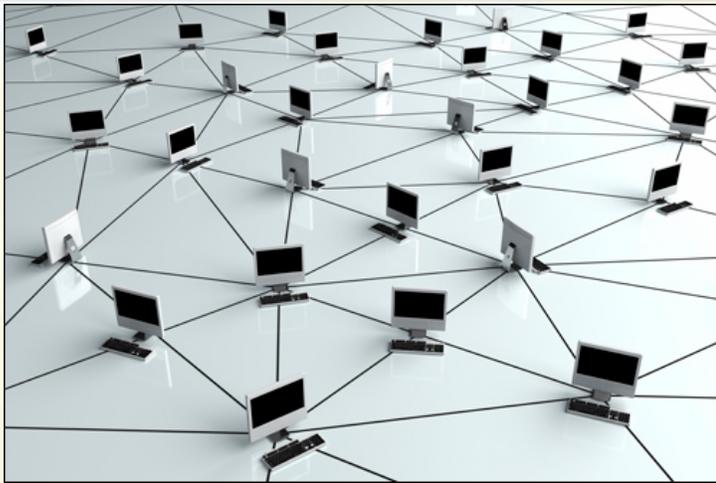


Computer Science

Undergraduate Student Handbook 2013-2014



Electrical Engineering and Computer Science
Texas A&M University - Kingsville

MSC 192, 700 University BLVD, Kingsville, TX 78636-8202

Welcome to Computer Science



Texas A&M-Kingsville offers a program leading to the Bachelor of Science Degree in Computer Science. This program emphasizes the theory and design of digital computer software and their applications. Computer science is one of the fastest growing fields with excellent opportunities for applications in almost all areas of government, industry and commerce.

The objectives of the undergraduate computer science program are:

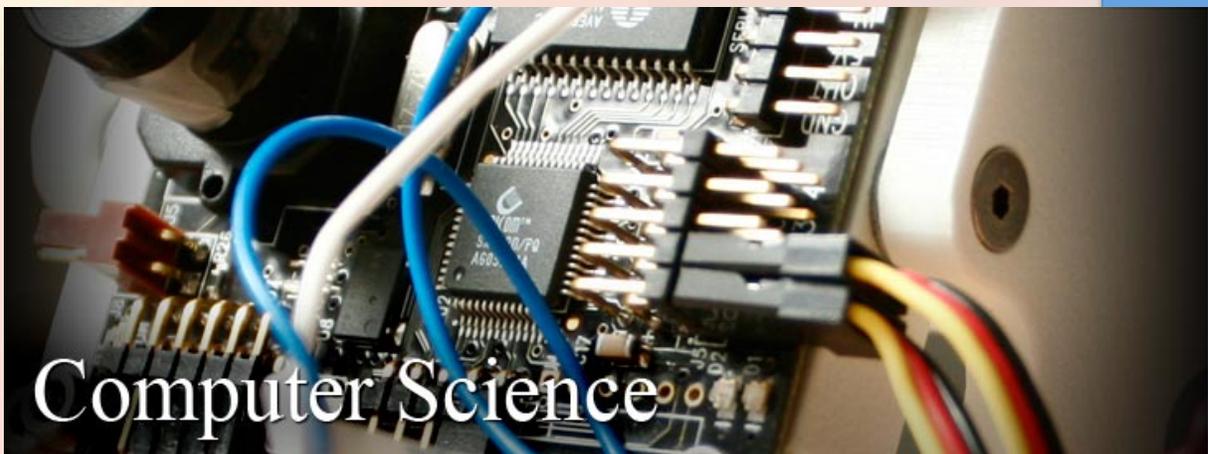
- To prepare our graduates for careers as computer science professionals and/or for advanced studies.
- To enable our graduates to pursue state-of-the-art solutions to real world problems and to evaluate and embrace new technologies.
- To instill in our graduates personal commitment to high ethical standards, sound business decisions, and professional excellence.

The Computer Science Program at Texas A&M-Kingsville introduces the concepts of modern computer science including productive programming, data structures, computer systems, writing computer applications and polishing programming skills. The program provides ultimate education to prepare students for positions in industry, education, government, commerce, or to pursue graduate studies.

What is Computer Science?

Computer Science is the systematic study of the feasibility, structure, expression, and mechanization of the methodical processes (or algorithms) that underlie the acquisition, representation, processing, storage, communication of, and access to information, whether such information is encoded in bits and bytes in a computer memory or transcribed in genes and protein structures in a human cell. The fundamental question underlying all of computing is: *what computational processes can be efficiently automated and implemented?*

To tackle this seemingly simple question, computer scientists work in many complementary areas. They study the very nature of computing to determine which problems are (or are not) computable. They compare various algorithms to determine if they provide a correct and efficient solution to a concrete problem. They design programming languages to enable the specification and expression of such algorithms. They design, evaluate, and build computer systems that can efficiently execute such specifications. And, they apply such algorithms to important application domains.



What is Computer Science not?

Contrary to popular belief, Computer Science is not *just* about building computers or writing computer programs, even though we do learn how to program. Computer Science is about how we use such tools, and what are the outcomes when we do. As a matter of fact, many problems in computer science need only pencil and paper to solve them. That said, the design and implementation of computing system hardware and software is replete with formidable challenges and fundamental problems that keep computer scientists busy. Computer Science is about building computers and writing computer programs, *and much much more!*

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Administration



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Faculty

Professor



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Digital communication systems for low-earth-orbit spacecraft, Embedded systems for low-earth-orbit spacecraft, Management of information technology in higher education

Professor



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Computer Network Security, Stored Data Security, Search Engines

Associate Professor



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Algorithm, Software Defined Radio, Bioinformatics, Computing Theory

Faculty

Assistant Professor



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Software Engineering, Software Visualization,
Software Metrics, Automated Software tools

Associate Professor



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Parallel Distributed Systems, Networking, Storage
Systems, Cluster and Grid Computing, Real-Time
Systems, Fault-Tolerant Computing, Performance
Evaluation, Dynamic Resource Management, Network
Security

Lecturer



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Software Visualization, Software Metrics, Web
Engineering

Faculty

Visiting Assistant Professor



Muhammad Aurgangzeb

EC 337

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**Game Theory, Graph Theory, Social Networks, Advantages
and Cost in Networks**

Visiting Lecturer



Yagnesh C. Trivedi

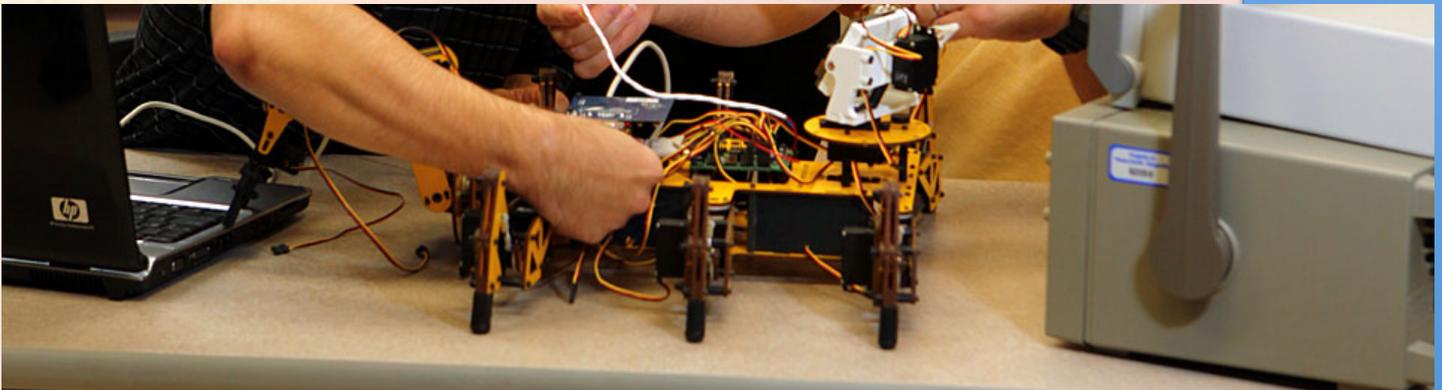
EC

361-593-2004

On Going Research

Research in Computer Science department is both experimental and theoretical, traversing many domains. Our department provides a stimulating environment for scientific investigation. Exciting research projects span a wide range of disciplines and many are highly interdisciplinary.

- Cybersecurity
- Search Engines
- Storage Systems
- Software Engineering
- Visualization
- Algorithms
- Bioinformatics
- Data Mining
- Remote Sensing
- Real-Time and Embedded Systems
- Reliability and Fault-Tolerance



Admission



Admission Deadlines

To ensure full consideration, all completed applications and documentation and other supporting materials must be in the Office of Admissions by the following deadlines:

- Fall Semester -- August 15
- Spring Semester -- December 15
- Summer I -- May 15
- Summer II -- June 15

Requirements for Entering Freshmen

Entering freshmen are required to have a minimum composite score of 21 on the ACT or 970 on the SAT. Students whose test scores fall between 18-20 (ACT) or 810-969 (SAT) will be placed in the Pre-Engineering (PPEN) major status in order to complete preparatory course work. The student will be transferred to an engineering program after successfully obtaining an overall cumulative and math/science GPA of 2.0 in the second semester of course work. (Course work in math and science must include MATH 1348 or higher and CHEM 1111/CHEM 1311.)

Application Procedure for Freshmen Student

- Submit a completed application for admission, including the \$15 application fee.
- Request that an official high school transcript be sent directly to the Office of Admission, Texas A&M University- Kingsville, MSC 128, Kingsville, TX 78363.
- Notify the testing authority to send official copies of ACT or SAT scores directly to the Texas A&M-Kingsville Office of Admission. (ACT code 4212, SAT code 6822)
- Students attending colleges or universities while still in high school or prior to enrolling at Texas A&M-Kingsville must request the official college transcripts be sent directly to the Office of Admission.
- The Texas Academic Skills Program (TASP)/Texas Higher Education Assessment (THEA) is required by Texas law. Although not an admission requirement, students must take the TASP/THEA test prior to enrolling at Texas A&M University-Kingsville and submit their test scores. (TASP Code 722)/(THEA Code 299)

Students can either complete the Texas A&M University-Kingsville application or the State of Texas Common Application. The Common Application is available online at www.applytexas.org.

The official high school transcript shows the units completed, the grades earned, rank in class and the date of graduation. Acceptance will be tentatively granted on the basis of a high school transcript showing at least six completed semesters and rank in class.

The Social Security number is used as a permanent student identification number. Anyone who does not have a social security number should obtain one prior to filing an application for admission, or a student I.D. number will be assigned.

Academic Support

Advising

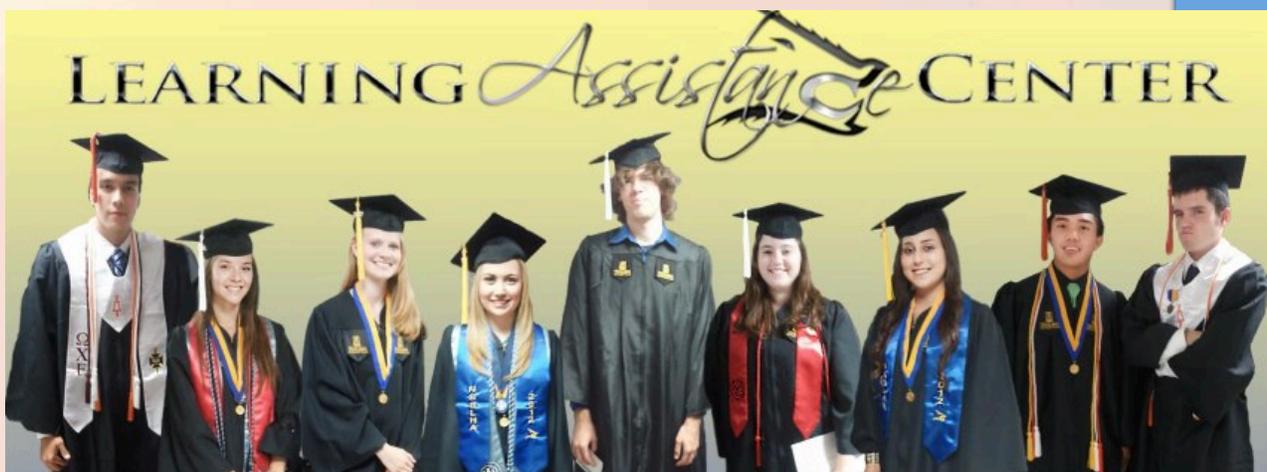
The college of Engineering has an assistant dean for undergraduate who is available to answer questions regarding schedule plans, registration, degree requirements, or any problems students may be experiencing.

The Computer Science Department assigns an academic advisor for each undergraduate student. The Department requires all incoming new and transfers students to meet with the advisors before registering for classes. Academic advisors can also answer questions about any of the technical issues, such as career decisions and equivalence of transfer classes.

The Javelina Engineering Student Success Center (JESSC)

The Javelina Engineering Student Success Center (JESSC) mission is to increase retention in the Frank H. Dotterweich College of Engineering and to provide students with the tools they need to succeed. The JESSC also encourages, engages, and promotes the development of leadership skills to further form and support integrity, quality, and the highest ethics in student's professional careers by:

- ❖ Establishing a tracking system to monitor academic progress for all new freshmen
- ❖ Establishing new freshmen cohort groups and activities in Living Learning Center for a better support system
- ❖ Providing a thorough transcript evaluation for new transfer students
- ❖ Establishing multiple tutoring center sites for assistance in Math, Physics and Chemistry
- ❖ Providing tutoring in major disciplines
- ❖ Providing tutoring in Math, Chemistry and Physics
- ❖ Establishing a mentoring program for new students



Current JESSC Services

- ❖ In-house resource center to enhance research and study skills
- ❖ Peer Mentoring
- ❖ In-house Coordinator of Internships and Coops
- ❖ Providing a centralized location for
 - ↪ Scholarship information
 - ↪ Posted job opportunities
 - Internships/coops
 - Interview sessions with visiting companies,
 - ↪ Degree program management
 - ↪ Other university activities and timely degree checkout
- ❖ Offers personal sessions with representatives from the Office of Career Services on:
 - ↪ Resume building
 - ↪ Interviewing skills
 - ↪ Job searches and more!
- ❖ Offers group sessions in writing, presentation skills, etc. with the Intensive English Institute
 - ❖ Provide support for students wanting to enhance their leadership and professional development skills and better prepare them for the engineering workforce!

Student Research Opportunities

- ❖ Summer Research Experience for Undergraduates (REU): amazing research goes on within Computer Science Department and you can be a part of it. Through the REU program, undergraduates have a unique opportunity to work on cutting-edge research guided by Computer Science faculty. Computer Science faculties are excited to work with bright, enthusiastic undergraduates.



**REQUIREMENTS FOR THE DEGREE OF
BACHELOR OF SCIENCE IN COMPUTER SCIENCE
CURRICULUM**

FRESHMAN YEAR

ENGL 1301 Rhetoric and Composition3	ENGL 1302 Rhetoric and Composition 3
CHEM 1311/1111 General Inorganic Chemistry I and Lab4 (prereq: MATH 1314, HS Chemistry or CHEM 1481)	HIST 1301 American History..... 3
MATH 2413 Calculus I4 (prereq: MATH 1348)	PHYS 2325/2125 University Physics I and Lab 4 (prereq: PHYS 1305/1105; coreq: MATH 2413)
CSEN 2304 Introduction to Computer Science.....3 (prereq: MATH 1314)	MATH 2414 Calculus II 4 (prereq: MATH 2413)
UNIV 1101 1	CSEN 2306 Object Oriented Programming 3 (prereq: CSEN 2304)
	UNIV 1102 1
15	18

SOPHOMORE YEAR

HIST 1302 American History.....3	POLS 2302 Government and Politics of U.S. 3
POLS 2301 Government and Politics of US 3	CSEN 2328 Data Structures and Algorithms 3 (prereq: CSEN 2304)
PHYS 2326/2126 University Physics II and Lab4 (prereq: PHYS 2325/2125; coreq: MATH 2414)	^ <i>Visual/performing arts</i> 3
MATH 3320 Differential Equation3 (prereq: MATH 2414)	^ <i>Literature/philosophy</i> 3
CSEN 2310 Object-Oriented Software Engineering.3 (prereq: CSEN 2304)	STAT 1342 Elementary Statistics 3 (prereq: MATH 1314 or MATH 1324)
16	15

JUNIOR YEAR

MATH 3370 Discrete Math.....3	EEEN 3449 Microprocessor Systems 4 (prereq: EEEN 2340)
^ <i>Oral communication*</i> 3	CSEN 4316 Software Engineering I 3 (prereq: 6 semester hours of CS)
EEEN 2340 Digital Logic Design3 (prereq: CSEN 2304)	CSEN 4314 Database Systems..... 3
CSEN 4315 Computer Graphics.....3 (prereq: CSEN 2304)	^ <i>Global learning**</i> 3
^ <i>Social/behavioral</i>3	
15	13

SENIOR YEAR

CSEN 4201 Senior Project.....2 (prereq: senior standing)	CSEN 4202 Senior Project 2 (prereq: senior standing)
CSEN 4320 Computer Networks.....3 (prereq: 6 hours of upper level CS)	CSEN 4362 Operating Systems..... 3 (prereq: EEEN 3449)
EEEN 4344 Computer Architecture and Design..... 3 (prereq: EEEN 3449)	CSEN 4366 Programming Language 3 (prereq: CSEN 2328)
CSEN 4317 Software Engineering II3 (prereq: CSEN 4316)	CSEN 4340 Computer Security..... 3 (prereq: CSEN 4320)
Approved Elective***3	Approved Elective*** 3
14	14

Total Number of Hours: 120

*BCOM 2304, COMS 2374, or ENGL 2374 is strongly recommended.

**EVEN 2372 is strongly recommended.

***The approved electives must be selected with the consent of the student's advisor, and would normally be more advanced courses in computer science, computer information systems, mathematics, statistics, or one of the sciences taken in the freshman and sophomore years. However, a meaningful sequence of courses in any discipline, such as engineering or agriculture, may be taken with the consent of the student's advisor, except that all such courses must be at the 2000-level or above.

Revised 6/12

General Education Electives

^Visual/performing arts

ARTS 1303, ARTS 1304, ARTS 1311, ARTS 1312, ARTS 1316, ARTS 1317, ARTS 2301, ARTS 2313, ARTS 2316, ARTS 2326, ARTS 2333, ARTS 2346; MUSI 2301, MUSI 2306, MUSI 2308, MUSI 2310; THEA 1322, THEA 2301.

^Literature/philosophy

ANTH 2301, ANTH 2302; ENGL 2342, ENGL 2362; FREN 1311, FREN 1312, FREN 2311, FREN 2312; HIST 2321, HIST 2322; PHIL 1301; SPAN 1313, SPAN 1314, SPAN 2301, SPAN 2302, SPAN 2311, SPAN 2312; SWBS 2301, SWBS 2302.

^Oral communication

COMS 1311, COMS 1315, COMS 2335,
COMS 2374; BCOM 2304; ENGL 2374 (recommended).

^Global learning

ANTH 2301, ANTH 2302; BIOL 1372; BUAD 2374; ENGL 2331; GEOG 1303; HIST 2321, HIST 2322; PHIL 1301; POLS 2340; EVEN 2372 (recommended).

^Social/behavioral

ANTH 2303; ECON 2301, ECON 2302; POLS 2304, POLS 2340; PSYC 2301; SOCI 1301, SOCI 1306 or SOCI 2361.

Minor in Computer Science

Since principles of computer science are applicable in the sciences, engineering, business and other disciplines, the department offers a minor in Computer Science.

Minor in Computer Science
Fundamental course work
<ul style="list-style-type: none">• CSEN 2304 Introduction to Computer Science• CSEN 2306 Object-Oriented Programming• CSEN 2310 Object-Oriented Software Engineering• CSEN 4316 Software Engineering I
In addition, at least two advanced CSEN courses usually selected from
<ul style="list-style-type: none">• CSEN 4314 Database Management Systems• CSEN 4315 Computer Graphic• CSEN 4317 Software Engineering II• CSEN 4320 Computer Networks• CSEN 4340 Computer Security• CSEN 4362 Operating Systems• CSEN 4366 Theory of Programming Languages
<ul style="list-style-type: none">• Other choices must be approved by the department chairperson of Electrical Engineering and Computer Science.



Minor in Security Engineering

Students in Computer Science who are interested in minor program in security engineering must take the following courses:

Security Engineering Minor Program Curriculum
Core Curriculum Courses for Computer Science Major
<ul style="list-style-type: none">• CS 4314 Database Systems• CS 4320 Computer Networks• CS 4340 Computer Security
Elective Courses for the Minor Program (Program students must take at least 3 of the following 5 courses)
<ul style="list-style-type: none">• MEEN 43XX Introduction to Information Analysis and Modeling in Security Engineering• MEEN 43XX Resource Optimization for Security• EEEN 43XX Wireless Sensor Networks• MEEN 43XX Introduction to Unmanned Air Vehicles (UAVs)• CSEN 43XX Data Mining
<ul style="list-style-type: none">• Security Engineering Seminar Series Attendance is required by all program students. Non-credit.



Computer Science Courses

2303. Introduction to Computing Using Visual Basic and Excel. 3(3-0)

Problem solving methods and algorithm development. Computer programming using Visual Basic. How to use Excel. Designing, coding, debugging and documenting programs using techniques of good programming style. Prerequisites: MATH 1314 and MATH 1316 or equivalent.

2304. Introduction to Computer Science. 3(3-0)

Introduction to computer systems, problem solving methods and algorithm development. Structured programming using a programming language such as C. Designing, coding, debugging and documenting programs using techniques of software development cycle. Prerequisites: MATH 1314 and MATH 1316 or equivalent.

2310. Object-Oriented Software Engineering. 3(3-0)

Introduction to objects, object-oriented analysis and modeling, object-oriented design, implementation using an object-oriented language, such as C++. Prerequisite: CSEN 2328.

2328. Data Structures. 3(3-0)

Algorithm analysis, lists, stacks, queues, trees, hashing, priority queues, sorting, graph algorithms and algorithm design. Prerequisite: CSEN 2304.

2330. Assembly Language and Computer Organization. 3(3-0)

Basic concepts of computer systems and computer architecture. Machine instructions and basic data types. Representation of information. Arithmetic and logical operations. Addressing operands in storage. Assembly language programming. Prerequisite: CSEN 2304.

In addition to the listed prerequisite for the following 4000 series courses, a student must have an overall grade point average of 2.0 or higher.

4201-4202. Senior Project. 4(1-3)

A major project of an original nature carried to completion over a period of two semesters. Normally taken in the final academic year prior to graduation. Prerequisite: senior standing in Computer Science.

4314. Database Management Systems. 3(3-0)

File and database organization techniques. Network, hierarchical and relational data models. Normalization. Commercially - available DBMS. Query languages. DBMS design and implementation.

4316. Software Engineering I. 3(3-0)

Introduction to formal software design principles. An engineering approach to software development. Software project management. Software requirements analysis, specification, design, development and validation. Prerequisite: 6 semester hours of Computer Science or Computer Information Systems.

4317. Software Engineering II. 3(3-0)

Advanced software design principles. An engineering approach to software development emphasizing advanced techniques for validation and verification. Prerequisite: CSEN 4316.

4320. Computer Networks. 3(3-0)

Data communication networks and ISO reference model, the electrical interface, data transmission, data link and its protocols, local area network and its protocols, wide area network and its protocols, internetworking. Prerequisite: 6 hours of upper level Computer Science.

4335. Selected Topics. V: 1-3

One or more topics of computer science. May be repeated for a total of 6 semester hours. Prerequisite: consent of instructor.

4336. Special Problems. V: 1-3

Individual solution of selected problems in computer science conducted under direct supervision of a faculty member. May be repeated for up to 6 semester hours. Prerequisite: consent of instructor.

4361. System Software. 3(3-0)

The study of system software components such as assemblers, macros and macro processors, compilers, linkers and loaders. The function and development of these components are emphasized. Prerequisite: CSEN 2330 or EEEN 3449.

4362. Operating Systems. 3(3-0)

Study of operating system principles, including process management, memory management, resource allocation and input, output and interrupt processing.

Prerequisite: CSEN 2330 or EEEN 3449.

4366. Theory of Programming Languages. 3(3-0)

Formal definition of programming languages including specification of syntax and semantics. Precedence, infix, prefix and postfix notation. Global properties of algorithmic languages. List processing, string manipulation, data description and simulation languages. Run-time representation of program and data structures.
Prerequisite: CSEN 2328.



Fast Track

Put your Career on a Fast Track

- The Fast Track MS Program provides qualified undergraduate students a unique chance to start earning graduate credits during their senior year of study, setting them on a fast track to earn their Master's degree.
- Students earn undergraduate credits to satisfy the requirements of their undergraduate degree by examination, at no additional cost.
- Students may apply to the graduate school for admission and use the earned credits towards a MS degree.

TAMUK SENIORS / CS GRADUATE FAST TRACK PROGRAM

A Texas A&M University-Kingsville student in the last year of undergraduate work (or that has senior status) may, by written request to the graduate dean, undergraduate dean, and graduate coordinator, enroll for a maximum of 9 semester hours of graduate work consistent with the normal load regulations for graduate students without taking the GRE. The graduate courses may not be used to satisfy requirements for the baccalaureate degree. The student must satisfy the communication skills competency requirements and must have an undergraduate grade point average in excess of 2.60 on a 4.00 scale. This request must be approved before the student registers for the graduate courses.

Requirements for Computer Science Graduate Fast Track Program

- Be a Computer Science undergraduate student in good academic standing with prerequisites satisfied for all courses, including courses where credit is obtained by examination.
- Have at least a 2.6 undergraduate GPA in all courses, and in all major, math and science courses.
- Have no "F" grades on their transcript (exceptions can be granted by Dept. Chair).
- Have approval of EECS Department Chair.

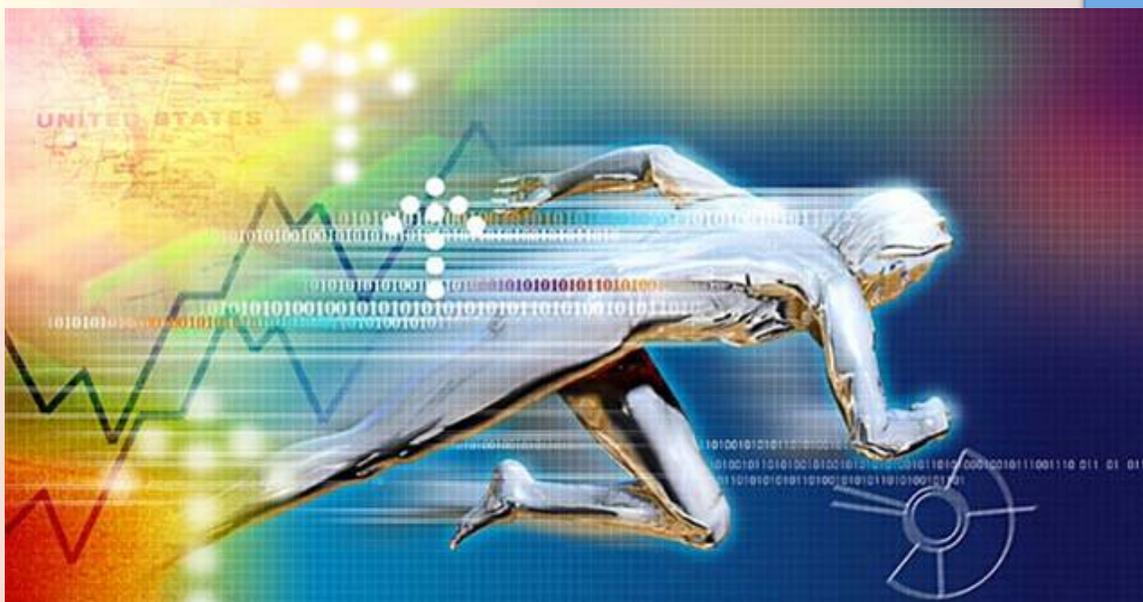
Computer Science undergraduate students who have been approved to participate in the CS Graduate Fast Track Program may register for up to 3 of the following graduate courses, and then obtain credit by examination for the lesser approximate undergraduate course. Students will not need to pay the tuition for the undergraduate course; however, they must take the examination for credit before the final exam of the respective graduate course.

CSEN Graduate Course	CSEN Undergraduate Course
CSEN 5322, Operating Systems	CSEN 4362, Operating Systems
CSEN 5314, Database Systems	CSEN 4313, Database Management Systems
CSEN 5325 Software Engineering	CSEN 4316, Software Engineering I
CSEN 5323 Computer Communication Networks	CSEN 4320, Computer Networks

Credit obtained by examination, as part of the Fast-Track Program may not be used to replace a previous poor or failing grade in the same subject.

Fast Track Option II for Undergraduate Engineering Students:

1. A student signs up for an undergraduate selected topics or special problems class with a faculty member teaching a graduate course in a topic that can be substituted for an elective or main course in the undergraduate degree.
2. The student attends the graduate course lectures or studies the materials of the course with guidance from the faculty member. The student earns a regular grade for the undergraduate selected topics or independent special problems course through work he/she does over the semester.
3. The student challenges the graduate course in the same semester or the following semester and earns a Pass or Fail grade for the graduate course that goes towards an advanced degree. The department will send a Pass/Fail memo to the Graduate School and the Registrar's offices.



Scholarships

Several kinds of scholarships are available in the College of Engineering at Texas A&M-Kingsville as well as through the university. Please browse the links below to find a scholarship you may be interested in.

- **College of Engineering Scholarships**
- **Emerson Korges and John R. Guinn Book Scholarship Award**
- **Graduate Student Scholarship**
- **University Scholarships**

For more information see the following link:

<http://www.tamuk.edu/engineering/departments/eecs/scholarships.html>



Important Phone Numbers

Admission	361-593-2315
Business Office	361-593-2616
Financial Aid	361-593-3911
Housing	361-593-3419
New Student Information Center	361-593-3907
Registrar	361-593-2811



Texas A&M University, Kuykendall, Tx

Visit Us On:

<http://www.tamuk.edu/engineering/departments/eecs/index.html>

Electrical Engineering and Computer Science Department

