

# College of Engineering

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The College of Engineering offers the following graduate programs:

- Graduate Certificate in Cloud Computing (p. 2)

**Department of Biomedical Engineering** (<http://catalog.utsa.edu/graduate/engineering/biomedicalengineering>)

- Master of Science in Biomedical Engineering (<http://catalog.utsa.edu/graduate/engineering/biomedicalengineering/#degreestext>)
- Doctor of Philosophy in Biomedical Engineering (<http://catalog.utsa.edu/graduate/engineering/biomedicalengineering/#degreestext>)

**Department of Civil and Environmental Engineering**  
(<http://catalog.utsa.edu/graduate/engineering/civilenvironmentalengineering>)

- Master of Civil Engineering (<http://catalog.utsa.edu/graduate/engineering/civilenvironmentalengineering/#degreestext>)
- Master of Science in Civil Engineering (<http://catalog.utsa.edu/graduate/engineering/civilenvironmentalengineering/#degreestext>)
- Doctor of Philosophy in Environmental Science and Engineering (<http://catalog.utsa.edu/graduate/engineering/civilenvironmentalengineering/#degreestext>)

**Department of Electrical and Computer Engineering**  
(<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering>)

- Master of Science in Electrical Engineering (<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering/#degreestext>)
- Master of Science in Computer Engineering (<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering/#degreestext>)
- Master of Science in Advanced Materials Engineering (<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering/#degreestext>)
- Doctor of Philosophy in Electrical Engineering (<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering/#degreestext>)
- Integrated Bachelor's/Master's Program (<http://catalog.utsa.edu/graduate/engineering/electricalcomputerengineering/#degreestext>)

**Department of Mechanical Engineering** (<http://catalog.utsa.edu/graduate/engineering/mechanicalengineering>)

- Master of Science in Advanced Manufacturing and Enterprise Engineering (<http://catalog.utsa.edu/graduate/engineering/mechanicalengineering/#degreestext>)
- Master of Science in Mechanical Engineering (<http://catalog.utsa.edu/graduate/engineering/mechanicalengineering/#degreestext>)
- Doctor of Philosophy in Mechanical Engineering (<http://catalog.utsa.edu/graduate/engineering/mechanicalengineering/#degreestext>)

These programs offer opportunities for advanced study and research designed to prepare students for leadership roles in engineering careers with industry, government, educational institutions, and research organizations. For master's degree programs, a thesis option is recommended for students who are planning a career in research or who

contemplate pursuing a doctorate in one of the engineering disciplines. A nonthesis option is also available for students who desire a practical industrial applications-oriented degree.

The Department of Biomedical Engineering offers a matrix of academic tracks based on segments of biomedical engineering and/or areas of clinical emphasis. Specifically, the program has emphases in the following areas: biomaterials, biomechanics, and bioimaging. The biological areas covered are orthopedics/dental tissues, cardiovascular systems, and neural systems. The Department of Civil and Environmental Engineering includes programs of study in structures, environmental engineering—transportation, water resources, hydrology, geotechnical engineering, solid mechanics, and materials. The Department of Electrical and Computer Engineering includes programs of study in Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Devices. The Department of Mechanical Engineering includes programs of study in thermal and fluid systems, mechanical systems and design, mechanics and materials, and manufacturing engineering and systems.

All College of Engineering departments offer Master's programs from their own discipline and research emphases: Department of Biomedical Engineering offers M.S. in Biomedical Engineering, Department of Civil Engineering offers M.S. in Civil Engineering and Master of Civil Engineering, Department of Electrical and Computer Engineering offers M.S. in Electrical Engineering and M.S. in Computer Engineering, and Department of Mechanical Engineering offers M.S. in Mechanical Engineering and M.S. in Advanced Manufacturing and Enterprise Engineering. In addition, the College of Engineering offers an interdisciplinary Master of Science degree in Advanced Materials Engineering that features state-of-the-art technical knowledge and multidisciplinary courses with focus in two concentration areas:

1. Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials; and
2. Multifunctional Biomedical Materials.

The M.S. in Advanced Materials Engineering degree program is administered by the Department of Electrical and Computer Engineering.

A Doctor of Philosophy degree in Biomedical Engineering will train students in the fundamental sciences and engineering related to medicine. Areas of focus include biomechanics, biomaterials, bioimaging, and the following systems: musculoskeletal/dental, cardiovascular, and neurological.

A Doctor of Philosophy degree in Electrical Engineering offers an in-depth and integrated study focused in one of the following areas: Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Devices.

A Doctor of Philosophy degree in Environmental Science and Engineering offers research emphases in Water Resources, Environmental Quality, Environmental Remediation, Pollution Control, Conservation Ecology, Spatial Analysis, Remote Sensing, and Natural Hazards.

A Doctor of Philosophy degree in Mechanical Engineering offers an in-depth and integrated research focus on three concentration areas: Thermal and Fluid Systems, Design and Manufacturing Systems, and Mechanics and Materials.

A limited number of assistantships and fellowships are available to qualified students. Financial assistance is awarded on a competitive basis.

## Graduate Certificate in Cloud Computing

The graduate certificate in Cloud Computing is a 12-semester-credit-hour program designed to equip technical professionals with the knowledge and technical skills necessary for a career in an organization that leverages cloud computing. The wide-range of use of cloud computing in today's business, government and academic environments requires a broad range of competencies and understanding of how cloud computing influences a particular area. This certificate is designed to give a common framework of understanding cloud computing, as well as allow for specialization in specific areas, such as, cyber-security, cloud-infrastructure, and applications in cloud.

The certificate is administered by the College of Engineering in conjunction with the College of Business and the College of Sciences. The course requirements for each program focus may be found under the College of Engineering, the Department of Computer Science (<http://catalog.utsa.edu/graduate/sciences/computerscience/#certificatestext>), and the Department of Information Systems and Cyber Security (<http://catalog.utsa.edu/graduate/business/informationssystemscybersecurity/#certificatestext>).

## Certificate Requirements

To satisfy the requirements for the Graduate Certificate in Cloud Computing, students must complete 12 semester credit hours as follows:

### A. Required Course 3

Select one entry course:

EE 5243 Topics in Systems and Control (Topic: Concepts in Cloud Computing)

Or a cross-listed course in CS and IS. The entry course is taught through team teaching in which instructor from each college contributes to the subjects outlined in the course syllabus.

### B. Track Electives 6

Select two courses from one of the following tracks:

#### Applications Track

CS 5233 Artificial Intelligence

CS 5263 Bioinformatics

CS 5443 Database Management Systems

CS 5463 Topics in Computer Science

CS 5473 Data Mining

CS 5493 Large-Scale Data Management

CS 5573 Cloud Computing

CS 6243 Machine Learning

CS 6293 Advanced Topics in Bioinformatics

EE 5243 Topics in Systems and Control (Topic: Data Analytics with Cloud Computing)

EE 5243 Topics in Systems and Control (Topic: Programming Techniques for the Cloud)

EE 6973 Special Problems (Topic: Machine Learning with Big Data)

IS 6703 Introduction to Data Mining

ME 5013 Topics in Mechanical Engineering (Topic: High Performance Computing)

### Security Track

CS 6353 Unix and Network Security

CS 6393 Advanced Topics in Computer Security

IS 5513 Fundamentals of Information Assurance

IS 6363 Computer Forensics

### Infrastructure Track

CS 5103 Software Engineering

CS 5123 Software Testing and Quality Assurance

CS 6463 Advanced Topics in Computer Science

CS 6463 Advanced Topics in Computer Science (Topic: Parallel and Distributed Systems Software)

CS 6523 Distributed Operating Systems

CS 6543 Networks

CS 6553 Performance Evaluation

CS 6643 Parallel Processing

EE 5103 Engineering Programming

EE 5453 Topics in Software Engineering (Topic: Advanced Data Structures and Algorithms)

### C. Capstone Project 3

Select one course from the following (topics should be in the field of Cloud Computing):

CS 6953 Independent Study

EE 6943 Graduate Project

EE 6953 Independent Study

IS 6953 Independent Study

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Total Credit Hours 12