

M.S. IN BIOMEDICAL ENGINEERING WORKSHEET

Name: _____ Z#: _____ Advisor: _____

Date of Admission: _____ GPA: _____

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

| Course No. | Course Name | Semester | Grade |
|----------------------|---|----------|-------|
| STA 5195 CAP 5768 | Introduction to Biostatistics or Introduction to Data Science | | |
| BME 5313 | BME Cell Biology and Physiology | | |
| BME 5537 | Bioimaging | | |
| BME 6105 | Biomaterials | | |
| BME 5521 | Bio-signal Processing | | |
| BME 5742 | Biosystems Modeling and Control | | |
| BME 6585 | BioMEMS | | |

*: All these courses are part of 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:

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

Non-Thesis Option:

| | | | |
|----------|---|--|--|
| CGS 5937 | Graduate Seminar (0) credits/ Mandatory | | |
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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 | Grade |
|-----------------------|--|----------|-------|
| BME 5052L | Biomedical Engineering LAB | | |
| BME 5200 | Orthopedic biomechanics | | |
| BME 5360 | Neuromechanics | | |
| BME 5405 | BME cell biology and physiology | | |
| BME 5425 | Introduction to Nanobiotechnology | | |
| BME 5521 (BME 4509) | Bio-Signal Processing | | |
| BME 5537 (BME 4536) | Bioimaging | | |
| BME 5567 | Electron Microscopy | | |
| BME 5586C (BME 4583C) | Microfabrication Technology | | |
| BME 5719 (BME 4732) | Finite Element Analysis in BME | | |
| BME 5742 | Biosystems Modeling and Control | | |
| BME 5914C (BME 4070C) | Methods in Biomedical engineering research | | |
| BME 5930/BME 4503 | Biomedical Instrumentation and Measurements | | |
| BME 5937 | Brain-machine interface | | |
| BME 5937 | Biomechanics | | |
| BME 6105 | Biomaterials | | |
| BME 6324 | Stem Cell Engineering | | |
| BME 6334 | Tissue Engineering | | |
| BME 6362 | Neural Engineering | | |
| BME 6425 | Computational Modeling of Biological Neural Networks | | |
| BME 6572 (BME 4571) | Nanotechnology | | |
| BME 6585 (BME 4581) | Advanced Topics in Microfluidics and BioMEMS | | |
| BME 6762 | Bioinformatics: Biomedical Perspectives | | |
| BME 6765 | Algorithms in Bioinformatics | | |
| BME 6930 | Drug delivery | | |
| BME 6935 | Advanced BioRobotics | | |
| BME 6935 | Introduction to Biosensing and Biophotonics | | |
| CAP 5615 | Introduction to Neural Networks | | |
| CAP 6411 | Foundations of Vision | | |
| CAP 6546 | Data Mining for Bioinformatics | | |
| CAP 6619 | Deep Learning | | |
| COT 6930 | Computational Data-Driven Modeling | | |
| COT 5930 | Medical Information Systems (Topics in Computer Science) | | |
| COT 5930 | Digital Image Processing (Topics in Computer Science) | | |
| EEL 5661 | Robotic Applications | | |
| EEL 6819 | Neural Complex and Artificial Neural Networks | | |

+ : 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 | Grade |
|------------|--|----------|-------|
| 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 | | |

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|-----------|---|--|--|
| CEN 6930 | 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 | Grade |
|------------|-----------------------------------|----------|-------|
| BSC 5417C | Practical Cell Neuroscience | | |
| 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 | Proteins in health and diseases | | |

Chemistry Electives:

| Course No. | Course Name | Semester | Grade |
|------------|-------------------------------------|----------|-------|
| 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 | Grade |
|------------|--|----------|-------|
| 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 | Grade |
|------------|---|----------|-------|
| MAD 5474 | Introduction to Cryptology and Information Security | | |
| MAP 6211 | Intro to Dynamical Systems and Chaos | | |
| MTG 6418 | Dynamical Systems, Chaos and Computing | | |

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|----------|--|--|--|
| 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 | Grade |
|------------|--|----------|-------|
| ENT 6016 | Venture Creation | | |
| ENT 6196 | Biotechnology Business Development [Counts as Biomedical Engineering Elective] | | |

College of Nursing

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

College of Medicine

| Course No. | Course Name | Semester | Grade |
|------------|--|----------|-------|
| 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 student's 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 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 AT LEAST *ONE THIRD* OF THE CREDITS MUST BE AT THE 6000 LEVEL COURSES TO MEET PART OF THE REQUIREMENTS FOR THE DEGREE.

Other Requirements:

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.

Student Signature: _____ **Date:** _____