Biomedical Engineering

Academic Objectives

The program, consistent with the mission and priorities of the University, is designed to achieve the following academic objectives:

- To provide high quality education in the field of biomedical engineering and to prepare the graduates for successful and rewarding employment as engineers or for continuing their education through the doctoral level.
- To provide the students with the training necessary to successfully apply the fundamental concepts and methods of biomedical engineering to selected areas of employment or research and development.
- To enhance the research environment and productivity of the School for the benefit of the students.

Master of Engineering (M.E.) in Biomedical Engineering

Admission

Individuals holding a Bachelor’s degree or equivalent in engineering, science, or related field may apply. Qualified applicants with Bachelor’s degree in other areas may be able to enroll in the program with additional preparation (approved by the program Director on a case-by-case basis).

Admission to the M.E. in Biomedical Engineering program is based on the following factors: grade point average of 2.75 or higher on a scale of 4.0 on approximately the last 60 credit hours of undergraduate coursework, class ranking, and faculty recommendation letters.

GRE scores are not required for admission. However, out-of-state or international students whose GRE Verbal score or Quantitative score percentile is 80% or higher will have the advantage of paying in-state graduate tuition rate. Also, GRE scores, especially Quantitative, may be considered for fellowships, assistantships, or scholarships. The minimum TOEFL score requirement for international applicants is 550 (paper based) or 80 (computer based). The application fee for all applicants, and any other documentation specifically required for international students will be in accordance to the requirements of the Graduate School.

Curriculum

The Master of Engineering (M.E.) in Biomedical Engineering program requires the completion of 30 hours of graduate level credit. It does not require a thesis. At least 6 courses must be selected from the core BME courses. ECE 592 and ECE 580 (seminar) will not count towards the degree. The remaining courses can be selected from the ECE 500-level courses. A maximum of 6 credit hours from academic units outside the School of ECBE can be applied towards the degree. Online/distance education credit hours offered by the University can be applied towards the degree. The degree can be completed in 3 semesters.

Biomedical Engineering Core

BME 417: Neuroengineering (3 CH)
Retention

Any student whose cumulative grade point average falls below 3.0 on courses that count towards the degree will be placed on academic probation. Any graduate student on academic probation whose grade point average remains below 3.0 on courses that count towards the degree for two consecutive semesters in which she or he is enrolled, excluding summer sessions, will be permanently suspended from the program, unless the School grants an exception.

Master of Science (M.S.) in Biomedical Engineering

Admission Requirements

Individuals holding a Bachelor’s degree or equivalent in engineering, science, or related field may apply. Qualified applicants with Bachelor’s degree in other areas may be able to enroll in the program with additional preparation (approved by the Director on a case-by-case basis).

Admission to the M.S. in Biomedical Engineering program is based on the following factors: grade point average of 3.0 or higher on a scale of 4.0 on approximately the last 60 credit hours of undergraduate coursework, class ranking, and faculty recommendation letters.

GRE scores are not required for admission. However, out-of-state or international students whose GRE Verbal score or Quantitative score percentile is 80% or higher will have the advantage of paying in-state graduate tuition rate. Also, GRE scores, especially Quantitative, may be considered for fellowships, assistantships, or scholarships. The minimum TOEFL score requirement for international applicants is 550 (paper based) or 80 (computer based). The application fee for all applicants, and any other documentation specifically required for international students will be in accordance to the requirements of the Graduate School.

Curriculum

The Master of Science (M.S.) in Biomedical Engineering program has two tracks: i) The non-thesis track is coursework-oriented; ii) The thesis track is research oriented and is designed for students who want to pursue research or a Ph.D. degree. The degree (non-thesis/thesis) can be completed in 3-4 semesters.

Non-thesis option: total of 30 hours of graduate level credit. At least 6 courses must be selected from the core BME courses. ECE 592 and ECE 580 (seminar) will not count towards the degree. The remaining courses can be selected from the ECE 500-level courses.

Thesis option: total of 30 hours of graduate level credit. At least 6 courses must be selected from the BME courses in the core. Six credit hours of thesis (BME 599) are required. ECE 580 (seminar) will not count towards the degree.

For both non-thesis and thesis tracks, with the approval of the school, a maximum of 3 online/distance education credit hours offered by the School of ECBE, and a maximum of 6 credit hours from academic units outside the school may be applied towards the degree.

Biomedical Engineering Core

BME 417: Neuroengineering (3 CH)
BME 418: Biomedical Electronics and Biosensors (3 CH)
BME 435: Computational Methods in Biomedical Engineering (3 CH)
BME 485: Cellular and Molecular Biomechanics (3 CH)
BME 521: Neuromodulation (3 CH)
BME 531: Biophotonics (3 CH)
BME 532: Introduction to Biomedical Imaging (3 CH)
BME 536: Biomedical Signal Analysis (3 CH)
BME 538: Medical Instrumentation: Application and Design (3 CH)
BME 539: Biomechanics I (3 CH)
BME 541: Diagnostic Ultrasound (3 CH)
BME 592: Biomedical Capstone Design (1-3 CH) (thesis option only; requires approval from the unit)

Retention

Any student whose cumulative grade point average falls below 3.0 on courses that count towards the degree will be placed on academic probation. Any graduate student on academic probation whose grade point average remains below 3.0 on courses that count towards the degree for two consecutive semesters in which she or he is enrolled, excluding summer sessions, will be permanently suspended from the program, unless the School grants an exception.

Biomedical Engineering Faculty

Electrical, Computer, and Biomedical Engineering Faculty:


Anagnostopoulos, Iraklis, Assistant Professor, Ph.D., National Technical University of Athens, 2014; 2015. Many-core architectures, run-time resource management, embedded systems.

Aruma Baduge, Gayan, Assistant Professor, University of Alberta, 2013; 2016. Communications theory, wireless communications, massive MIMO systems, millimeter-wave communications, cooperative relay networks, wireless energy harvesting for IoTs, physical-layer security.

Asrarri, Arash, Assistant Professor, Ph.D., University of Central Florida, 2015; 2017. Power systems operation and planning, power systems optimization, smart grid.

Chen, Kang, Assistant Professor, Ph.D., Clemson University, 2014; 2015. Software-defined networking (SDN), network function virtualization (NFV), vehicular networks, mobile opportunistic/ad hoc networks.

Chen, Ying (Ada), Associate Professor, Ph.D., Duke, 2007; 2007. Biomedical imaging, image reconstruction, digital tomosynthesis, image quality analysis, signal and image processing, simulation and computing.

Chilman, Bae, Assistant Professor, Ph.D., Pennsylvania State University, 2009; 2019. Bioelectrical engineering, neuroscience, mechanobiology.

Haniotakis, Themistoklis, Associate Professor, Ph.D., University of Athens, 2008; 2013. Digital VLSI design and test, RF IC design and test, low power VLSI design, and fault-tolerant systems.

Harackiewicz, Frances J., Professor, Ph.D., University of Massachusetts-Amherst, 1990; 1989. Electromagnetics, antenna theory and design, microwaves, microstrip phased arrays and anisotropic materials.

Kagaris, Dimitrios, Professor, Ph.D., Dartmouth College, 1994; 1995. VLSI design automation, digital circuit testing, communication networks.

Komae, Arash, Assistant Professor, Ph.D., University of Maryland, College Park, 2008; 2015. Control systems, microrobotics, signal processing, estimation theory.

Lu, Chao, Associate Professor, Ph.D., Purdue University, 2012; 2015. VLSI system design, device-circuit co-design, 3D IC.
Qin, Jun, Associate Professor, Ph.D. Duke University, 2008; 2012. Sensors and instrumentation, data acquisition, medical devices, therapeutic ultrasound, haptics.

Sayeh, Mohammad R., Professor, Ph.D., Oklahoma State University, 1985; 1986. Neural networks, optical computing, image processing, stochastic modeling, quantum electronics.

Tragoudas, Spyros, Professor and Director, Ph.D., University of Texas at Dallas, 1991; 1999. Design and test automation for VLSI, embedded systems, computer networks.

Wang, Haibo, Professor, Ph.D., University of Arizona, 2002; 2002. Mixed-signal VLSI design and testing, digital VLSI, VLSI design automation.

Weng, Ning, Professor, Ph.D., University of Massachusetts at Amherst, 2005; 2005. High performance routers, network processors, system-on-a-Chip, computer architectures.

**Mechanical Engineering and Energy Processes (MEEP) Faculty:**

Chowdhury, Farhan, Assistant Professor, Ph.D., University of Illinois at Urbana-Champaign, 2011; 2015. Mechanobiology, single-molecule cell mechanics, biomaterials.

**Emeriti Faculty**

Botros, Nazeih M., Professor, Emeritus, Ph.D., University of Oklahoma, 1985; 1985.

Daneshdoost, Morteza, Professor, Emeritus, Ph.D., Drexel University, 1984; 1984.


Gupta, Lalit, Professor, Emeritus, Ph.D., Southern Methodist University, 1986; 1986

Hatziadoniu, Konstantine, Professor, Emeritus, Ph.D., West Virginia University, 1987; 1987.

Osborne, William, Professor, Emeritus, Ph. D., New Mexico State University, 1970; 2005.

Pourboghrat, Farzad, Professor, Emeritus, Ph.D., University of Iowa, 1984; 1984.

Viswanathan, Ramanarayanan, Professor, Emeritus, Ph.D., Southern Methodist University, 1983; 1983.

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**Catalog Year Statement:**

Students starting their collegiate training during the period of time covered by this catalog (see bottom of this page) are subject to the curricular requirements as specified herein. The requirements herein will extend for a seven calendar-year period from the date of entry for baccalaureate programs and three years for associate programs. Should the University change the course requirements contained herein subsequently, students are assured that necessary adjustments will be made so that no additional time is required of them.