

College of Engineering

ADMINISTRATIVE OFFICER

Milton R. Bryant, *Dean*

ADMINISTRATIVE STAFF

Shield B. Lin, *Associate Dean*

FACULTY

Cajetan M. Akujuobi, *Electrical Engineering*

John Okyere Attia, *Electrical Engineering*

Mohsen Beheshti, *Computer Science*

Paul O. Biney, *Mechanical Engineering*

Ronald D. Boyd, *Mechanical Engineering*

Ing Chang, *Mechanical Engineering*

Kamel H. Fotouh, *Chemical Engineering*

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Jorge F. Gabitto, *Chemical Engineering*

Michael Gyamerah, *Chemical Engineering*

Ziaul Huque, *Mechanical Engineering*

Kelvin K. Kirby, *Electrical Engineering*

Siew T. Koay, *Electrical Engineering*

Raghava R. Kommalapati, *Civil Engineering*

Anil A. Kumar, *Electrical Engineering*

Shield B. Lin, *Mechanical Engineering*

Kent Martin, *Computer Science*

Houshang Masudi, *Mechanical Engineering*

James O. Morgan, *Mechanical Engineering*

Irvin W. Osborne-Lee, *Chemical Engineering*

Kwang Paick, *Computer Science*

Ramalingam Radhakrishnan, *Civil Engineering*

K.M.A. Rahman, *Civil Engineering*

Charlie L. Tolliver, *Electrical Engineering*

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Shuguang Yan, *Computer Science*

Feng-Jen Yang, *Computer Science*

Yanggao Yang, *Computer Science*

Hsiang Y. Yeh, *Civil Engineering*

Yukong Zhang, *Computer Science*

Jianren Zhou, *Mechanical Engineering*

PURPOSE AND GOALS

The graduate Engineering programs are designed to enhance the student's research capabilities and to make the student more competitive in the professional practice of engineering. They are the continuation of the intellectual, scholarly and professional development of the individual producing technological leaders and creative engineers devoted to the discovery, development, and refinement of knowledge and methodologies associated with the various engineering disciplines. Each degree candidate is expected to have demonstrated the highest degree of professional ethics and standards. The College of Engineering provides excellent facilities in support of its graduate programs.

INSTRUCTIONAL ORGANIZATION

The College of Engineering offers the following graduate degree programs:

Programs	Degree Offered
<i>Computer Information Systems</i>	M.S.C.I.S.
<i>Computer Science</i>	M.S.C.S.
<i>Engineering</i>	M.S.ENGR.
<i>Electrical Engineering</i>	M.S.E.E.

SUPPORTING FACILITIES

Chemical Engineering

The Chemical Engineering Department has research facilities available in the areas of Environmental, Transport Processes, Chemical Conversion, Bioengineering, and general purpose laboratories.

Civil Engineering

The Civil Engineering Department has a Dynamic and Cyclic Loading Equipment Laboratory, Materials Testing Laboratory, and Environmental Laboratory.

Computer Science

The Computer Science Department has a variety of computing facilities, including three MS Windows-based PC labs, a LINUX lab, and a HP UNIX lab.

Electrical Engineering

Research facilities are available in the Advanced Solid State Laboratory, the Power Laboratory, Logic and Digital Design Laboratory, Electronic Laboratory, Analog and Mixed Signal Testing Laboratory, Broadband Communication Laboratory, Digital Signal Processing Laboratory, and General Communication Laboratory. Additional research laboratories exist in the Center for Applied Radiation Research (CARR).

Mechanical Engineering

Research facilities are available in the Thermal Science Research Center, the Future Aerospace Science and Technology Center (FAST) on Lightweight Structural Materials and Processing, Material Testing and Characterization lab, Surface Coating facilities, the Computational Fluid Dynamics Institute, and Computer-Aided Design and Manufacturing facilities.

Environmental Engineering

Research facilities are available in Chemical Engineering and Civil Engineering.

ADMISSION TO PROGRAM

The following are admission requirements to the master's programs in the College of Engineering. Students will be awarded graduate degree status admission if they satisfy all the admission requirements.

- 1) Meet the requirements for admission to the graduate school.
- 2) Have an undergraduate degree from an ABET (or equivalent) accredited program.
- 3) Have a cumulative Grade Point Average (GPA) of 3.00 on a 4.00 scale.
- 4) Have a minimum GRE General Test score of 900 (combined verbal and quantitative).
- 5) Have previous educational background in the intended area of study.

Students may be awarded provisional graduate degree status admission if they satisfy the following requirements.

- 1) Have a minimum cumulative Grade Point Average (GPA) of 2.75 on a 4.00 scale.
- 2) Have a minimum GRE General Test score of 700 (combined verbal and quantitative).

Provisional students must petition the Dean of Engineering for full status to the graduate program during the term in which the first 12 graduate semester credit hours will be completed. To be considered for full degree status provisional students must have earned a minimum GPA of 3.0 in all courses recommended by the faculty advisor and the head of the graduate program, and submit official scores on the GRE examination to the Office of Graduate Programs.

Students may be awarded non-degree status admission or special student status admission if they satisfy the requirements as outlined in the catalog section “Types of Admission” under Admissions Information and Requirements.

MASTER OF SCIENCE IN ENGINEERING DEGREE PROGRAM

The Master of Science Degree in Engineering is a general engineering program with four areas of concentration:

Chemical Engineering,
Civil Engineering,
Environmental Engineering, and
Mechanical Engineering.

Each area of concentration has an option of a thesis or non-thesis degree plan. The thesis option requires 30 semester credit hours including 6 semester credit hours for the thesis and the “zero semester hour” for a research seminar. The non-thesis option requires 33 semester credit hours including 3 semester hours for a major project and the “zero semester hour” for a research seminar. Each option includes 12 semester credit hours of graduate courses in general engineering with the remaining hours to be determined by the student and his academic advisor during the first semester of acceptance to the graduate program as a degree status student.

During the first semester of graduate degree status, the student should select an advisory committee consisting of at least three members, two of whom must come from the engineering faculty, and the chairman of the committee who shall be a full member of the graduate faculty in engineering.

THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements	6 SCH
GNEG 5086 Thesis	
GNEG 5010 Research Seminar	
*General Engineering Requirements	12 SCH
GNEG 5063 Engineering Analysis I	
GNEG 5073 Engineering Analysis II	
GNEG 5033 Engineering Probability and Statistics	
GNEG 5133 Numerical Methods in Engineering	
GNEG 5023 Operations Research	
GNEG 5193 Special Topics	
Technical Electives	12 SCH
Selection based on consent of student’s academic advisor.	
Total Degree Requirements	30 SCH

- * The student must consult his/her academic advisor and take at least two courses in GNEG 5063, 5073, 5033, 5133 or 5023.

NON-THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements	3 SCH
ELEG 5993 (MCEG, CVEG, CHEG) Independent Study	
or	
GNEG 5203 Graduate Internship	
GNEG 5010 Research Seminar	
*General Engineering Requirements	12 SCH
GNEG 5063 Engineering Analysis I	
GNEG 5073 Engineering Analysis II	
GNEG 5033 Engineering Probability and Statistics	
GNEG 5133 Numerical Methods in Engineering	
GNEG 5023 Operations Research	
GNEG 5193 Special Topics	
Technical Electives	18 SCH
Selection based on consent of student's academic advisor.	
Total Degree Requirements	33 SCH

- * The student must consult his/her academic advisor and take at least two courses in GNEG 5063, 5073, 5033, 5133 or 5023.

Department of Computer Science

ADMINISTRATIVE OFFICER

Mohsen Beheshti, *Department Head*

FACULTY

Kent Martin, *Artificial Intelligence*
Kwang Paick, *Information Theory and Pattern Recognition*
Gerard Rambally, *Database Management Systems*
Shuguang Yan, *Computer Networks*
Feng-Jen Yang, *Artificial Intelligence*
Yanggao Yang, *Graphics and Computer Networks*
Yukong Zhang, *Compiler Optimization and Software Engineering*

PURPOSE AND GOALS

The Master’s degree programs prepare graduate students for positions in business, industry, and research. They produce professionals capable of contributing to the core areas of Computer Information Systems and Computer Science. They also provide Master’s degree graduates with a foundation for continuing their study at the doctoral level.

More specifically the major objectives of the programs are to:

1. Address the critical shortage of professionals in Computer Science and Information Technology in Texas and the nation;
2. Provide an avenue for computer professionals in industry to upgrade their professional skills; and
3. Prepare graduates to pursue the terminal degree in Compute Science and Computer Information Systems.

MASTER OF SCIENCE IN COMPUTER INFORMATION SYSTEMS DEGREE PROGRAM REQUIREMENTS

THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements6 SCH
CIS 5906 Master’s Thesis

Computer Information Systems Requirements 21 SCH
CINS 5003 Research Methods and Graduate Seminars
CINS 5013 Information Resources Management
CINS 5033 Database Management Systems
CINS 5043 Data Communications and Computer Networks
CINS 5063 Data Structures and Algorithms
CINS 5073 Information Technology
CINS 5183 Software Engineering

Computer Information Systems Track Requirements9 SCH
Students are required to declare one of the tracks listed below and take the requirements under that track.

General Computer Information Systems Track
9 hours from the list of CINS Electives (no duplicates)

Internet Technologies Computer Information Systems Track

6 hours from the list of IT CINS Electives

3 hours from the list of CINS Electives (no duplicates)

Total Degree Requirements 36 SCH

NON-THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements 3 SCH

CINS 5913 Master's Project

Computer Information Systems Requirements 21 SCH

CINS 5003 Research Methods and Graduate Seminars

CINS 5013 Information Resources Management

CINS 5033 Database Management Systems

CINS 5043 Data Communications and Computer Networks

CINS 5063 Data Structures and Algorithms

CINS 5073 Information Technology

CINS 5183 Software Engineering

Computer Information Systems Track Requirements 12 SCH

Students are required to declare one of the tracks listed below and take the requirements under that track.

General Computer Information Systems Track

12 hours from the list of CINS Electives (no duplicates)

Internet Technologies Computer Information Systems Track

6 hours from the list of IT CINS Electives

6 hours from the list of CINS Electives (no duplicates)

Total Degree Requirements 36 SCH

General CINS Electives

CINS 5103 Decision Support Systems

CINS 5143 Advanced Database Management Systems

CINS 5173 Information Storage and Retrieval

CINS 5213 Advanced Data Communication and Computer Networks

CINS 5223 Artificial Intelligence and Expert Systems

CINS 5233 Distributive Computing and Parallel Processing

CINS 5303 E-Commerce

CINS 5323 Multimedia Applications

CINS 5333 Reverse Logistics

CINS 5413 Object Oriented Analysis and Design

CINS 5463 Human Computer Interaction and Interface Design

CINS 5983 Special Topics in Computer Information Systems

CINS 5993 Independent Study

IT CINS Electives

CINS 5043 Data Communications and Computer Networks

CINS 5143 Advanced Database Management Systems

CINS 5173 Information Storage and Retrieval

CINS 5303 E-Commerce

CINS 5323 Multimedia Applications

MASTER OF SCIENCE IN COMPUTER SCIENCE DEGREE PROGRAM REQUIREMENTS

THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements6 SCH
COMP 5906 Master’s Thesis

Computer Science Requirements 21 SCH
COMP 5003 Research Methods and Graduate Seminars
COMP 5113 Fundamentals and Concepts of Programming
COMP 5123 Advanced Computer Architecture
COMP 5133 Advanced Operating Systems
COMP 5143 Advanced Database Management Systems
COMP 5153 Design and Analysis of Algorithms
COMP 5423 Software Engineering Processes

Computer Science Track Requirements9 SCH
Students are required to declare one of the tracks listed below and take the requirements under that track.

General Computer Science Track
9 hours from the list of Computer Science Electives (no duplicates)

Software Engineering Track
6 hours from the list of Software Engineering Electives
3 hours from the list of Computer Science Electives (no duplicates)

Total Degree Requirements 36 SCH

NON-THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements3 SCH
COMP 5913 Master’s Project

Computer Science Requirements 21 SCH
COMP 5003 Research Methods and Graduate Seminars
COMP 5113 Fundamentals and Concepts of Programming
COMP 5123 Advanced Computer Architecture
COMP 5133 Advanced Operating Systems
COMP 5143 Advanced Database Management Systems
COMP 5153 Design and Analysis of Algorithms
COMP 5423 Software Engineering Processes

Computer Science Track Requirements 12 SCH
Students are required to declare one of the tracks listed below and take the requirements under that track.

General Computer Science Track
12 hours from the list of Computer Science Electives (no duplicates)

Software Engineering Track
6 hours from the list of Software Engineering Electives
6 hours from the list of Computer Science Electives (no duplicates)

Total Degree Requirements 36 SCH

General Computer Science Electives

COMP 5183 Software Engineering
COMP 5213 Advanced Data Communications and Computer Networks
COMP 5223 Artificial Intelligence and Expert Systems
COMP 5233 Distributed Computing and Parallel Processing
COMP 5243 Numerical Analysis
COMP 5253 Theory of Computation
COMP 5263 Advanced Computer Graphics
COMP 5413 Object-Oriented Analysis and Design Methodology
COMP 5433 Software Project Planning and Management
COMP 5443 Advanced Software Quality Assurance
COMP 5463 Human Computer Interaction and Interface Design
COMP 5993 Independent Study

Software Engineering Electives

COMP 5183 Software Engineering
COMP 5433 Software Project Planning and Management
COMP 5443 Advanced Software Quality Assurance
COMP 5463 Human Computer Interaction and Interface Design

Department of Electrical Engineering

ADMINISTRATIVE OFFICER

John O. Attia, *Department Head*

FACULTY

Cajetan Akujuobi, *Electrical Engineering*

John H. Fuller, *Electrical Engineering*

Kelvin K. Kirby, *Electrical Engineering*

Siew T. Koay, *Electrical Engineering*

A. Anil Kumar, *Electrical Engineering*

Charlie L. Tolliver, *Electrical Engineering*

Richard Wilkins, *Electrical Engineering*

PURPOSE AND GOALS

The primary purpose of the Electrical Engineering Program is to enhance students' skills in specialized areas and provide opportunities for students to pursue careers in private industry, government research laboratories and design facilities.

The objectives of the program are:

1. To produce graduate students who have advanced training in one of the following areas of emphasis in Electrical Engineering: (i) Microelectronics, (ii) Computer Engineering, (iii) Telecommunications and Signal processing.
2. To produce a significant number of graduates with experience in research.
3. To prepare outstanding students to pursue doctoral degrees.
4. To produce post-graduates who have the technical, cognitive and interpersonal skills that will allow them to secure employment within the State of Texas, or in the nation.

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING DEGREE PROGRAM REQUIREMENTS

THESIS OPTION DEGREE PROGRAM REQUIREMENTS

General Requirements6 SCH
 ELEG 5996 Thesis

General Engineering Requirements6 SCH
 GNEG 5033 Engineering Probability and Statistics
 GNEG 5063 Engineering Analysis I
 GNEG 5073 Engineering Analysis II
 GNEG 5133 Numerical Methods in Engineering

Electrical Engineering Track Requirements.....6 SCH
 Students are required to declare one of the tracks listed and take two courses under that track.

Telecommunications/Signal Processing Track
 ELEG 5073 Statistical Communications Theory
 ELEG 5083 Advanced Digital Signal Processing
 ELEG 5133 Information Theory

Microelectronics Track

- ELEG 5153 Solid State for Engineers
- ELEG 5173 VLSI Design
- ELEG 5263 Integrated Circuit Engineering

Computer Engineering Track

- ELEG 5043 Computer Networks
- ELEG 5183 Computer Architecture
- ELEG 5093 Digital Image Processing

Technical Electives 12 SCH

At least two technical electives must be taken in the Electrical Engineering department.

Select from:

- ELEG 5063 Advanced Semiconductor Devices
- ELEG 5133 Information Theory
- ELEG 5093 Digital Image Processing
- ELEG 5153 Solid State for Engineers
- ELEG 5233 Mobile and Wireless Networked Computing Systems
- ELEG 5243 Advanced Broadband Communication System
- ELEG 5223 Embedded and Real-Time Systems
- ELEG 5253 Advanced Mixed Signal Techniques
- GNEG 5193-001 Special Topics – Advanced Heat Transfer
- GNEG 5193-003 Special Topics – Dynamics of Mechanical Systems
- GNEG 5193-015 Special Topics – Modern Control Systems
- GNEG 5193-019 Special Topics – Advanced Analytic Basis Design
- GNEG 5193-172 Special Topics - Environmental Modeling
- GNEG 5193-175 Special Topics – Water Quality Management
- GNEG 5193-179 Special Topics – Management of Engineering Projects
- MCEG 5023 Advanced Thermodynamics
- MCEG 5123 Advanced Computer Aided Engineering Design
- CVEG 5123 Structured Dynamics
- CVEG 5133 Advanced Mechanics of Materials
- MATH 5033 Complex Analysis II
- MATH 5343 Boundary Value Problem
- MATH 5613 Theory of Matrices
- MATH 5723 Partial Differential Equations
- MATH 5773 Advanced Analysis
- MATH 5903 Modern Algebra

Total Degree Requirements 30 SCH

NON-THESIS OPTION DEGREE PROGRAM REQUIREMENTS

Masters Project 3 SCH

- ELEG 5913 Engineering Project

General Engineering Requirements 6 SCH

- GNEG 5063 Engineering Analysis I
- GNEG 5073 Engineering Analysis II
- GNEG 5133 Numerical Methods in Engineering
- GNEG 5033 Engineering Probability and Statistics

Electrical Engineering Track Requirements.....6 SCH

Students are required to declare one of the tracks listed and take two courses under that track.

Telecommunication/Signal Processing Track

ELEG 5073 Statistical Communications Theory
ELEG 5083 Advanced Digital Signal Processing
ELEG 5033 Information Theory

Microelectronics Track

ELEG 5153 Solid State for Engineers
ELEG 5173 VLSI Design
ELEG 5263 Integrated Circuit Engineering

Computer Engineering

ELEG 5043 Computer Networks
ELEG 5183 Computer Architecture
ELEG 5093 Digital Image Processing

Technical Electives 12 SCH

At least two technical electives must be taken in the Electrical Engineering department.

Select from:

ELEG 5063 Advanced Semiconductor Devices
ELEG 5033 Information Theory
ELEG 5093 Digital Image Processing
ELEG 5153 Solid State for Engineers
ELEG 5223 Embedded and Real-Time Systems
ELEG 5233 Mobile and Wireless Networked Computing Systems
ELEG 5243 Advanced Broadband Communication Systems
ELEG 5253 Advanced Mixed Signal Techniques
GNEG 5193-001 Special Topics – Advanced Heat Transfer
GNEG 5193-003 Special Topics – Dynamics of Mechanical Systems
GNEG 5193-015 Special Topics – Modern Control Systems
GNEG 5193-019 Special Topics – Advanced Analytic Basis Design
GNEG 5193-172 Special Topics - Environmental Modeling
GNEG 5193-175 Special Topics – Water Quality Management
GNEG 5193-179 Special Topics – Management of Engineering Projects
MCEG 5023 Advanced Thermodynamics
MCEG 5123 Advanced Computer Aided Engineering Design
CVEG 5123 Structured Dynamics
CVEG 5133 Advanced Mechanics of Materials
MATH 5033 Complex Analysis II
MATH 5343 Boundary Value Problem
MATH 5613 Theory of Matrices
MATH 5723 Partial Differential Equations
MATH 5773 Advanced Analysis
MATH 5903 Modern Algebra

Total Degree Requirements 33 SCH