

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.

### **T e a - F d S e e S e a a**

Three core courses selected in consultation with the student adviser from the list below ... 9

MAE 5130	Viscous Flows	
MAE 5210	Conduction Heat Transfer	
MAE 5220	Convection Heat Transfer	
MAE 5230	Radiation Heat Transfer	
	Mathematics.....	6
	Approved electives, which may include 6 credit hours of thesis .....	15
		<b>TOTAL CREDITS REQUIRED 30</b>

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

### **D a S e , R b a d C S e a a**

Three core courses selected in consultation with the student adviser from the list below ... 9

MAE 5610	Advanced Dynamics	
MAE 5630	Modeling and Simulation of Dynamic Systems	
MAE 5650	Robotics	
MAE 5660	Robot Control	
	Mathematics.....	6
	Approved electives, which may include 6 credit hours of thesis .....	15
		<b>TOTAL CREDITS REQUIRED 30</b>

The student's program 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, bio-medical engineering, energy and power systems, etc.

## **MASTER OF SCIENCE IN OPERATIONS RESEARCH (MS/OR)**

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*(Code: 8074)*

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 the use of a high-level programming language such as FORTRAN, Pascal or C must be demonstrated by testing or suitable course work.

General admission requirements and the process for applying are presented in the "Admissions" section of this catalog.

### **DEGREE REQUIREMENTS**

The master of science degree can be pursued with either a thesis or nonthesis option; each requires 33 credit hours. Under the thesis option, up to six credit hours of thesis may be granted in place of electives toward the required 33 hours, and an oral defense is required. The nonthesis option requires a comprehensive 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





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 the "Admissions" section 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 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.

**P a P e e e** (noncredit for this program)

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 1) the applicant's undergraduate course work or 2) passing a proficiency exam offered by the School of Extended Graduate Studies, or 3) completing a suitable computer course.*

<b>Re ed C e</b> (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

**E e e** (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

**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 MS/Project Management specialization areas:

## Concentration in Information Systems

(Code: 8358)

<b>C e</b> (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

## Concentration in Operations Research

(Code: 8359)

<b>C e</b> (3 courses) .....	9
MTH 5401 Applied Statistical Analysis	

## DEGREE REQUIREMENTS

The Master of Science in Software Engineering is offered with both thesis and non-thesis degree paths. Each requires a minimum of 30 credit hours of approved graduate study. Prior to the completion of nine credit hours, the student must submit for approval by the student's adviser and department head, a program plan to indicate the specific courses to be taken. Up to six credit hours of thesis work may be included in the 30-credit-hour requirement. The non-thesis path requires successful completion of a comprehensive examination.

## CURRICULUM

The degree candidate must take four required courses, four electives, and either a thesis or two additional electives. Successful completion of a master's thesis can be substituted for two of the non-restricted electives. All electives that apply to the program must be approved by the student's adviser.

### Required Courses

SWE 5001	Software Engineering 1	3
SWE 5002	Software Engineering 2	3
SWE 5411	Software Testing 1	3
SWE 5621	Software Metrics and Modeling	3

### Required Elective: Practical

Common to all courses in this restricted elective area is that a substantial program or series of programs must be submitted by the student, and contribute a significant factor in the assessment of the student's work in the course.

A list of courses satisfying this requirement is available from the department. Three courses typical of this list are: CSE 5232 Network Programming, CSE 5250 Programming Languages and CSE 5280 Computer Graphics.

### Required Elective: Foundational

Courses in this area cover computer science concepts upon which software engineering principles and skills are based. A list of courses suitable for satisfying this requirement is available from the department.

Some typical classes on this list are: CSE 5210 Formal Languages and Automata Theory, CSE 5230 Operating Systems and CSE 5260 Database Systems.

## 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.

This program is offered at Florida Tech Graduate Centers at NASA Kennedy Space Center and Patrick Air Force Base.

# ADMISSION REQUIREMENTS



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

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*(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 Graduate Centers at NASA Kennedy Space Center and Patrick Air Force Base in Florida.

### **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 work for the Master of Science in the BMQ

**Elective** (1 course) ..... 3  
The elective course may be taken with the approval of the academic unit head, from any SPC or SPS graduate level (5000) course in the current catalog.

TOTAL CREDITS REQUIRED 36

## **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 the "Admissions" section 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.

**Prerequisite** (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 1) the applicant's undergraduate course work or 2) passing a proficiency exam offered by the School of Extended Graduate Studies, or 3) completing a suitable computer course.*



## Concentration in Operations Research

(Code: 8331)

**P r e r e q u i s i t e s** (noncredit for this program)

<b>Required Courses</b> (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
<b>Elective Courses</b> (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**

*Note: Electives may be taken with approval of both the faculty adviser and program head from other graduate-level offerings in the School of Extended Graduate Studies or other schools or academic units (e.g., computer science, operations research, psychology). Any other deviation requires specific approval of the program head.*



## Section VIII Graduate Certificate Programs

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### 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.

# CURRICULUM

## Graduate Certificate in Business Management

### Required Course

MGT 5013 Organizational Behavior ..... 3

**Elective Course** (4 required) ..... 12

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 Course** (4 required) ..... 12

The elective courses may be selected from the following:

MGT 5212 Advanced Procurement and Contract 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
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<b>Elective Course</b> (4 required) .....	12
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The elective courses can be selected from the following:

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
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<b>Elective Course</b> (4 required) .....	12
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The elective courses can be selected from the following:

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
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<b>Elective Course</b> (4 required) .....	12
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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 Course (4 required) ..... 12

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

# Course Descriptions

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## COMPUTER SCIENCE

CSE 5000 INTRODUCTION TO PROGRAMMING (3 credits). An introduction to the fundamentals of software development. Topics include syntax and semantics of modern programming language and techniques for the design and implementation of simple programs. *(Noncredit for CS and CIS majors.)*

CSE 5001 ASSEMBLY LANGUAGE AND ORGANIZATION (3 credits). Programming and execution model in the classical stored-program von Neumann machine. Assembly language vs. machine language, instruction set of selected processors, addressing modes, shifting and masking, string manipulations, floating point representation, subprograms, hardware and software interrupts. *(Noncredit for CS and CIS majors.)*

CSE 5100 DATA STRUCTURES AND ALGORITHMS (3 credits). Data structures including queues, stacks, lists, sets, hash tables, trees, heaps and graphs are studied. Algorithms manipulating and using these data structures are introduced and analyzed for time and space complexity. *(Prerequisites: CSE 5000, MTH 2051. Noncredit for CS majors.)*

CSE 5210 FORMAL LANGUAGES AND AUTOMATA THEORY (3 credits). 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) are presented. Applications in compiler design, algorithms and complexity theory are presented. *(Prerequisite: CSE 5100.)*

CSE 5211 ANALYSIS OF ALGORITHMS (3 credits). Time and space complexity of computer algorithms. 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. *(Prerequisite: CSE 5100.)*

CSE 5220 COMPUTER ARCHITECTURE (3 credits). History, organization, operation and performance evaluation of computer systems. Design of RISC and CISC instruction sets, arithmetic units, datapath and microprogrammed control, pipeline computers, hierarchical memory systems and input/output subsystems. *(Prerequisite: CSE 5001. Noncredit for CS majors.)*

CSE 5230 OPERATING SYSTEMS 1 (3 credits). A study of the initial components and various functions provided by an operating system. Topics include the structure of operating systems, process scheduling, process synchronization, memory management, virtual memory, file system management and input/output device management. *(Prerequisites: CSE 5001, CSE 5100. Noncredit for CS majors.)*

CSE 5231 COMPUTER NETWORKS (3 credits). Theory, design and analysis of computer communication systems. Topics include 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.

CSE 5232 NETWORK PROGRAMMING (3 credits). Design and implementation of programs that communicate with other programs across a computer network. Topics include streams, server-side networking, client-side networking, multithreading, exceptions and remote method invocation. *(Prerequisite: CSE 5231.)*

CSE 5240 PARALLEL PROCESSING (3 credits). Architectures for parallel computers and parallel algorithms for computational problems are investigated. Performance evaluation metrics for the performance of parallel processing are discussed. *(Prerequisites: CSE 5100, CSE 5220.)*



CSE 5650 ADVANCED PROGRAMMING LANGUAGES (3 credits). Theoretical topics in programming languages. The main topics are the lambda-calculus, functional programming, type interface and different approaches to the semantics of programming languages. *(Prerequisite: CSE 5250.)*

CSE 5660 DATABASE MANAGEMENT SYSTEMS (3 credits). A study of the internal components of a Database Management System (DBMS). Topics include data organization, query optimization, transaction processing, concurrency control, logging and recovery, security and distributed DBMS. *(Prerequisite: CSE 5260.)*

CSE 5661 ADVANCED INFORMATION RETRIEVAL (3 credits). Topics include but are not limited to 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. *(Prerequisite: CSE 5261.)*

CSE 5680 ADVANCED COMPUTER GRAPHICS (3 credits). Image synthesis using textures, shadows, ray tracing and radiosity methods. Animation, solid modeling fractals, nonuniform rational B-splines, antialiasing and advanced graphical data structures. *(Prerequisite: CSE 5280.)*

CSE 5690 EXPERT SYSTEMS (3 credits). A study of the components and characteristics of an expert (knowledge-based) system. Issues including knowledge acquisition/engineering, knowledge representation, reasoning and uncertainty are discussed. An AI language is explored to implement expert system concepts. *(Prerequisite: CSE 5290.)*

CSE 5691 SEARCH AND ARTIFICIAL INTELLIGENCE (3 credits). A survey of the latest results in AI research on effective search strategies for intelligent systems. Constructive and local approaches to search, heuristic search algorithms including A\* and IDA, and adversary search techniques such as minimax and a-b will be investigated. *(Prerequisite: CSE 5290.)*

CSE 5692 CONSTRAINT REASONING (3 credits). Foundations of constraint satisfaction and constraint-based reasoning; problem representation and characterization; consistency checking, heuristics and search; deterministic and stochastic solving methods; applications such as scheduling, timetabling and temporal reasoning. *(Prerequisite: CSE 5100; recommended CSE 5211 and CSE 5290.)*

CSE 5693 MACHINE LEARNING (3 credits). Computational paradigms and techniques in learning and adaptation. Topics include tree learning, rule learning, genetic algorithms, neural networks, case-based learning, Bayesian learning, analytical learning and reinforcement learning. *(Prerequisite: CSE 5290.)*

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. The course may be repeated for credit. *(Prerequisite: Instructor's 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. The course may be repeated for credit. *(Prerequisite: Instructor's approval.)*

CSE 5810 ADVANCED TOPICS IN COMPUTER SCIENCE THEORY (3 credits). Topics vary and the course may be repeated for credit. *(Prerequisite: CSE 5210.)*

CSE 5820 ADVANCED TOPICS IN COMPUTER ARCHITECTURE (3 credits). Topics are selected according to the choice and expertise of the instructor. Possible subjects may include advanced processor design, data communications, micro-computer systems, theory of coding, the architecture of symbolic computers, distributed systems and parallel processing. *(Prerequisite: CSE 5290.)*

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 5230, instructor's approval.)*

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. *(Prerequisite: 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, instructor's approval.)*

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. *(Prerequisite: CSE 5250.)*





ECE 5112 INTRODUCTION TO WIRELESS SYSTEMS AND APPLICATIONS (3 credits). Princi-

ECE 5245 DIGITAL SIGNAL PROCESSING 1 (3 credits). A description of discrete-time signals in the time and frequency domains; z-transform, discrete Fourier transform, FFT algorithms; introduction to classical digital filter design techniques; and introduction to linear predictive coding.

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). 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 an introduction to 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. Topics include image enhancement and image analysis, transform techniques including the wavelet transform, feature extraction, segmentation, compression and morphology. The Khoros graphical interface programming language is used.

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; and applications to failure detection, target recognition, image recognition and speech recognition. (*Prerequisites: ECE 5201, MTH 5425.*)

ECE 5260 APPLICATION OF ARTIFICIAL NEURAL NETWORKS IN EE (3 credits). Current applications of artificial neural networks to various topics in electrical engineering will be presented. Neural signal processing, closed loop neural control and design of neural systems will be discussed. (*Prerequisite: MTH 5320 or permission of the instructor.*)

ECE 5268 THEORY AND APPLICATIONS OF NEURAL NETWORKS (3 credits). Topics include learning in a single neuron, single- and multilayer

perceptrons, recurrent neural networks, structured neural networks, neural networks to perform principal component analysis, principal component regression and partial least squares regression. (*Prerequisite: ECE 5201 or MTH 5102 or permission of the instructor.*)

ECE 5270 SPECIAL TOPICS IN SYSTEMS (3 credits). A course based on topics of current interest in the technical literature on systems.

ECE 5301 SEMICONDUCTOR DEVICE THEORY (3 credits). A review of basic semiconductor physics and band theory; and 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. (*Prerequisite: ECE 3331.*)

ECE 5310 VLSI PROCESSING (3 credits). Presents VLSI fabrication theory. Course 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. (*Prerequisite: 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 5331 IC COMPUTER-AIDED ANALYSIS (3 credits). Presents the fundamentals of CAD techniques for the IC design verification including the hierarchy of simulation tools. Emphasis is placed on the mathematical and numerical techniques used for circuit level simulation. (*Prerequisites: CSE 1502, ECE 3111.*)

ECE 5333 ANALOG IC DESIGN (3 credits). Design of analog circuits using CMOS and related technologies. Switching and op-amps, A/D converter and D/A converter circuits are designed and verified using simulation tools. (*Prerequisites: ECE 3111, ECE 3331.*)



ECE 5426 ANTENNAS 2 (3 credits). Includes Pocklington's integral equation and the point matching technique; weighted residuals and Galerkin's method of moments; analysis of aperture antennas; the geometric theory of diffraction; antenna pattern synthesis. (*Prerequisite: ECE 5425.*)

ECE 5430 ELECTROMAGNETIC TENSOR GREEN FUNCTIONS (3 credits). Students learn formulation of Maxwell's equations for anisotropic media; derivation of the vector and scalar wave equations and the Helmholtz (time-harmonic) wave equations; Green functions for scalar wave equations in rectangular, cylindrical and spherical coordinates; Dyadic Green's functions. (*Prerequisite: ECE 3442.*)

ECE 5431 COMPUTATIONAL ELECTROMAGNETICS (3 credits). Includes method-of-moments and integral equation treatments of wire antennas and scatterers; FDTD and PDE analyses in propagating and diffracting media; finite element, conjugation gradient and mode matching solutions of electromagnetic boundary value problems. (*Prerequisite: ECE 3442.*)

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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.

ENM 5495 SPECIAL PROJECTS IN ENGINEERING MANAGEMENT (3 credits). Special graduate projects are undertaken on a cooperative basis between the student and a member of the graduate faculty. The project may include a literature search in a selected area or research and development in one of the engineering management specialty areas.

ENM 5900 ENGINEERING MANAGEMENT INTERNSHIP (3 credits). Industry-based internship experience undertaken under the supervision of a member of the graduate faculty. The objective is to provide industrial experience to students without prior experience in a practical engineering setting. Industrial presentations are required.

ENM 5999 THESIS RESEARCH (3 credits). Individual research work under the direction of a member of the graduate faculty on a selected topic.

## **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 3082; 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. (*Prerequisite: 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, Falkner and Skan, Hartree, etc.; approximate solutions for non-similar boundary layers. (*Prerequisite: MAE 5110.*)

MAE 5140 EXPERIMENTAL FLUID DYNAMICS (3 credits). Introduces students to test facilities such as wind tunnels and water tanks. Topics include 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). (*Prerequisite: 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. (*Prerequisite: 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 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 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



MGT 5003 PUBLIC FINANCE (3 credits). Concepts and methods of public-sector financial management in federal, state and local governments. This includes the analysis of the theory and practice of public finance through taxation, debt instruments, intergovernmental funds and other revenue sources. Course includes a review of financial planning, forecasting and budgeting, as well as financial management practices. (*Prerequisite: MGT 5000.*)

MGT 5006 INTRODUCTORY MANAGERIAL STATISTICS (3 credits). Methods of collecting, analyzing and interpreting data for managerial decision making. Topics include 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). Application of statistical theory to managerial problems, particularly methods of statistical inference for management decision making. Topics include F- and Chi-square distributions; nonparametric tests, analysis of variance, regression and correlation analysis. (*Prerequisite: MGT 5006.*)

MGT 5008 FINANCE SEMINAR (3 credits). Advanced topics in the field of finance are discussed, including current activity in the field of finance, as well as financial tools and strategy. The course is intended to blend financial theory with the current practice in finance. (*Prerequisite: MGT 5002.*)

MGT 5010 SEMINAR IN RESEARCH METHODOLOGY (3 credits). Reviews research methods in the managerial disciplines. Includes nature and sources of secondary data, primary data collection techniques, design of research projects, sample selection, model building, etc. A research proposal is prepared and presented by each student. A fully documented research report completes the results of the study.

MGT 5011 MANAGEMENT THEORY AND THOUGHT (3 credits). An overview of classical and contemporary management philosophies and theories. Focus is applied to managing enterprises in today's rapidly changing global economy. Coverage includes developing strategic vision, planning, organizing, directing and controlling, social responsibility and international management.

MGT 5012 SEMINAR IN PROFESSIONAL ACCOUNTANCY (3 credits). Current issues and trends in areas within the discipline of

accountancy. Includes, but not restricted to, professional ethics, historical trends, developments in sampling techniques and IRS procedures.



MGT 5041 FEDERAL INCOME TAX (3 credits). This course is designed to cover Federal Income Taxes for individuals, corporations and partnerships. Includes procedure and administration of Federal Tax Law, as well as Federal Tax Research. *(Prerequisite: MGT 5000.)*

MGT 5042 INTERNATIONAL BUSINESS (3 credits). Addresses world environments and specific international business activities such as foreign investment and international marketing. The decision-making process for going abroad is examined along with current issues in international business. *(Prerequisites: MGT 5002, MGT 5019.)*

MGT 5047 NEW VENTURE DEVELOPMENT (3 credits). This course introduces students to 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). Advanced analysis of current marketing opportunities and problems stemming from the ever-changing social, economic and political environments. The course entails the preparation of detailed marketing programs for all or part of an organization's marketing effort, consistent with its financial and managerial resources. *(Prerequisite: MGT 5019.)*

MGT 5049 INTERNATIONAL MARKETING (3 credits). Formulation of marketing strategies and techniques are studied within the framework of the world marketplace. Fundamental marketing concepts are examined and adapted to various economic, cultural, political, legal and business environments. *(Prerequisites: MGT 5000, MGT 5019.)*

MGT 5050 ADVANCED INTERNATIONAL MARKETING (3 credits). The complex 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 discussions of emerging issues that create new problems and opportunities for international marketing managers. *(Prerequisite: MGT 5019.)*

MGT 5060 MANAGEMENT OF ASSETS (3 credits). Determination of requirements for management of major and secondary items. Needs and techniques for accurate asset reporting and analysis of demand data for customers' requirements are reviewed. Emphasis is placed on problems related

to unstable items and the management methods required to integrate the acquisition and management of assets into the life-cycle program.

MGT 5061 SYSTEMS AND LOGISTICS SUPPORT MANAGEMENT (3 credits). Addresses the management of evolving systems. Emphasis is placed on the planning and support requirements of the system during its life cycle. Areas of study include maintenance planning, physical distribution, manpower requirements, facilities and equipment needs, documentation, systems integration and other support requirements.

MGT 5062 LOGISTICS POLICY (3 credits). This course analyzes logistics as a science and provides a comparative analysis of different policy considerations. The role of logistics in organizational policy and problems is reviewed, and future trends in logistics are studied. *(Prerequisites: MGT 5061, MGT 5100.)*

MGT 5063 INVENTORY CONTROL AND MANAGEMENT (3 credits). Management techniques and methods related to the life-cycle management of material. Material management systems are assessed and considerations given to concepts of standardization, modernization, material reserve, cataloguing, pro-ordering, storage and distribution.

MGT 5064 COST AND ECONOMIC ANALYSIS (3 credits). Cost effectiveness, trade-off analysis, system effectiveness model structure, development of criteria for evaluation of alternative systems, principles of cost accounting and cost estimating for system life cycle. Assesses basic math to perform cost-effective analysis, computer tools for economic modeling and risk assessment. *(Prerequisites: MGT 5002, MGT 5006, MGT 5026.)*

MGT 5065 SUPPLY CHAIN MANAGEMENT (3 credits). This course combines lectures, class discussions on assigned topics and case analyses. Covered areas include 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). Application of case analysis and modeling tools in a business environment. Concept of systems analysis discussed and computer models are constructed to illustrate key issues. Includes classification of systems, problem formulation, decision and risk analysis, modeling

techniques, discrete event simulation and evaluation of information. A design project is required. *(Prerequisite: MGT 5006.)*

MGT 5067 SYSTEM MANAGEMENT (3 credits). Nature and operations of systems, system science and general system theory, strategic concepts, analytical tools, general systems approach, process management; systematic decision-making, problem-solving concepts, scientific and technical disciplines, communications theory, socio-environmental factors, interface and strategic management.

MGT 5068 SYSTEM ENGINEERING MANAGEMENT (3 credits). Study of system technical management concepts and methods as applied to the management of system engineering activities. It covers the general principles and requirements of system engineering and the application of system management techniques used to manage the multidiscipline technical teams engaged in development programs.

regular class. A comprehensive term paper is required.

**MGT 5100 DISTRIBUTION MANAGEMENT (3 credits).** Distribution systems and management of systems 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).** Historical development of leadership theory and supporting research, followed by examination of contemporary leadership and research. Consideration of past and contemporary theory provides a basis of self-analysis by students, enabling them to define their own personal leadership styles. (*Prerequisite: MGT 5013.*)

**MGT 5105 INTERPERSONAL RELATIONS AND CONFLICT RESOLUTION (3 credits).** Focus on interpersonal behavior in two-person relationships with emphasis placed on interpersonal communication and conflict resolution. Coverage is also devoted to group processes, development and how group norms and culture influence interpersonal relationships. (*Prerequisite: MGT 5013.*)

**MGT 5106 ORGANIZATIONAL COMMUNICATION (3 credits).** Basic communication theory and the effects of communication on human

MGT 5138 BUSINESS ETHICS (3 credits). The primary objectives of this course are to increase students' understanding of concepts of moral philosophy and their relevance to decision making, and to provide an opportunity for students to apply this understanding in a wide variety of practical management settings. Extensive use is made of case analyses.

MGT 5139 INTERNATIONAL FINANCIAL ANALYSIS (3 credits). This course focuses on understanding the problems associated with international financial management. Topics include the environment of international financial management, foreign exchange risk management, multinational working capital management, foreign investment analysis and financing foreign operations. (*Prerequisite: MGT 5002.*)

MGT 5140 INTERNATIONAL FINANCE (3 credits). 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. (*Prerequisite: MGT 5002.*)

MGT 5141 IMPLEMENTING STATISTICAL PROCESS CONTROL (3 credits). Implementation of an overall SPC program, with emphasis on how to manage a process throughout the entire organization with the aid of tools and methods for the improvement of quality. Topics include how to target processes for SPC, conduct process capability studies and maintain ongoing process control. (*Prerequisite: MGT 5006.*)

MGT 5142 BUSINESS, GOVERNMENT AND PUBLIC POLICY (3 credits). 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. Extensive use is made of actual 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. (*Prerequisite: MGT 5013.*)

MGT 5147 MANAGEMENT OF TECHNOLOGY RESEARCH SEMINAR (3 credits). An overview of past and current MOT research. Systematically explores adaptation of scientific methodology to the analysis and solution of technology management problems. Students will be required to develop a written proposal and conduct a formal oral defense.

MGT 5148 DESIGN AND ANALYSIS OF EXPERIMENTS (3 credits). Productivity measurement and improvement and quantitative methods used in the management of technology. Topics covered include analysis of means, multifactor analysis of variance, factorial experiments and orthogonal arrays, including DESIGN-AESEIM (personal computer software) applications for the design and analysis of experiments. (*Prerequisite: MGT 5007.*)

MGT 5149 ECONOMICS FOR BUSINESS (3 credits). An advanced economics course consisting of several parts: 1) economic modeling and forecasting; 2) economic efficiency and allocation of resources in product markets and public sector; 3) macroeconomics; and 4) open economy, foreign exchange and international trade. (*Prerequisites: MGT 5006, MGT 5022, MGT 5132.*)

MGT 5150 MANAGEMENT OF SOFTWARE SYSTEMS (3 credits). This course is designed to explore 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. Included are software-related management topics in cost estimating/control, risk management, system life cycle models, prototype development/testing, development tools (e.g., Computer-aided Software Engineering (CASE)), and maintenance (e.g., software modification after delivery in order to improve performance, correct faults or adapt the product to a changed organizational environment). (*Prerequisite: MGT 5014 or equivalent; may not be taken for credit if MGT 5027 has been taken for credit.*)

MGT 5151 DATABASE SYSTEMS MANAGEMENT (3 credits). This course is designed to investigate how database management system techniques

are used to design, develop, implement and maintain modern database applications in organizations. Related to management's needs, topics explored in the course include database design and structured queries for data retrieval/analysis, data modeling techniques (e.g., entity-relationship diagrams), knowledge management (e.g., data warehousing/mining techniques), data security/privacy/recovery, Internet/Intranet distributed databases in electronic commerce and uses/risks of standard application development software. *(Prerequisite: MGT 5014 or equivalent; may not be taken if MGT 5028 has been taken for credit.)*

**MGT 5152 COMPUTER SYSTEMS ADMINISTRATION (3 credits).** This course is designed to explore the need for effective and efficient management of computer-based technology in local or globally networked organizational settings. Topics include chief information officer's (CIO) multiple role in management of computer-based resources, managing both centralized and networked data center operations with wide-area networks (WANs) and local-area networks (LANs), computer-based systems development/maintenance/security. Help Desk operations, personnel requirements (e.g., systems analysts, programmers, computer operators, database administrators (DBAs), network administrators and computer security specialists), support to an organization's Internet/Intranet applications and systems documentation standards. *(Prerequisite: MGT 5014 or equivalent; may not be taken for credit if MGT 5029 has been taken for credit.)*

**MGT 5153 TELECOMMUNICATIONS SYSTEMS MANAGEMENT (3 credits).** This course is designed to explore both the legal and the technical operation environment of telecommunications in organizations. Organizational ramifications are assessed of government telecommunication laws, policies and deregulatory activities. Technical topics include network design/construction/management, telecommunication architectures/standards, data/voice/multimedia communication, Internet applications of telecommunications, increased demand for bandwidth and network transmission, and organizations' strategic use of telecommunications. *(Prerequisite: MGT 5014 or equivalent; may not be taken for credit if MGT 5030 has been taken for credit.)*

**MGT 5154 ADVANCED MANAGEMENT INFORMATION SYSTEMS (3 credits).** This course is design to develop an understanding of the relationship between information technology (IT) and the strategic operational and functional areas of organizations in both global and domestic environments. Topics include current and emerging computer-based management information

and decision support systems' impact upon orga-

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Impact of advertising and other models of consumer behavior in an eBusiness environment are also discussed. (*Prerequisites: MGT 5019 and MGT 5160.*)

MGT 5165 SPECIAL TOPICS IN eBUSINESS (3 credits). Employs case studies to analyze organizations that plan, design, develop and implement eBusiness operations. Students study the characteristics that make an eBusiness successful or unsuccessful in a dynamic environment. Students prepare written evaluation reports of the eBusiness case studies. (*Prerequisite: 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 plan for an acquisition/merger of existing companies. An applied research project report is required. (*Prerequisite: 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). Solving problems with decision trees, decision models based on expected value/uncer-



include understanding all of the elements of ILS, the relationship of ILS elements to ILS planning and current systems acquisition practices.

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: MTH 2201 and CSE 1502 or CSE 1503 or CSE 2050.*)

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. (*Prerequisite: 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). An introduction to architectures, algorithms, and applications. Topics include single and multi-layer perceptrons, counterpropagation, Kohonen self-organization, adaptive resonance theory, neocognitron, probabilistic neural networks and Boltzmann machines with and without learning, recurrent neural networks. (*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. (*Prerequisite: MTH 2001.*)

MTH 5411, MTH 5412 MATHEMATICAL STATISTICS 1, 2 (3, 3 credits). Introductory survey of the basic concepts of probability and statistics. (*Prerequisites: MTH 2001, MTH 2201, MTH 4101, and CSE 1502, or CSE 1503 or CSE 2050, MTH 2201.*)





SPC 5091 SPECIAL TOPICS IN SPACE SYSTEMS (1 credit). Individual study of specific problems in space systems. (*Prerequisite: Permission of the program chair.*)

SPC 5092 SPECIAL TOPICS IN SPACE SYSTEMS (2 credits). Individual study of specific problems in space systems. (*Prerequisite: Permission of the program chair.*)

SPC 5999 THESIS (3 credits). Individual work, under the direction of a member of the graduate faculty, on a selected topic in the field of space systems. (*Prerequisites: Completion of 18 semester hours in space systems with a GPA of at least 3.0 and written approval from the program chair.*)

## **SPACE SCIENCES**

SPS 1010 INTRODUCTORY ASTRONOMY (3 credits). A descriptive survey of astronomical topics suitable for both majors and nonmajors in the space sciences. Topics include properties of light, astronomical instrumentation, stellar struc-

SPS 4035 COMPARATIVE PLANETOLOGY (3 credits). A comprehensive survey. Observations from both space-based and Earth-based experimentation is incorporated with the major planetary bodies, asteroids, comets and other small orbitals. The topics of both planetary interiors surface features and atmospheres will be discussed. *(Prerequisites: PHY 3060 and SPS 1020.)*

SPS 4100 SENIOR LABORATORY 1 (2 credits). Students conduct experiments in optics, atomic structure, nuclear and solid state physics that are basic to observations in space sciences. *(Prerequisite: Senior standing in physics or space sciences.)*

SPS 4110 SENIOR LABORATORY 2 (2 credits). Students conduct experiments in optics, atomic structure, nuclear and solid state physics that are basic to observations in space sciences. *(Prerequisite: Senior standing in physics or space sciences.)*

SPS 4200, SPS 4210 SENIOR SEMINAR 1, 2 (1, 1 credit). This seminar includes reports and discussions on selected topics in contemporary, experimental and theoretical physics and space sciences. *(Prerequisite: Student must be within three semesters of graduation.)*

SPS 4201 SPECIAL TOPICS IN SPACE SCIENCES (3 credits). Specific problems of space sciences are studied. *(Prerequisite: Permission of the department head.)*

SPS 4301 INDEPENDENT STUDIES (3 credits). Individual study of specific problems in space sciences. *(Prerequisite: Permission of the department head.)*

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. *(Prerequisite: Senior standing or permission of the instructor.)*

SPS 4401 MATERIAL PERFORMANCE (3 credits). Special requirements for materials used in space flight hardware, including characterizing and evaluation of performance and failure analysis of the components. The materials analytical facilities at NASA/KSC will be utilized. *(Prerequisite: Senior standing or permission of the instructor.)*

SPS 4402 TELEMETRY AND SPACE COMPUTER SYSTEMS (3 credits). This course is concerned with the transmitted data stream from and to a typical space vehicle during its mission. Students also study the computer software and systems used to control the vehicle. *(Prerequisite: Senior standing or permission of the instructor.)*

SPS 4403 SMALL SATELLITE/PAYLOAD INTEGRATION AND MISSION ANALYSIS (3 credits). A course on 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, altitude control, communications, etc. *(Prerequisite: Senior standing or permission of the instructor.)*

SPS 5010 ASTROPHYSICS 1: STELLAR STRUCTURE AND EVOLUTION (3 credits). Introduces basic interior structural equations, energy generation processes, opacity, and energy transport; radiation transport in stellar atmospheres, star formation, late stages of stellar evolution, stellar binaries and clusters. Special emphasis is placed on analytic and numerical models relevant to the sun. *(Prerequisites: SPS 1010, PHY 3064.)*

SPS 5011 ASTROPHYSICS 2: GALACTIC STRUCTURE AND COSMOLOGY (3 credits). Topics include 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. *(Prerequisite: SPS 5010.)*

SPS 5020 SPACE PHYSICS 1: THE LOW-ENERGY UNIVERSE (3 credits). An introduction to low-energy space plasma physics including the statistical behavior of plasmas, kinetic theory and magnetohydrodynamics. Emphasis is on solar system space plasma physics and the Sun-Earth connection including magnetospheric physics. *(Prerequisite: ECE 5410.)*

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, heavy particles, cosmic rays, neutrons and gravitational waves from both spacecraft and Earth. *(Prerequisite: SPS 5020 or instructor approval.)*

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. Topics include the planetary crust, mantle, core, core-mantle interface, seismicity, density and elastic constraints. *(Prerequisite: SPS 3010 or permission of the instructor.)*

SPS 5031 PLANETARY SCIENCE 2: ATMOSPHERES (3 credits). Principles governing the evolution, composition and retention of planetary atmospheres and the interplanetary environment.

Topics include the neutral atmosphere, photochemical processes, diffusion dynamics and planetary ionospheres and magnetospheres. (*Prerequisite: SPS 4030.*)

SPS 5050 ASTRODYNAMICS (3 credits). Topics include 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. (*Prerequisite: SPS 3030.*)

SPS 5088, SPS 5089 SPECIAL TOPICS IN SPACE SCIENCES (3, 3 credits). Investigation of specific problems in the space sciences. (*Prerequisite: Permission of the department head.*)

SPS 5090, SPS 5091 SPECIAL TOPICS IN OBSERVATIONAL ASTRONOMY 1, 2 (3, 3 credits). Participation in advanced observing programs at the university's observatories. (*Prerequisite: Permission of the department head.*)

SPS 5999 THESIS (3 credits). Individual work under the direction of a member or members of the graduate faculty on a selected topic in space sciences. (*Prerequisite: Permission of the department head.*)

## SOFTWARE ENGINEERING

SWE 5001 SOFTWARE ENGINEERING 1 (3 credits). The application of engineering rigor to all phases of software development, including requirements elicitation and analysis, and software architecture, design, construction, integration, testing and maintenance. Each student will work individually to apply a prescribed discipline from an initial problem statement through the release of the completed software.

SWE 5002 SOFTWARE ENGINEERING 2 (3 credits). Covers the application of engineering rigor and team coordination to the development of a software product. Teams will create and document their own disciplined procedures for each phase of software development based on an initial problem statement, then create the software from the established procedure. Upon completion, teams will be required to provide an in-depth critique of the process. (*Prerequisite: SWE 5001.*)

SWE 5110 REQUIREMENTS ENGINEERING (3 credits). This course provides an in-depth study of software requirements, engineering tools and techniques. Topics will include gathering user requirements, formal specification of system behavior, system interfaces, end-user and system documentation and validation techniques. The

end-user aspect of gathering and formalizing or user requirements is emphasized. (*Prerequisite: SWE 5000.*)

SWE 5310 INTERFACE DEVELOPMENT (3 credits). This course focuses on a specific class of software for which special engineering consideration must be given—software interfaces. The four major categories to be explored (human interfaces, file/database interfaces, APIs and real-time interfaces) and techniques to read from and write to these interfaces are given. (*Prerequisite: SWE 5000.*)

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++. (*Prerequisite: SWE 5000.*)

SWE 5411 SOFTWARE TESTING 1 (3 credits). Explores functional (black box) methods for testing software systems, reporting problems effectively and planning testing projects. Students will apply their learning throughout the course to a sample application that is commercially available

SWE 5440 INTRODUCTION TO SOFTWARE ARCHITECTURE (3 credits). Covers the role of architecture in the software engineering life cycle. Techniques covered include those for designing a software architecture that satisfies functional requirements; analyzing with respect to certain required attributes such as performance, reliability and maintainability; and transforming the initial architecture to one that better satisfies the required attributes while still meeting the functional requirements. (*Prerequisite: SWE 5001.*)

SWE 5460 COMPUTER AND INFORMATION SECURITY (3 credits). An examination of concepts of modern computer security from a practical point of view. Topics include secure system design, system vulnerability, threat assessment, intrusion detection, cryptography, and legal and ethical issues in computer security. Emphasis on software engineering applications of security and implementation of a secure computer system.

SWE 5510 SOFTWARE MAINTENANCE (3 credits). This course describes abstraction techniques to extract specifications and design from existing



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