



DEPARTMENT OF COMPUTER &
ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

College of Engineering & Computer Science
Florida Atlantic University

Master of Science in Bioengineering



Bioengineering combines the analytical and experimental methods of the engineering and computer science disciplines with the biological and medical sciences in order to achieve a more detailed

- understanding of biological phenomena and to develop
- new techniques and devices for medical and non-medical applications. Students
- successfully completing the
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- master of science degree in bioengineering will be
- prepared for professional careers in pharmaceutical and biotechnology industries and
- in health-related fields.
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Graduate Student Assistantships

The dean's office in the College of Engineering and Computer Science offers teaching/graduate assistantships for qualified students. Go to www.eng.fau.edu/graduate for more information.

Admission Requirements

To be admitted to the master's program in bioengineering applicants must have:

- A bachelor's degree in biology, chemistry, physics, computer science or any engineering field with a mathematics background through differential equations.
- A combined score of 1000 or higher on the verbal and quantitative portions of the GRE and 3.0 GPA.

Curriculum Requirements

Prerequisite Requirements

- Genetics or Molecular Genetics (PCB 4522 or PCB 3063 at FAU or equivalent)
- Advisor's approval is required for students that do not have the required mathematics and/or computer programming background.

A. Program Options

- **Thesis Option (30 credits = 24 credits of coursework + 6 thesis credits)**

Program Core	12 credits
Electives	12 credits
Master Thesis	6 credits

- **Non-thesis Option (33 credits = 30 credits of coursework + 3 research project credits)**

Program Core	12 credits
Electives	18 credits
Research Project	3 credits

B. Program Core

The main purpose of the program core is to assure that students with diverse backgrounds (in science and engineering) are brought to a sufficient common denominator in their knowledge of engineering/mathematical methods, tools and techniques as well as fundamental biology, chemistry and physiology.

BME 5000 Introduction to

Bioengineering provides a broad perspective of bioengineering as applied to topics in contemporary biology, physiology and medicine.

BME 5742 Bio-Systems Modeling

and Control covers mathematical biology and physiology models and introduces students to concepts of dynamic simulations and control.

BME 6762 Bioinformatics:

Engineering Perspectives covers information resources and databases: proteins and genomes and biological sequence analysis and applications, sequence search/analyses tools and protocols.

BSC 6936 Biotechnology Lab

covers basic and advanced techniques in molecular genetics, including RNA and protein purification.

C. Program Electives

Thesis Option 12 credits of electives

Non-thesis Option 18 credits of electives

Regularly offered bioengineering electives cover the areas of:

- Automatic Biometrics
- Bio-Imaging
- Robotics
- Nanotechnology
- Neural Networks
- Computer Vision
- Biologically-inspired Computing
- Data Mining for Bioinformatics
- Biomechanics

New bioengineering elective courses under development cover the areas of:

- Biomedical Control Models
- Bio-Signal Processing
- Tissue Engineering
- Micro and Nano Fluidics and Lab-On-A-Chip.

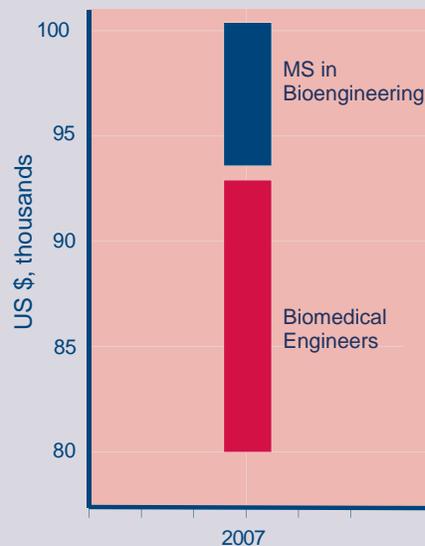
Up to 6 credits (thesis option) or 9 credits (non-thesis option) may be taken from a larger menu of relevant graduate engineering courses such as DSP and database systems, and science courses such as cell neuroscience and human morphology and function.

Careers and Jobs in Bioengineering

The Bureau of Labor Statistics (BLS) projects a 21% growth for biomedical engineers, with an estimated 3,000 new careers created in the industry through 2016. Biomedical engineers saw mean annual earnings of \$79,610 in 2007, according to the BLS. Those working in medical equipment and supplies manufacturing saw slightly higher salaries, at \$81,950, while those working in scientific research and development earned \$92,870. Careers with the most competition often require applicants to have a master's degree (according to www.collegegrad.com).

Salary Comparison

Bioengineering
The Bureau of Labor Statistics 2007



The College of Engineering and Computer Science collaborates with the FAU Charles E. Schmidt College Science.

Industry Support for the M.S. in Bioengineering Program at FAU

Dr. Harry W. Orf, Vice President for Scientific Operations and Professor of Chemistry, Scripps Florida – *“We will need a significant number of qualified bioengineers, bioinformaticians and biomechanical technicians to staff our Advanced Technologies and Drug Discovery Programs. Programs like your master’s level offering will be of considerable help in training candidates for these positions. We view your program as especially important in providing qualified candidates who will allow us to fulfill our staffing requirements from within the State.”*

Notes from Students

Ian Gerstel: *"I enjoyed the classes and found the coursework interesting.... I was able to pick up some biology and chemistry information through the program, which I may not have been able to get in another engineering program...."*

Ian received his B.S. in mechanical engineering from the University of Florida. He is in the final phase of his M.S. thesis in bioengineering, combining microfluidics and machine vision.

Cameron Matthews: *"...A novel application of classical EE, computer engineering and ME principles to a very exciting new field. In my experience, the basic tenants of DSP were very well taught by the faculty and I am continuing my education with a constantly evolving aspect of them that I did not get as an undergrad. Many of the IT methods ...taught for Bioinformatics became very important for my research."*

Cameron is pursuing a non-thesis option.

Sophia Banton: *"I entered the program with a strong natural science (biology) background and a modest understanding of computing. This program introduced me to many engineering concepts, tenets and their application domains. Most importantly the program taught me how to approach biological problems from a design and solution driven perspective. The bioengineering program has greatly enhanced my potential to work as a researcher by using the skills and tools I acquired to enhance the scope and content of biomedical research. "*

Sophia obtained a B.S. and an M.S. in biology at Georgia State. She is presently pursuing a Ph.D. in Integrative Biology at FAU, while completing her M.S. thesis in bioengineering. Her thesis combines immunology, mathematical modeling and bioinformatics.

For more information about the
Master of Science in Bioengineering Program
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