



IUPUI

DEPARTMENT OF BIOMEDICAL ENGINEERING

BS Neuroscience – MS Biomedical Engineering

5-Year Combined Degree Program Handbook

Bachelor of Science Degree in Neuroscience
and
Master of Science Degree in Biomedical Engineering

Fall, 2021

Amendments

1. First version was approved by the BME faculty on August 14, 2020
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1. Introduction

The 5-Year BS Neuroscience MS Biomedical Engineering Combined Degree Program at IUPUI provides academically successful students the opportunity to earn both a Bachelor's degree in Neuroscience and Master's degree in Biomedical Engineering in a total of five years. Both Non-Thesis and Thesis options are possible, however, Thesis option may require more than 5 years to complete depending on scheduling and research progress.

This handbook addresses common questions from applicants and current students in the 5-Year BS Neuroscience MS Biomedical Engineering Combined Degree Program. Information is provided concerning the application process, establishing a program of study, required scholastic performance and general administrative expectations of the Department of Biomedical Engineering and the IUPUI and Purdue Graduate Schools. Neuroscience students should work closely with their undergraduate advisor to ensure all degree requirements for their BS Neuroscience degree are met.

2. Entry to the 5-Year BS Neuroscience MS BME Program

To be eligible for this combined degree program, students must maintain a GPA of at least 3.2 for the first 85 credit hours of coursework that apply towards the BS Neuroscience plan of study (PoS). For students following the standard undergraduate plan, those 85 credit hours will be completed by the end of the first semester of the junior year.

To apply for the combined degree program, interested students should submit the Declaration of Intent to Pursue the Combined Degree no later than February 15th of the junior spring term immediately preceding their senior year. A copy of the 5-year combined degree Declaration of Intent is enclosed in this Handbook. Notification of preliminary admission to the combined degree program will be made no later than March 15th of the term of application. Full admission to the MS BME program is contingent upon successful completion of the BS Neuroscience program and meeting minimum grade and GPA requirements as described below.

3. Conversion to Full Admission to the MS program

The Transition Period is the contingent period of the combined degree program between Preliminary Admission to the combined program and full admission to the MS BME program. During this time, the student is jointly and contingently enrolled in both the BS Neuroscience and MS BME programs. They must take coursework that will be used to complete their BS Neuroscience degree, including the 9 credit hours of overlapping 500 level graduate courses, to prepare for their applications for full admission into the MS BME program. In consultation with both Neuroscience and BME advisors, students must develop and file a Plan of Study (PoS) for their MS BME degree. A template to be used for drafting a 5-year combined degree Plan of Study is enclosed in this Handbook. You will be able to edit your MS BME PoS prior to entering in Purdue University's electronic system after meeting with your BME MS Faculty Advisor.

A combined degree program student who successfully completes the coursework for the BS Neuroscience degree, including the three overlapping courses, may continue in the program. Upon completion of the BS Neuroscience program and with the approval of the

graduate Faculty Advisor, students must apply for admission to the Graduate BME Program no later than the final semester of the student's combined degree program.

Rules of admission and program administration are governed under the department's academic policies and procedures of the MS BME program. Applicants to the MS BME program must show quantitative evidence of proficiency in Mathematics, Physics, Engineering and Life Science. Demonstrated proficiency with at least one high level computer programming language or a command interpreter such as MATLAB is also preferred. The full admission to the graduate program will not be made unless the student meets the minimum 3.2 GPA requirement and receives at least a B grade in each of the three overlapping graduate courses in his/her BS Neuroscience plan of study. Admission to the MS BME program will convert the preliminary admission to full admission to the MS BME program. Once admitted into the MS BME program, students must refer to the *BME MS Graduate Handbook* for further guidelines.

The GRE and application fee requirements of the application packet to the MS BME program will be waived. However, students will be strongly encouraged to take the GRE, and to submit the graduate application no later than December of the transition year, to maintain eligibility for graduate scholarships.

4. Courses Requirement

The total credit hours required for the 5-Year BS Neuroscience MS BME Program combined degree program is 150 credit hours:

- Total BS Neuroscience = 120 (Mathematics Minor, 21 credits)
- Total MS BME = 30 (9 double counted from Fourth Year)

Students in the combined degree program must complete all the requirements of both the BS Neuroscience degree and the MS BME degree programs, described in the *BME MS Graduate Handbook*. For reference, the BS Neuroscience program requires 120 credit hours and the MS in BME requires 30 credit hours, for a total of 150 credit hours. However, to reduce the time to graduation, 9 overlapping credit hours (3 courses) will be selected to satisfy both undergraduate (depth area) and graduate program requirements. The combined degree program is designed to allow students to use 9 credit hours (3 courses) to overlap both the undergraduate BS Neuroscience and the graduate MS BME program requirements. These overlapping and transfer courses will be designated as a "Primary" or "Related" courses on the MS BME PoS, as described in the *BME MS Graduate Handbook*.

The 30 credit hours required for Master's degree in BME program are distributed in the following subject areas according to the table below. To satisfy graduate requirements, the 9 overlapping credit hours, together with the 21 credit hours in the post-baccalaureate year must include the following:

MS Plan of Study Courses	Credit Hours	
	Non-Thesis	Thesis
Approved graduate MATH or STAT course	3	3
Graduate Biomedical Engineering courses	12	6-12
Approved Graduate Life Science or Engineering elective courses	0-6	6
Approved graduate Engineering courses	9-15	0-6
Thesis research	0	9

Total	30	30
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5. Guidelines for Course Selection

Research interests of the faculty as well as the course offerings of the BME department can be generally categorized into three areas of concentration:

- Biomaterials / Tissue Engineering
- Biomechanics / Mechanobiology
- Bioinstrumentation/Neural Engineering/Biosignal Processing

Students should aim to design a graduate BME course selection that focuses on one of these areas of concentration. In the Appendix are three versions of the 5-year combined degree program plan of study for students who want to focus on: (A) Biomaterials, (B) Biomechanics, or (C) Biosignals & Neural Engineering.

For the 3 overlapping courses in the combined degree program, students should work closely with their undergraduate and graduate advisors to select courses appropriate to their BS degree program and their graduate education goals. Thus, while such courses can be included on the graduate plan of study, they cannot be completed during the transition year. Examples of possible overlapping courses, taken during the transition year, are listed below by BME depth areas. However, other 500-level math, science, or engineering courses not included here but suggested by the student's advisors might also be appropriate. Once a student is fully admitted as a graduate student in the BME MS program, consult with the BME Faculty Advisor to prepare your Purdue graduate MS PoS using the draft PoS prepared earlier.

Biomaterials/Tissue Engineering

BME 59500 Polymers for Biomedical Applications OR BME 58200 Advanced Biomedical Polymers

BME 57100 Drug Delivery

BME 59500 Engineering Principles of Biomolecular Interaction

BME 59500 Biomolecular Engineering

BME 59500 Engineering Analysis of Tissues

BIOL 56100 Immunology

BIOL 56800 Regenerative Biology & Medicine

BIOL 57310 Stem Cell Biology

BIOL 50700 Principles of Molecular Biology

CHEM 53300 Intro to Biochemistry

Biomechanics/Mechanobiology

BME 57100 Drug Delivery OR BME 59500 Engineering Principles of Biotechnology

BME 59500 Biomolecular Engineering OR BME 59500 Molecular and Cellular Mechanics

BME 59500 Vascular Biomechanics OR BME 59500 Cellular Mechanotransduction

BME 54400 Musculoskeletal Biology and Mechanics OR BME 59500 Engineering Analysis of Tissues

ME 54600 CAD/CAM Theory and Advanced Applications

ME 59700 Orthopedic Biomechanics

ME 59700 Models of Musculoskeletal Load

ME 59700 Image-Based Biomedical Flow

Bioinstrumentation/Neural Engineering/Biosignal Processing

BME 59500 Cardiac Electrophysiology
BME 52700 Implantable Systems OR BME 59500 Cellular Electrophysiology
BME 59500 Neural Engineering OR BME 59500 Embedded Bioinstrumentation
BME 59500 Engineering Principles of Biotechnology
MATH 52500 Intro to Complex Analysis

Appropriate for Any Depth Area

BME 59500 Experimental Methods in BME
BIOL 55600 Physiology I OR PHSL-F 503 Human Physiology
MATH 51000 Vector Calculus
MATH 51100 Linear Algebra w/Applications
MATH 53700 Applied Math Scientists/Engr I
MATH 55200 Applied Numerical Methods II
STAT 51100 Statistical Methods I
STAT 51200 Applied Regression Analysis
STAT 52300 Categorical Data Analysis
STAT 52800 Intro to Mathematical Statistics

6. Grade Requirements

Upon preliminary acceptance to the combined degree program, the student will enter a transitional period where they will complete the requirements of the BS Neuroscience degree program, including the three overlapping graduate level courses, while maintaining the minimum academic performance requirements. During the transition year, students must maintain a minimum GPA of 3.2 on the cumulative GPA of coursework that applies towards the BS Neuroscience degree. Furthermore, students must earn grades of at least B in the three overlapping 500-level courses that will apply to the MS BME PoS. Failure to maintain these standards can result in the dismissal of the student from the combined degree program (see below). These requirements are more stringent than the current admission requirements for the MS BME program.

Upon full admission to the MS BME program, a minimum GPA of 3.00 will be required in the student's MS BME PoS as described in the *BME MS Graduate Handbook*. Master's GPA will be calculated by including the grades of the three overlapping graduate courses transferred from the BS plan of study.

7. Advising and Advisory Committee

Students in the 5-year combined degree program should continue to consult with their undergraduate advisor in Neuroscience Program to ensure all requirements for their BS degree program are met. Once students are admitted into the MS BME program, they will be assigned a BME graduate advisor to advise students on requirements related to the MS BME degree. Students will continue to retain their Neuroscience undergraduate advisor until completion of the BS degree.

The combined degree program will offer Thesis and Non-Thesis options. There are three general pathways through the BME Master's program: (A) Non-Thesis with course only, (B) Non-Thesis with a project and (C) Thesis. Both options A and B can be completed in 5 years, with possible summer research. However, Thesis option may require more than 5 years to complete (one or more semesters including summer research) depending on scheduling and research progress.

For Thesis MS students, their Faculty Advisor is the faculty member sponsoring the MS thesis research project. Student planning to pursue the thesis-based MS degree must work closely with their advisor to plan out their program. Depending on the research project, it may take longer than 5 years for Thesis students to complete the BS/MS combined degree program. The Faculty Advisor and student must establish a Graduate Advisory Committee. It is the responsibility of this committee to assist the student in finalizing the MS PoS, meeting degree requirements, and conducts all necessary examinations related to the MS Thesis research project.

For Non-Thesis students in the 5-year combined degree program, the BME Director of the Graduate Program will serve as their Faculty Advisor.

The Faculty Advisor or Advisory Committee will review each student's performance each semester in the one-year transitional period including academic advisement reports, student's overall GPA, and grades in the 500-level coursework. Students must maintain academic performance and progress to meet the admission requirements of 3.2 GPA and a grade of at least a B in the 500-level coursework to be allowed to continue in the combined-degree program. Otherwise, the advisory committee will evaluate each student's progress on a case by case basis and recommend action. Possible recommendations include but are not limited to exclusion of a class from the Master's plan of study, the retaking of a class, and dismissal from the program.

8. Graduation

The BS Neuroscience degree will be awarded upon the successful completion of the BS plan of study. Students will be eligible for the MS BME degree only upon successful completion of the combined degree program: 150 credit hours, successful submission of all administrative forms, and successful thesis defense, if applicable. Note that a degree will not be automatically awarded without a graduation application. Depending on the nature of the thesis research project, in some cases the Thesis MS students may require additional semesters to complete the MS BME degree.

9 Important Timeline

The following table summarizes important dates for students interested in pursuing the 5-Year BS Neuroscience MS Biomedical Engineering Combined Degree Program. Dates in the table area for students who complete a BS Neuroscience degree in four years. Transfer students and/or students on an accelerated plan of study should may have altered dates and deadlines.

5-YEAR COMBINED DEGREE	FORM	TURN FORM TO	TYPICAL DEADLINE
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Declaration of Intent (DOI) Form	Yes	BME Department	February 15 during the junior year (BS)
<i>You will receive notification of DOI approval from the BME department by March 15</i>			
Tentative Plan of Study Form	Yes	BME Advisor	<u>First week of classes</u> of your senior year (BS)
Apply to Purdue University Graduate School	Online Application	Online	<u>October 1</u> of your senior year (BS)
<i>You will receive notification of acceptance into the Purdue Graduate School.</i>			
File Official Purdue Plan of Study	Online	Online	Discuss with MS BME Advisor

IUPUI

Master of Science Degree in Biomedical Engineering (MS BME)

Tentative PLAN OF STUDY for Students in

5-Year BS Neuroscience MS Biomedical Engineering Combined Degree Program

(All declared students of the 5-year combined degree program should fill out this form by the First week of classes of your senior year in the BS program)

Name: _____ ID Number: _____

Admission Date: _____ Anticipated Graduation: _____

Area of Concentration (Biomechanics, Biomaterials, Bioinstrument/Neuro): _____

9-CREDITS OF 500-LEVEL OR HIGHER OVERLAP COURSES (BS AND MS)

Table with 6 columns: Primary/Elective, Course # (ex:BME595), Course Title, Semester Taken, Credit Hours, Grade (if known). Contains 4 empty rows.

Total Credit Hours: _____

SEMESTER 1 (MS BME)

Table with 5 columns: Primary/Elective, Course # (ex:BME595), Course Title, Credit Hours, Grade (if known). Contains 4 empty rows.

Total Credit Hours: _____

SEMESTER 2 (MS BME)

Table with 5 columns: Primary/Elective, Course # (ex:BME595), Course Title, Credit Hours, Grade (if known). Contains 4 empty rows.

Total Credit Hours: _____

SEMESTER 3 (MS BME, IF NEEDED)

Primary /Elective	Course # (ex:BME595)	Course Title	Credit Hours	Grade (if known)

Total Credit Hour: _____

Fill out only the table below with that is applicable to your MS BME degree.

SUMMARY – NON-THESIS MS BME REQUIREMENTS

	Required	Course #	Credit Hours
Mathematics or Statistic Course	3		
BME Courses	12		
Life Science or Eng Elective	0 – 6		
Engineering Elective	9-15		

Total: 30 Total Credit Hour: _____

SUMMARY – THESIS MS BME REQUIREMENTS

	Required	Course #	Credit Hours
Mathematics or Statistic Course	3		
BME Courses	6-12		
Life Science or Eng Elective	0 – 6		
Engineering Elective	6		
Thesis Research	9		

Total: 30 Total Credit Hour: _____

Thesis students: discuss Committee members with your Faculty Advisor prior to listing the members below. Do not contact your committee members until you begin your MS BME coursework.

MS BME ADVISORY COMMITTEE MEMBERS

- (1 - Chair) _____ (Non-Thesis: Dr. Ji; Thesis: MS Advisor)
- (2) _____ (Thesis only)
- (3) _____ (Thesis only)

APPENDIX A

BS Neuroscience MS Biomedical Engineering (Non-Thesis)

BIOMATERIALS FOCUS

First Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K101 Concepts of Biology I	5	CHEM-C 105 Principles of Chemistry I	3
SCI-I 120 Windows on Science	1	CHEM-C 125 Experimental Chem. I	2
PSY-B 110 Intro to Psychology	3	PHYS 15200 Mechanics	4
MATH 16500 Analytic Geometry & Calculus*	4	ENGR 29700 Intro. to Computing (MATLAB)	1
ENG-W 131 Reading, Writing, and Inquiry I	3	MATH 16600 Analytic Geometry & Calculus*	4
ENGR 19700 Intro. to Computing (C prog.)	2	PSY-B 201 Foundations of Neuroscience	3
TOTAL SCH	18		17

Second Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
MATH 17100 Multidimensional Mathematics*	4	MATH 26100 Multivariate Calculus *	4
PHYS 25100 Electricity, Heat, and Optics	5	BIOL-K 324 Cell Biology	3
BIOL-K 103 Concepts of Biology II	5	PSY-B 301 Systems Neuroscience	3
Chem. C106 Principles of Chemistry II	3	Gen Ed Social Science (SOC-R 100)	3
		COMM-R 110 Fundamentals of Speech	3
		CHEM-C 126 Experimental Chem II	2
TOTAL SCH	17		18

Third Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 24101 Introductory Biomechanics	3	BIOL-K 384 Biochemistry (Biology Elective)	3
BME 24300 Biomechanics Lab	1	General Education Elective (AH)	3
MATH 26600 Differential Equations *	3	CHEM-C 342 Organic Chemistry II	3
CHEM-C 341 Organic Chemistry I	3	CHEM-C 344 Organic Lab II	2
CHEM-C 343 Organic Lab I	2	STAT 35000 Introduction to Statistics*	3
TCM 21800 Intro to Eng Tech Reports	1	BME 38800 Applied Biomaterials	3
PSY-B Elective	3		
TOTAL SCH	16		17

Fourth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K 416 Cell and Mol Neuroscience	3	MS BME approved grad Elective (e.g. MATH 51100 Linear Alg)	3
PSY-B 434 Neuroscience Capstone	3	MS BME approved grad Elective (e.g. BIOL 57310 Spring only)	3
BME 38100 Implantable Materials & Biol Resp	3	General Education Elective (SS or AH)	3
BME 38300 Implantable Materials Lab	1	General Education Elective (CU)	3
TCM 35900 Tech Data Reporting and Pres.	1		
BME 5XX00 Graduate BME Course (e.g. Advanced Biomed Polymers or equivalent)	3		
TOTAL SCH	14		12

Fifth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 59500 or 69500	3	Approved graduate life-science or engineering	3
BME 59500 or 69500	3	Approved graduate engineering	3
BME 59500 or 69500	3	Approved graduate engineering	3
Approved graduate engineering	3		
TOTAL SCH	12		9

APPENDIX A

* Courses would count toward a Mathematics Minor

TOTAL BS Neuroscience = 120 (Mathematics Minor, 21 credits)

TOTAL MS BME = 30 (9 double counted from Fourth Year)

Notes

120 credits for BS Neuroscience would include:

- 11 credits of 200-/300-level BME courses
- 9 credits of 500-level courses that would count toward MS BME
- Two credits of TCM courses paired with BME courses (1-credit TCM 21800, 1-credit TCM 35900)
- 2 credits of MATH to reach AREA V requirement of 18 credits

Students on this track would also need to declare a Mathematics minor, as the following would be extra courses:

- MATH 17100 (4 credits)*
 - MATH 26600 (3 credits)
 - MATH 26100 (3 credits)
- *2 credit of MATH would need to apply to BS Neuroscience

MS BME Non-Thesis Requirements:

3 credit hours	Approved Graduate Mathematics or Statistics courses (3 cr. 4 th year)
12 credit hours	Graduate Biomedical Engineering courses (3 cr. 4 th year)
0 - 6 credit hours	Approved Graduate Life Science or Engineering elective courses (3 cr. 4 th year)
9 - 15 credit hours	Approved Graduate Engineering electives

APPENDIX B

BS Neuroscience - MS Biomedical Engineering (Non-Thesis)

BIOMECHANICS FOCUS

First Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K101 Concepts of Biology I	5	CHEM-C 105 Principles of Chemistry I	3
SCI-I 120 Windows on Science	1	CHEM-C 125 Experimental Chem. I	2
PSY-B 110 Intro to Psychology	3	PHYS 15200 Mechanics	4
MATH 16500 Analytic Geometry & Calculus*	4	ENGR 29700 Intro. to Computing (MATLAB)	1
ENG-W 131 Reading, Writing, and Inquiry I	3	MATH 16600 Analytic Geometry & Calculus*	4
ENGR 19700 Intro. to Computing (C prog.)	2	PSY-B 201 Foundations of Neuroscience	3
TOTAL SCH	18		17

Second Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
MATH 17100 Multidimensional Mathematics*	3	MATH 26100 Multivariate Calculus *	4
PHYS 25100 Electricity, Heat, and Optics	5	BIOL-K 324 Cell Biology	3
BIOL-K 103 Concepts of Biology II	5	PSY-B 301 Systems Neuroscience	3
Chem. C106 Principles of Chemistry II	3	Gen Ed Social Science (SOC-R 100)	3
		COMM-R 110 Fundamentals of Speech	3
		CHEM-C 126 Experimental Chem II	2
TOTAL SCH	16		18

Third Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 24101 Introductory Biomechanics	3	BIOL-K 384 Biochemistry (Biology Elective)	3
BME 24300 Biomechanics Lab	1	General Education Elective (AH)	3
MATH 26600 Differential Equations *	3	CHEM-C 342 Organic Chemistry II	3
CHEM-C 341 Organic Chemistry I	3	CHEM-C 344 Organic Lab II	2
CHEM-C 343 Organic Lab I	2	PSY-B Elective	3
TCM 21800 Intro to Eng Tech Reports	1	STAT 35000 Introduction to Statistics*	3
TOTAL SCH	13		17

Fourth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K 416 Cell and Mol Neuroscience	3	BME 35200 Cell and Tissue Mechanics	3
PSY-B 434 Neuroscience Capstone	3	BME 35400 Cell and Tissue Lab	1
BME 38100 Implantable Materials & Biol Resp	3	MS BME approved grad Elective (e.g. ME 54600 CAD/CAM)	3
BME 38300 Implantable Materials Lab	1	MS BME approved grad Elective (e.g. GRDM-G 819 SP only)	3
TCM 35900 Tech Data Reporting and Pres	1	General Education Elective (SS or AH)	3
MS BME approved grad Elective (e.g. MATH 53700 FA only)	3	General Education Elective (CU)	3
TOTAL SCH	14		16

Fifth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 59500 or 69500	3	Approved graduate life-science or engineering	3
BME 59500 or 69500	3	BME 59500 or 69500	3
Approved graduate engineering	3	BME 59500 or 69500	3
Approved graduate engineering	3		
TOTAL SCH	12		9

APPENDIX B

* Courses would count toward a Mathematics Minor

TOTAL BS Neuroscience = 120 (Mathematics Minor, 21 credits)

TOTAL MS BME = 30 (9 double counted from Fourth Year)

Notes

120 credits for BS Neuroscience would include:

- 12 credits of 200-/300-level BME courses
- 9 credits of 500-level courses that would count toward MS BME
- Two credits of TCM courses paired with BME courses (1-credit TCM 21800, 1-credit TCM 35900)
- 1 credit of MATH to reach AREA V requirement of 18 credits

Students on this track would also need to declare a Mathematics minor, as the following would be extra courses:

- MATH 17100 (4 credits)*
 - MATH 26600 (3 credits)
 - MATH 26100 (3 credits)
- *1 credit of MATH would need to apply to BS Neuroscience

MS BME Non-Thesis Requirements

3 credit hours	Approved Graduate Mathematics or Statistics courses (3 cr. 4 th year)
12 credit hours	Graduate Biomedical Engineering courses
0 - 6 credit hours	Approved Graduate Life Science or Engineering elective courses (3 cr. 4 th year)
9 - 15 credit hours	Approved Graduate Engineering electives (3 cr. 4 th year)

APPENDIX C

BS Neuroscience MS Biomedical Engineering (Non-Thesis)

BIOSIGNALS & NEURAL ENGINEERING FOCUS

First Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K101 Concepts of Biology I	5	CHEM-C 105 Principles of Chemistry I	3
SCI-I 120 Windows on Science	1	CHEM-C 125 Experimental Chem. I	2
PSY-B 110 Intro to Psychology	3	PHYS 15200 Mechanics	4
MATH 16500 Analytic Geometry & Calculus*	4	ENGR 29700 Intro. to Computing (MATLAB)	1
ENG-W 131 Reading, Writing, and Inquiry I	3	MATH 16600 Analytic Geometry & Calculus*	4
ENGR 19700 Intro. to Computing (C prog.)	2	PSY-B 201 Foundations of Neuroscience	3
TOTAL SCH	18		17

Second Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
MATH 17100 Multidimensional Mathematics*	3	MATH 26100 Multivariate Calculus *	4
PHYS 25100 Electricity, Heat, and Optics	5	BIOL-K 324 Cell Biology	3
BIOL-K 103 Concepts of Biology II	5	PSY-B 301 Systems Neuroscience	3
Chem. C106 Principles of Chemistry II	3	Gen Ed Social Science (SOC-R 100)	3
		COMM-R 110 Fundamentals of Speech	3
		CHEM-C 126 Experimental Chem II	2
TOTAL SCH	16		18

Third Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 24101 Introductory Biomechanics	3	BIOL-K 384 Biochemistry (Biology Elective)	3
BME 24300 Biomechanics Lab	1	PSY-B Elective	3
MATH 26600 Differential Equations *	3	CHEM-C 342 Organic Chemistry II	3
CHEM-C 341 Organic Chemistry I	3	CHEM-C 344 Organic Lab II	2
CHEM-C 343 Organic Lab I	2	BME 22201 Introductory Biomeasurements	3
TCM 21800 Intro to Eng Tech Reports	1	BME 22400 Biomeasurements Lab	1
General Education Elective (AH)	3	TCM 35900 Tech Data Reporting and Pres.	1
TOTAL SCH	16		16

Fourth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BIOL-K 416 Cell and Mol Neuroscience	3	BME 32200 Probability and Applications for BME*	3
PSY-B 434 Neuroscience Capstone	3	MS BME approved Grad Elective (e.g. ANAT-D 527 SP only)	3
BME 33100 Biosignals and Systems	3	MS BME approved Grad Elective (e.g. MATH 51100)	3
BME 33400 Biomedical Computing	3	General Education Elective (CU)	3
MS BME approved Grad Elective (e.g. BIOL 55600 FA only)	3	General Education Elective (SS or AH)	3
TOTAL SCH	15		15

Fifth Year

<i>First Semester</i>	SCH	<i>Second Semester</i>	SCH
BME 59500 or 69500	3	BME 59500 or 69500	3
BME 59500 or 69500	3	BME 59500 or 69500	3
Approved graduate engineering	3	Approved graduate engineering	3
Approved graduate engineering	3		
TOTAL SCH	12		9

APPENDIX C

* Courses would count toward a Mathematics Minor

TOTAL BS Neuroscience = 120 (Mathematics Minor, 21 credits)

TOTAL MS BME = 30 (9 double counted from Fourth Year)

Notes

120 credits for BS Neuroscience would include:

- 17 credits of 200-/300-level BME courses (with BME 32200 counting as the statistics requirement for BS Neuroscience and Mathematics Minor)
- 9 credits of 500-level courses that would count toward MS BME
- Two credits of TCM courses paired with BME courses (1-credit TCM 21800, 1-credit TCM 35900*)

*TCM 35900 for Biosignals & Neural Eng Focus will be a general course, not the BME section

Students on this track would also need to declare a Mathematics minor, as the following would be extra courses:

- MATH 17100 (4 credits)
- MATH 26600 (3 credits)
- MATH 26100 (3 credits)

MS BME Non-Thesis Requirements

3 credit hours Approved Graduate Mathematics or Statistics courses (3 cr. 4th year)

12 credit hours Graduate Biomedical Engineering courses

0 - 6 credit hours Approved Graduate Life Science or Engineering elective courses (6 cr. 4th year)

9 - 15 credit hours Approved Graduate Engineering electives