FLORIDA ATLANTIC UNIVERSITY
Department of Biomedical Engineering
College of Engineering & Computer Science

# M.S. IN BIOMEDICAL ENGINEERING WORKSHEET

## Program Core Courses (12 Credits, 4 courses out of 8*)

| Course No. | Course Name | Semester |
|---|---|---|
| CAP 5768 | Introduction to Data Science | F |
| BME 5405 | BME Cell Biology and Physiology | S |
| BME 5537 | Bioimaging | S |
| BME 6105 | Biomaterials | S |
| BME 5521 | Bio-signal Processing | F |
| BME 5742 | Biosystems Modeling and Control | F |
| BME 6585 | BioMEMS | S |
| BME 6334 | Tissue Engineering | F |

***: All these courses are part of the technical elective group A as well. If four courses are taken as the core, the other four can be taken as technical electives.**

## Thesis Option:

| | | |
|---|---|---|
| BME 6971 | Master's Thesis Biomedical engineering (6 credits) | |
| BME 6905 | Directed Independent Study. *A maximum of 3 credits of directed independent study may be applied toward the master's degree.* | |
| **CGS 5937** | **Graduate Seminar (0) credits/ Mandatory** | |

## Non-Thesis Option:

| | | |
|---|---|---|
| **CGS 5937** | **Graduate Seminar (0) credits/ Mandatory** | |

**Electives:**

**Non-Thesis Option:** 18 credits of electives (at least 9 credits from Group A below).

**Thesis Option:** 12 credits of electives (at least 9 credits from Group A below)

## Group A: Engineering, Computer Science, and Biomedical Engineering Electives

**Electrical Engineering and Computer Science, Mechanical Engineering, and Biomedical Engineering Electives**
(No **limit** on the number of courses that can be chosen from the list below) [+]

| Course No. | Course Name | Semester |
|---|---|---|
| BME 4503C | Biomedical Instrumentation | F |
| BME 5052L | Biomedical Engineering LAB | F |
| BME 5200/BME 4201 | Orthopedic biomechanics | S |
| BME 5360/BME 4363 | Neuromechanics | S |
| BME 5282/BME 4509 | Bio-Signal Processing | F |
| BME 5405 | Biomedical Engineering, Cell Biology, and Physiology | S |
| BME 5425 | Introduction to Nanobiotechnology | |
| BME 5537/BME 4536 | Bioimaging | S |
| BME 5567 | Electron Microscopy | F |
| BME 5586C/BME 4583C | Microfabrication Technology | S |
| BME6105/ BME 4100 | Biomaterials | S |
| BME 6935 | Computational Modeling Brain &Behavior | S |
| BME 4733/<br>BME 5719 | Modeling in Biomedical Eng<br>Finite Element Analysis in BME | F |
| BME 5742 | Biosystems Modeling and Control | F |
| BME 5914C/BME 4070C | Methods in Biomedical Engineering Research | S |
| BME 6324/BME 4326 | Stem Cell Engineering | S |
| BME 6334/ BME 4332 | Tissue Engineering | F |
| BME 4361/BME 6362 | Neural Engineering | |
| BME 6425 | Computational Modeling of Biological Neural Networks | |
| BME 6572/BME 4571 | Nanotechnology | F |
| BME 6585/BME 4581 | Advanced Topics in Microfluidics & BioMEMS | S |
| BME 6762/ BME 4930 | Bioinformatics: Biomedical Perspectives | F |
| BME 4276C/<br>BME 6275 | Applied Biorobotics<br>Advanced Biorobotics | S |
| BME 4930<br>BME 5930<br>BME 6935 | Special Topics Biomedical Engineering | |
| TBD | Introduction to Biosensing and Biophotonics<br>Computational Data-Driven Modeling<br>Therapeutics | S |
| CAP 5615 | Introduction to Neural Networks | |
| CAP 6411 | Foundations of Vision | |
| CAP 6619 | Deep Learning | F/S |
| CAI 5006 | Foundations of Artificial Intelligence for Non-majors | |
| CAP 5796 | Foundations of Data Engineering for Non-majors | |
| CIS 5653 | Foundations of Cloud Computing for Nonmajors | |
| CIS 5775 | Foundations of Cybersecurity for Nonmajors | |
| COP 5085 | Foundations of programming for nonmajors | |
| CAP 5625 | Computational Foundations of Artificial Intelligence | |
| CAP 6415 | Computer Vision | |
| CAP 6618 | Machine Learning for Computer Vision | |
| CAP 6629 | Reinforcement Learning | |

**+ : Any other graduate-level courses offered by BME, EECS, OME, and CEGE can be considered a technical group A elective by permission of the program's advisor.**

**Electrical Engineering, Computer Science, and Mechanical Engineering (Limit of 3 credits)**

| Course No. | Course Name | Semester |
|---|---|---|
| CAP 6010 | Multimedia Systems | |
| CAP 6415 | Computer Vision | |
| CAP 6512 | Evolutionary Computing | |
| CAP 6635 | Artificial Intelligence | |
| CAP 6673 | Data Mining and Machine Learning | |
| CAP 6777 | Web Mining | |
| CAP 6778 | Advanced Data Mining & Machine Learning | |
| CDA 6122 | Evaluation of Parallel and Distributed Systems | |
| CDA 6214 | Structured VLSI design | |
| CEN 5931 | Special Topics in Computer Engineering | |
| CEN 6930 | Special Topics in Computer Engineering | |
| COP 6726 | New Directions in Database Systems | |
| COP 6728 | Visual Information Retrieval | |
| COP 6731 | Theory & Implementation of Database Systems | |
| EEE 5502 | Digital Processing of Signals | |
| EEE 6585 | Digital Processing of Speech Signals | |
| EEL 5613 | Modern Control | |
| EEL 5654 | Control Systems 2 | |
| EEL 5934 | Special Topics- Electrical Engineering | |
| EIN 5603C | Industrial Automation | |
| EML 6930 | Controls | |
| EOC 6630 | Signal Processing | |
| EOC 6635 | Engineering Data Analysis | |

**Group B: Science Electives (Limit of 6 credits)**

**Biology Electives:**

| Course No. | Course Name | Semester |
|---|---|---|
| BSC 6417C | Practical Cell Neuroscience | |
| BSC 6895 | Honors AI Applications in Biology | |
| MCB 6930 | Advanced Topics in Microbiology | |
| PCB 6236 | Advanced Immunology | |
| PCB 5064L | Advanced Genetics Lab | |
| PCB 5532 | Advanced Molecular Cell Biology | |
| PCB 6045 | Conservation Biology | |
| PCB 6849 | Cellular Neuroscience and Disease | |
| PCB 6456 | Experimental design in biometry | |
| PCB 6933 | New Tech in Biomed Science | |
| PCB 6818 | Proteins in health and disease | |
| EEL 5661 | Robotic Applications | |

**Chemistry Electives**:

| Course No. | Course Name | Semester |
|---|---|---|
| BCH 6740 | Advanced Biochemistry | |
| BCH 6930 | Advanced Topics in Biochemistry | |
| CHM 6157 | Instrumentation | |
| CHM 6277C | Advanced Drug Development | |
| CHM 6720 | Kinetics and Energetics of Reaction | |

**Complex Systems and Brain Science**

| Course No. | Course Name | Semester |
|---|---|---|
| ISC 5453 | Nonlinear Dynamic Systems | |
| ISC 5465 | Cognitive Neuroscience | |
| ISC 5930 | Neural Time Series Analysis (Special Topics) | |
| ISC 6452 | Cognition and Complex Systems | |
| ISC 6460 | Computational Neuroscience 1 | |
| ISC 6930 | Special Topics | |
| PSB 6345 | Cellular and Molecular Neuroscience | |
| PSB 6346 | Systems and Integrative Neuroscience | |

**Physics/Medical Physics and Math Electives**

| Course No. | Course Name | Semester |
|---|---|---|
| MAD 5474 | Introduction to Cryptology and Information Security | |
| MAP 6211 | Intro to Dynamical Systems and Chaos | |
| MTG 6418 | Dynamical Systems, Chaos, and Computing | |
| RAT 6204 | Radiation Biology | |
| RAT 6616 | Medical Imaging Physics | |
| RAT 6628 | Radiation Therapy Physics | |
| RAT 6629 | Advanced Photon Beam Radiation Therapy | |
| RAT 6686 | Radiation Physics | |
| RAT 6687 | Nuclear Medical Physics | |
| STA 5195 | Biostatistics | |
| STA 6857 | Applied Time Series Analysis | |

## Group C: Other Electives (Limit of 3 credits)

**College of Business**

| Course No. | Course Name | Semester |
|---|---|---|
| ENT 6016 | Venture Creation | |
| ENT 6196 | Biotechnology Business Development [Counts as Biomedical Engineering Elective] | |

**College of Nursing**

| Course No. | Course Name | Semester |
|---|---|---|
| NGR 6141 | Advanced Pathophysiology | |

**College of Medicine**

| Course No. | Course Name | Semester |
|---|---|---|
| BMS 6523 | Autonomic Function and Diseases (Medicine) | |
| BMS 6601 | Fundamentals of General Pathology (Medicine) | |
| BMS 6736 | Brain Diseases: Mechanism and Therapy (Medicine) | |
| BOT 6735C | Advanced Plant Biotechnology | |
| GMS 6302 | Molecular Basis of Disease & Therapy | |
| GMS 6513 | Pharmacology | |
| GMS 6735 | Molecular Neuropsychopharmacology | |
| PCB 6207 | Advanced Cell Physiology | |
| PCB 6238 | Problem-Based Immunology | |
| PCB 6705 | Molecular Biology of the Cardiovascular System and Cardiac Disease | |
| PCB 6885 | Physiology of the Heart | |

**Admission to Candidacy/Online Plan of Study:** Students must apply for candidacy as soon as they are eligible. Students should prepare, in consultation with a graduate advisor, the online Plan of Study, i.e., the list of courses, for completing their degree requirements. All courses must be approved by the students' advisor.

**A student is eligible to apply for candidacy/online plan of study when:**

1. A minimum of 9 credit hours as a graduate student have been completed.
2. A minimum of 3.0 GPA in all courses attempted as a graduate student has been maintained.

Normally, no more than 15 credit hours of work completed before submitting your Plan of Study will be accepted toward the degree program.

**Students working toward the MS (thesis option) degree may not register for thesis credits until their Plan of Study has been approved.**

**A minimum of two 6000-level courses must be met as part of the requirement for the degree.**

**A maximum of 3 credits of directed independent study may be applied toward both the thesis and non-thesis options of the master's degree.**