



# WAYNE STATE

## College of Engineering

**Department of Biomedical Engineering**

**Undergraduate Handbook**

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## Table of Contents

<b>Preface</b>	<b>1</b>
<b>Department of Biomedical Engineering</b>	<b>2</b>
<b>BME Undergraduate Program Philosophy</b>	<b>2</b>
<b>BME Undergraduate Program Objectives and Learning Outcomes</b>	<b>3</b>
<b>BME Undergraduate Curriculum</b>	<b>4</b>
<b>BSBME Course Progression</b>	<b>5</b>
<b><i>Undergraduate Program Policies</i></b>	
<b>Admission to the Undergraduate Program in BME</b>	<b>6</b>
<b>Advising</b>	<b>7</b>
<b>Placement and Qualifying Examinations</b>	<b>8</b>
<b>Honors Program</b>	<b>9-10</b>
<b>General Education Requirements</b>	<b>11-12</b>
<b>Concentration Electives</b>	<b>13-14</b>
<b><i>College of Engineering Policies</i></b>	
<b>Transferring Courses towards an Engineering Degree</b>	<b>15</b>
<b>Registration for Courses</b>	<b>16</b>
<b><i>Important Information</i></b>	
<b>Academic Support Resources</b>	<b>17-18</b>
<b><i>Programs and Options to Consider as You Pursue Your Degree</i></b>	
<b>AGRADE Program</b>	<b>19</b>
<b>Senior Rule</b>	<b>20</b>

## Préface

This *Handbook* is provided for students in the undergraduate Biomedical Engineering (BSBME) Program in the College of Engineering. It includes both policies set by the College of Engineering for all students as well information specifically related to Biomedical Engineering students.

All students are responsible for knowing and following the policies outlined in this *Handbook*, the *College of Engineering Pre-Professional Handbook*, and the *Undergraduate Bulletin*. The *Undergraduate Bulletin* is published every two years. Changes to College Policy that take effect between editions will be included in revisions to the *Pre-Professional Handbook* as well as this *BME Undergraduate Handbook*. In some cases, program and policy changes will take effect for all students immediately or from a defined date. In other cases, students who entered the College prior to the enactment of a policy or program requirement will have the choice of following either the original or new policy. These grandfather provisions, if available, will be described in the various publications. Any questions about this *Handbook* or College policy can be directed to the BME Undergraduate Program Chair, the Associate Dean for Academic Affairs, and the undergraduate Academic Advisors.

Per University policy, students must graduate under degree requirements that are listed in the *Undergraduate Bulletin* currently in effect or the two previous *Bulletins*. For instance, a student who applies to graduate in 2017 must meet the program, College, and University requirements listed in the 2017-2016, 2015-2014, or 2013-2012 *Undergraduate Bulletin*. If something delays a student's progress through the undergraduate program so that she will not graduate under the Bulletin that was in effect at the time she entered Wayne State, then a conversation must be held as early as possible to identify what, if any, requirements have changed that must be accounted for.

*Note: Portions of this Handbook are taken directly or indirectly from the Undergraduate Bulletin of Wayne State University and the College of Engineering Pre-Professional Handbook.*

# Department of Biomedical Engineering

**Mission:** The mission of the department is to enhance biomedical engineering education and research at Wayne State University in order to enable our graduates to mitigate disease, trauma, and the effects of aging in society.

**Department Organization:** The Department is part of the Wayne State University's College of Engineering and is led by a chair that reports directly to the Dean of the College of Engineering. The Graduate Program Chair (Grad Certificate, MS, and PhD) and the Undergraduate Program Chair (BS) coordinate academic Programs.

**Accreditation:** The accrediting body for engineering programs in the US is ABET ([www.abet.org](http://www.abet.org)). The Bachelor of Science in Biomedical Engineering program at Wayne State University is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>, under the commission's General Criteria and Program Criteria for Bioengineering and Biomedical and Similarly Named Engineering Programs.

## BME Undergraduate Program Philosophy

An individual trained in biomedical engineering is not merely an engineer who has not taken a few courses in biology; nor is he/she a physiologist with some training in physics. A biomedical engineer brings together traditional engineering principals with the life sciences in a completely integrated fashion. The result is an engineer who views the human body as a complex system, its diseases and injuries as breakdowns in that system, and medical interventions as design alternatives for the repair of the system. As the population ages and medical costs skyrocket, biomedical engineers are required both to understand the mechanistic causes of injury and disease and to design and implement interventions to prevent and mitigate the suffering of individuals and reduce the cost of medical care to society.

With this understanding, the Undergraduate Program in Biomedical Engineering is designed to completely, immediately, and continuously integrate the application of engineering with the medical domain. Starting in the first semester, students apply engineering to develop solutions to real world biomedical challenges. First and foremost, Wayne State BME students are engineers – and a strong foundation in engineering is key to the program.

The undergraduate program is also a cohort-based program. Students advance as a group, taking key courses as a block. This allows the students to develop a strong sense of camaraderie, which supports student learning. BME students participate in BME Design Labs each semester (fall and winter) of their academic program. The Design Labs are designed to meet multiple learning objectives:

- Students will apply engineering principals from their other coursework to the solution of biomedical engineering challenges.
- Students will demonstrate and refine professional skills, including those related to teamwork, communication, biomedical ethics, device regulation, and lifelong learning.
- Students will build and utilize a technical toolbox, including appropriate software tools and life science laboratory techniques.

Because of the academic rigor of the program, students applying to the BME program are reviewed critically to determine that they have a strong probability of success in the program. The cohort size is also limited in order to insure that students have sufficient interaction with their faculty and access to the broader resources of the College and Department.

# **BME Program Objectives and Student Learning Outcomes**

ABET requires all programs seeking accreditation to establish Program Objectives and Student Learning Outcomes. Program Objectives are defined as what graduates of the program will be able to do 3-5 years after graduation. Student Learning Outcomes describe what students will be able to at the time of graduation.

Following discussion with the Program faculty and the Industrial Advisory Board, the following Program Objectives were established in 2011 and have been reviewed and updated periodically throughout the program's history. The current Program Objectives of the BSBME program are to develop graduates who, within a few years of graduation, will:

- Work in multidisciplinary teams to translate biomedical science to applications that will improve people's quality of life
- Utilize and advance engineering, mathematical, and biomedical tools to solve biomedical engineering problems and design biomedical engineering systems
- Continue a practice of lifelong learning in engineering and/or biomedical fields based on a strong underlying foundation in both areas of study

The program student learning outcomes guide the program development, and establish that students will be able to:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. an ability to communicate effectively with a range of audiences.
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
8. apply principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations), and statistics
9. solve biomedical engineering problems, including those associated with the interaction between living and non-living systems
10. analyze, model, design, and realize biomedical engineering devices, systems, components, or processes
11. make measurements on and interpret data from living systems

ABET requires that these Objectives and Outcomes are reviewed and evaluated on a regular basis as part of a continuous improvement process.

# BME Undergraduate Curriculum

The minimum degree requirements for the BSBME degree include 120 credit hours, at least 45 of which must be engineering credits and at least 28 of which must be math and science credits. Described are the standard curriculum recommendations. Students pursuing Honors and Pre-Med variations should confer with an academic advisor to review recommended course progression and additional requirements for those secondary curricula. Course names are available in the *Undergraduate Bulletin*.

Concentration electives should be selected from the course list provided. These must be presented and approved on a Concentration Plan worksheet.

The basic components of the program include:

*Basic Math and Science (28 cr):*

- MAT 2010, 2020, 2030, and 2150
- CHM 130
- PHY 2175 and 2185

*Life Science (9cr):*

- BIO 1510 w/ Lab
- BME 2050
- BME 4010

*Biomedical Engineering Core (20 cr):*

- Design: BME 1910, 1920, 2910, 2920, 3910, 3920, 4910, and 4920
- BME 3010
- BME 3470
- BME 4xxx, 5xxx, or 6xxx

*Biomedical Engineering Concentration (15 cr):*

- BME 4X10 – Bridge Course
- 12 credits of Concentration Electives

*Core Engineering (23 cr):*

- BE 1200
- BE 1300 + 1310
- BE 1500
- BE 2100
- ECE 3300
- ME 2410 and 2420
- 

*General Education (15 cr (some required gen. ed. courses are covered by major required coursework)):*

BC, IC, OC, CT, QE, SI, CI,  
NSI, GL, DEI and CIV

# BSBME Course Progression

Year 1	FALL	WINTER
	BE 1200 CHM 1125+1130 ENG 1020 MAT 2010 Wayne Experience ( on hold for 2023 and 2024)	BE 1300+1310 BE 1500 MAT 2020 PHY 2175
	Total Credits 15	Total Credits 15
Year 2	BE 2100 BIO 1510+1511 BME 2910 MAT 2030 ME 2410	ME 2050 BME 2920 PHY 2185 MAT 2150 ME 2420
	Total Credits 15	Total Credits 16
Year 3	BME 3470 BME 3910 BME 3010 ECE 3300 or 3320 ENG 3050	BME 3920 BME 4010 BME 4X10 ENG 3060 General Education General Education
	Total Credits 14	Total Credits 15
Year 4	BME 4910 2 Concentration Elective courses General Education	BME 4920 BME 4X10 Concentration Elective General Education
	Total Credits 14	Total Credits 16

# Admission to the Undergraduate Program in Biomedical Engineering

The BSBME program is a competitively selective program..

BME program application decisions are made after university admission. Applications from students not admitted to the university will not be considered.

## Recommended Academic Background:

Students are encouraged to pursue more advanced coursework in mathematics (including calculus), chemistry, and biology – although this is not required. However, all BSBME students are encouraged to start in the following courses and must have sufficient background to place into these (or more advanced) courses:

- MAT 2010 – Calculus I
- CHM 1125 – General Chemistry
- ENG 1020 – Basic Composition
- BIO 1510 – Basic Life Mechanisms

Students who have not attained this background through high school/community college may take foundational courses at Wayne State University.

**Admission Requirements - Freshmen:** Students applying directly from high school, including if they have earned dual enrollment or AP credit, are expected to meet the following minimum requirements:

- High School GPA: 3.2
- Composite/Total Score:
  - ACT Composite: 23/ACT Math: 26
  - SAT Combined: 1150/SAT Math: 620

The department does not have absolute cut-offs for admission.

**Admission Requirements - Transfer Students:** Students who have completed one or more years of college-level coursework (university or community college) may apply as transfer students. Depending on the coursework completed, transfer students may be admitted as first year, 2<sup>nd</sup> year students. In general, transfer students must have earned a 3.3 or higher overall gpa in college-level coursework.

To transfer to the biomedical engineering major in your second year, you must complete the following courses or their equivalents:

- Math: MAT 2010 and MAT 2020
- Chemistry: CHM 1125 and 1130
- Physics: PHY 2175
- English: ENG 1020
- Biology: BIO 1510 (+ BIO 1511)
- Engineering: BE 1200, 1300, 1310 and BE 1500



## Advising

Advising for undergraduate students enrolled in the Biomedical Engineering Program comes from four sources:

- Dr. Namrata Murthy, Academic Services Officer: Responsible for assisting students with development of a plan of work, selection of elective courses, and monitoring academic progress. Enforces College of Engineering and University academic policy. Will set approved overrides to assist with registration.
- Undergraduate Program Faculty: Great sources of information regarding professional opportunities, links to industry and research opportunities, internships, and general plan of work development. Part of these faculties' job is to advise students in academic and professional careers.

Dr. Mahendra Kavdia, Undergraduate Program Chair: Responsible for enforcing adherence to Departmental academic policy. Departmental Concentration Course Selection forms should be completed and sent for review and approval to the Undergraduate Program Chair. Requests for waivers of Departmental policy should also be addressed in writing to the Undergraduate Program Chair. [Dr. Mahendra Kavdia, Associate Professor, kavdia@wayne.edu](#)

- Dr. Leslie Monplaisir, Associate Dean for Academic and Student Affairs: Responsible for oversight of all academic programs within the College and enforcement of College academic policy. Requests for waivers of College policy should be submitted in writing to the Associate Dean for Academic Affairs. This includes matters concerning the Basic Engineering courses of the core curriculum. Students must meet with their academic advisor first, then the UG chair, and receive a referral, before seeing the Associate Dean for Academic Affairs. The Associate Dean also serves as the Judicial Officer for the College of Engineering.

Students are encouraged to meet with their Academic Advisor on an annual basis. Meetings every semester can provide a student with up-to-date feedback on their academic progress.

## Placement and Qualifying Examinations

Biomedical Engineering undergraduates are required to start in freshman engineering coursework including Biology, Chemistry, English, and Mathematics. Admission to the BME program is contingent upon this placement, either based on ACT scores (within the past two years), transfer credit, or placement test results.

**Chemistry Placement Examination:** The sequence of chemistry courses for the BSBME the degree begins with CHM 1125 and CHM 1130. *There is no ACT score for Chemistry placement. Therefore, all incoming students must take the Chemistry Placement Exam for appropriate placement unless AP or transfer credit already exists on their record.*

**English Placement Examination:** In order to register for ENG 1020, students must meet one of the following placement requirements: 1) English ACT score of 21 or higher taken within 2 years of planned registration for the course; 2) appropriate placement on the English Placement Exam; or 3) satisfactory grade (C or higher) in ENG 1010.

**Mathematics Placement Examination:** The sequence of mathematics courses for the BSBME degree begins with MAT 2010. BME students must demonstrate placement into at least MAT 2010 through either a Math ACT score of 29 or higher, a score of 3 or better on the AP Calculus AB or BC examination, transfer credit of MAT 2010 or higher (with a grade of C or higher), or through the Math Placement Exam.

**Biology Placement Exam** – In order to register for BIO 1510+1511, students must meet one of the following placement requirements: 1) Composite ACT score of 21 or higher taken within 2 years of planned registration for the course; 2) appropriate placement on the Biology Placement Exam; or 3) satisfactory grade (C or higher) in BIO 1050.

# Honors Program

Students in the College of Engineering have the option of pursuing their degree through the Honors College and/or with Engineering Honors. Admission to the Honors College is by invitation to incoming freshmen only. If courses are chosen carefully, students can complete both University and College Honors requirements without any additional credit hour requirements. University Honors builds on the Engineering Honors program – all credits earned as part of the Engineering Honors Program apply to the requirements for University Honors. A publication is available on the BME Website with specific suggestions for selection of Honors courses to most easily satisfy these requirements.

## *University Honors*

Students interested in earning their degree with University Honors must first be invited to join the Honors College as an incoming freshman. In order to graduate with University Honors, students must complete 28 credits of Honors coursework, including the following:

- HON 1000 – The City
- Foundational Seminar
- HON 3000 – Service Learning + BME 2920
- 24 credits from Engineering Honors (see below)

In order to graduate with University Honors designated on the transcript, students must complete their overall undergraduate program with a minimum gpa of 3.3 as well as earning at least a 3.3 gpa in the honors designated courses. Students may pursue University Honors without Engineering Honors if they so choose, in which case these 24 credits must include an Honors Seminar and Honors Thesis (BE 5998-4 credits)

## *Engineering Honors*

Students interested in earning Honors in Engineering in conjunction with their Bachelor of Science in Engineering must complete 24 credits of honors courses, including 12 credits of honors coursework in Engineering.

To be eligible for the Engineering Honors Program, BME students must meet the following criteria:

- Enter the University with a 3.5 overall grade point average from High School
- Have earned a minimum of a 3.5 grade point average after at least 24 credits of University coursework
- Maintain a cumulative grade point average of 3.5 or higher, with at least a 3.3 in the Honors-designated courses, throughout the course of undergraduate study.

The following are the required courses for students to earn Honors in Engineering:

- HON 42XX – Honors Seminar (3 – 4 cr)

Students should select an Honors Seminar that satisfies a remaining General Education requirement. This will then meet the student's general education requirement in this area.

- BE 5998 – Engineering Honors Thesis (4 cr)  
Engineering students must conduct their thesis with a full-time faculty member in Engineering. This course can count for a four-credit concentration elective. This course counts towards the 12 required honors credits in Engineering.
- Departmental Honors Course(s)  
Students must complete at least one honors course within their departmental major requirements. For BME, this is designated as the Honors sections of BME 4910 and BME 4920 (6 credits). These courses will count towards the 12 required honors credits in Engineering.

The remainder of the required 12 credits of Engineering Honors credits can be satisfied through selection of an Honors Option in any Engineering course or by the courses listed on a student's AGRADE Plan of Work (see below)

#### Honors-Option Coursework

The Honors Option allows a student in any course at the 2000-level or above, and taught by a regular faculty member, to elect honors type work. This requires that the instructor agree to furnish extra instructional material commensurate with expectations for an Honors course. If a grade of 'B' or above is earned in the course and in the additional work, the student will receive honors credit for the course on the transcript. Application forms for the Honors Option are available in the Honors Program Office. The application form must be signed by the instructor after which it should be returned to the Honors Program Office by the end of the third week of classes. After the Honors Option request is approved by the Honors Program, the form will be returned to the student until a grade is assigned by the instructor. The completed form, including the final grade, must then be returned to the Honors Program Office at the end of the semester.

#### Honors and AGRADE for BME Students

Honors students retain the option of entering the AGRADE program during their junior year. Students must meet with their advisor to establish an AGRADE Plan of Work, to include up to 16 credits from their BS. The Concentration electives and required courses that can be applied to the MS through the AGRADE program include:

- BE 5998 – Engineering Honors Thesis (4 cr)
- BME 5010 – Quantitative Physiology (4 cr)
- Up to 8 credits of 5000-level or higher courses on an approved Concentration Plan

The Honors College accepts courses on an AGRADE plan of work as being completed with the Honors Option. Once the AGRADE Plan of Work is approved, a copy should be emailed to [honors@wayne.edu](mailto:honors@wayne.edu).

# General Education Requirements

The University has established General Education Requirements that must be met by all students who are working towards their first undergraduate degree at Wayne State. (Students who have been awarded a previous bachelor's degree from an accredited institution are exempt from the University General Education requirements, but must satisfy all other Department and College requirements.)

Other programs within the College of Engineering have stricter requirements for some of the General Education requirements than the BME Program. Therefore, students who opt to transfer out of BME into another Engineering program will need to review their academic record with their new advisor to determine whether all completed Gen Ed courses will still apply to their degree.

Two classifications of general education requirements have been established: competency requirements and group requirements.

## *Competency Requirements*

Students must satisfy 12 competency requirements before graduating. These can be satisfied through either satisfactory completion of a designated course (including through transfer credit) or examination. In some cases, the course used to satisfy a competency requirement is dictated by the required curriculum of the Biomedical Engineering Program.

**Written Communication:** The Written Communication Competency is satisfied in three stages, each of which must be completed for graduation.

Basic Composition (BC): Can be satisfied through one of the following means:

- Earning credit for basic composition through Advanced Placement or CLEP tests
- Completing (with a C or better) ENG 1020
- Transferring credit received for successful completion of a composition course taken at another college or university (with a grade of C or better)

Intermediate Composition (IC): Can be satisfied through the successful completion (C or better) of ENG 3050 or through transfer of an equivalent course in technical writing (with a grade of C or better). Students who transfer in a course in intermediate composition that is deemed to meet the IC requirement, but does not cover the topics of technical writing included in ENG 3050, are still required to successfully complete ENG 3050. Second degree students who do not have previous course-work in technical writing must also successfully complete ENG 3050. Students who wish to have coursework evaluated for equivalency to ENG 3050 must contact the Department of English.

**Oral Communication (OC):** For all Engineering students, the OC requirement must be met by successfully completing (with a grade of C- or better) ENG 3060. Second degree students must demonstrate completion of equivalent learning objectives or complete ENG 3060.

**Quantitative Experience ( QE)** The MC requirement is met at Wayne State by satisfactory completion of MAT 1050, placement into MAT 1800 or higher through the Math Placement Examination (see above), or transfer in of the equivalent of MAT 1800 or MAT 2010. All Engineering students satisfy this requirement through their required mathematics courses.

### ***Group Requirements***

All students must take a single course (minimum of 3 credits) in each of the six group areas. The selection of those courses is governed by the following principles:

1. Courses that satisfy the Group Requirements must be selected from lists of approved courses.
2. Students who place out of a course or courses that satisfy one or more of the Group Requirements will be considered to have fulfilled those portions of the group requirements represented by such courses.
3. Where designated, a Group Requirement may be satisfied by approved course sequences.

The College of Engineering specifies in some cases a reduced list of courses from which Group Requirement classes may be selected. Students in either the University or Engineering Honors program must include an Honors Seminar in their curriculum, which can be selected to satisfy one of these Group Requirements.

### **Natural Scientific Inquiry (NSI)**

: Students must elect one course each from the PS and LS course lists. A laboratory must be associated with at least one of these courses. For Engineering students, the following courses satisfy this requirement:

- **Physical Sciences (PS):** CHM 1125/1130
- **Life Sciences (LS):** BIO 1510

### **Civic Literacy Inquiry (CIV)**

BME students may elect any course from the CIV list

### **Cultural Inquiry (CI) :**

BME students may elect any course from the CI list.

### **Global Learning Inquiry (GL)**

BME students may elect any course from the GL list.

### **Social Inquiry (SI) :**

BME students may elect any course from the SI list. Students in the University Honors Program must take HON 1000 (The City).

## Concentration Electives

All BME students must complete 12 credits of Concentration Electives in order to satisfy the requirements for the BSBME degree. Specific sets of Concentration Electives have been approved for each of the undergraduate concentrations.

In order to guarantee that ABET requirements regarding minimum numbers of Engineering credits are met, at least 6 of 12 credits of Concentration Electives must be in an engineering course. Note that not all 5995 courses may count for Engineering Credit. Please discuss with the Undergraduate Chair if you are electing one of these courses.

Notable exceptions are these current and former BME courses that count as life science credits and not engineering credits:

BME 2050- Introduction to Anatomy and Physiology

BME 5070 – Engineering Anatomy

BME 4010 – Engineering Physiology Laboratory

Prior to registration for senior year courses, each student should file a Concentration Plan (available on the BME website) with the Undergraduate Program Chair.

NOTE: Students should pay attention to listed course prerequisites in developing their Concentration Plans.

### All Concentrations

BE 5998 – Honors Thesis (4 cr)

BME 5010 – Quantitative Physiology (4 cr)

BME 5020 – Computer and Mathematical  
Applications in Biomedical Engineering  
(4 cr)

BME 5070 – Engineering Anatomy (4 cr)

BME 5990 – Directed Study (1 cr.)

IE 4260 – Principles of Quality Control (3 cr)

IE 6240 – Quality Management Systems (3 cr)

IE 6405 – Integrated Product Develop (3 cr)

IE 6840 – Project Management (3 cr)

### Biomaterials

BME 5210 – Musculoskeletal Biomechanics  
(4 cr)

BME 5220 – Cell & Tissue Biomechanics (3 cr)

BME 5310 – Device and Drug Approval and the  
FDA (3 cr)

BME 5320 – Fundamentals in Implant Tech (3 cr)

BME 5350 – Regenerative Biology and Medicine  
for Biomedical Engineers (4 cr)

BME 5380 – Biocompatibility (4 cr)

CHE 5060 – Low-Cost Microfluidic and  
Millifluidic Systems: Design, Fabrication and  
Testing (3 cr)

CHE 5450 – Nanocarrier-based Drug Delivery  
Systems (3 cr)

CHM 5600 – Biochemistry (3 cr)

MSE 5350 – Polymer Science (3 cr)

MSE 5360 – Polymer Processing (3 cr)

MSE 5650 – Surface Science (3 cr)

## Biomechanics

BME 5130 – Vehicle Safety Engineering (4 cr)	ME 3400 – Dynamics (3 cr)
BME 5210 – Musculoskeletal Biomechics (4 cr)	ME 5040 – Finite Element Analysis I (4 cr)
BME 5220 – Cell & Tissue Biomechanics (3 cr)	ME 5400 – Dynamics II (4 cr)
BME 6130 – Accident Reconstruction (3 cr)	ME 5580 – Computer-Aided Mech Design (4 cr)
KIN 3580 – Biomechanics (3 cr)	ME 5720 – Mech of Composite Materials (4 cr)
KIN 6310 – Physiology of Exercise II (3 cr)	

## Biomedical Instrumentation

BME 6470 – Smart Sensor Tech I: Design (4 cr)	ECE 4330-Linear Systems and Signals (4cr)
BME 6480 – Biomedical Instrumentation (4 cr)	ECE 4570 – Fundamentals of Microelectronic Devices (4 cr)
CSC 3100 – Computer Architecture & Organization (4 cr)	ECE 5425 – Robotics Systems 1 (4 cr)
CSC 3110 – Algorithm Design & Analysis (3 cr)	ECE 5575 – Introduction to Micro and Nano Electro Mechanical Systems (3 cr)
CSC 3400 – Human-Computer Interaction (3 cr)	ECE 5690 – Introduction to Digital Image Processing (4 cr)
CSC 6860 – Digital Image Processing & Analysis (3 cr)	ECE 5770 – Digital Signal Processing (4 cr)
ECE 3330 – Circuits II (3 cr)	PHY 5340/5341 – Optics Lecture + Lab (5 cr)
ECE 3570 – Electronics (4 cr)	
ECE 4050 – Algorithms & Data Structures (3 cr)	



## Transferring Courses towards an Engineering Degree

Students who have been accepted to the College of Engineering after completing college-level coursework at another institution may apply for the courses to be transferred into the University and applied to the degree program. Requests for an evaluation of transfer credit must be made through the Transfer Credit Evaluation Office. Courses with known equivalencies (which are noted in the Transfer Equivalency Tables at [www.transfercredit.wayne.edu](http://www.transfercredit.wayne.edu)) will be assessed by the central University office

**NOTE: In order for transfer credit of any course to be applied towards an engineering degree at Wayne State, a grade of C or higher must have been earned. A grade of C- will not be accepted for transfer of these courses.**

Any request for reconsideration of the evaluation of transfer credits accepted by the College of Engineering should be made in writing within *one year of the date of the student's first enrollment in the College of Engineering*

**Once a student has matriculated at Wayne State, he or she must receive prior approval for all courses to be transferred in and applied towards a Wayne State degree.**

General guidelines for approval of such requests are:

- Students must be in good academic standing and have no more than three substandard grades on their WSU academic record
- **Students must not have made an attempt at the course at Wayne State. An attempt will include any transcript mark, including withdrawals, for a course.**

Students who receive permission to take a course at another institution must submit their transcript to the University. If a substandard grade is earned at the other institution, that will count towards the student's allowance of substandard grades.

## Registration and Withdrawal of Courses

Refer to the following website for instructions on Registration of Courses: <https://wayne.edu/students/how-to-register>

### Grade Point Average

The grade point average is calculated both on a semester basis and as a cumulative average. In order to calculate the grade point average, use the following formula:

The grade earned is converted to a numerical value using the following equivalencies:

A	4.0	2
		.
		3
		3
A-	3.67	2
		.
		0
B+	3.33	1
		.
		6
		7
B	3.0	1
		.
		3
		3
B-	2.67	1
		.
		0
		0
		.
		0

For BME students, the “Major gpa” includes all required math, science, core engineering, and BME courses along with concentration elective courses . Additional elective courses and liberal arts general education courses are not included in this calculation.

**ACADEMIC SUPPORT RESOURCES:  
ACADEMIC SUCCESS CENTER  
And  
TUTORING SERVICES IN THE COLLEGE OF ENGINEERING**

The courses in the Engineering curriculum are challenging, and it is important not to fall behind. The worst thing a student can do is to say, “I’ll catch up before the exam!” Topics covered in science, math, and engineering courses build on the material that has been covered before – both in the current class and in classes you have taken previously. If at any time you find yourself struggling with concepts or falling behind, it is important that you take advantage of the support services available on campus.

**Academic Success Center**

Visit [www.success.wayne.edu](http://www.success.wayne.edu) for information.

Tutoring – Free tutorial services are available on a walk-in basis for a wide variety of courses. These include courses in the required math, physics, and chemistry courses of the engineering curriculum as well as a number of Basic Engineering and departmental courses. The list of walk-in hours can be found on the Academic Success Center web site. Individual tutoring sessions can also be arranged.

Supplemental Instruction – SI is a peer-led, group study opportunity. The student leader has already taken the course, and is being paid to attend the course and meet with interested students to review the course materials and work on problem solving strategies. SI sections are free of charge and are typically arranged for 1000- and 2000-level courses that have proven to be challenging to students in the past. The list of SI sections, with times, for each semester is available on the Academic Success Center web site.

Workshops and Courses – The Academic Success Center offers free workshops to students, featuring topics such as time management, test taking strategies, and preparation for the required Critical Thinking Examination. In addition, free classes that focus on improved reading skills – including speed reading and reading of analytical textbooks – are available for Wayne State students.

**Tutoring in the College of Engineering**

As part of its mission of service, Tau Beta Pi – the engineering honors society – offers tutoring in engineering classes. Sessions are organized based on student requests. For more information, and to arrange to meet with a tutor, email Tau Beta Pi at [tbp@eng.wayne.edu](mailto:tbp@eng.wayne.edu). Further information can be found at this link: <https://engineering.wayne.edu/resources/students/academic-support>

**STEM Commons, Math, Chemistry, and Biology advising websites**

<http://www.clas.wayne.edu/stemcommons/>

<https://clas.wayne.edu/math/students/advising-undergrad>

<https://clas.wayne.edu/math/students/resources>

<https://success.wayne.edu/academic-success-center-tutoring-program---welcome->

<https://success.wayne.edu/>

[http://chem.wayne.edu/students/undergrad\\_advising.html](http://chem.wayne.edu/students/undergrad_advising.html)

[http://chem.wayne.edu/students/undergrad\\_clc.html](http://chem.wayne.edu/students/undergrad_clc.html)

<https://clas.wayne.edu/biology/students/advising>

# *Programs and Options to Consider As You Pursue Your Degree*

## **AGRADE Program**

The Accelerated Graduate Enrollment Program (AGRADE) allows top Wayne State students to complete a Master's degree in their chosen field of engineering with only 14 credits in addition to the undergraduate degree (depending on undergraduate and master's fields). This is accomplished by counting up to 16 credits from the BS program towards the MS degree. In addition to the time savings, students pay undergraduate tuition for these 16 credits of their Master's degree – which results in a substantial monetary savings.

In order to be eligible for the AGRADE program, students must satisfy the following criteria:

- Have completed approximately 90 credits of coursework towards the BS degree (be completing the junior year)
- Have earned at least a 3.3 College gpa in completed coursework
- Have earned at least a 3.45 gpa in courses offered by the department of specialization

Students interested in entering the AGRADE program should consult with their advisor during their junior year to discuss their eligibility. All students desiring to pursue the AGRADE option must submit and have approved an AGRADE plan of work, which outlines the required credits of the planned MS degree. This includes the credits that will be applied to the undergraduate degree and the remaining credits that will be completed AFTER completion of the bachelor's degree. The student then completes the work for the BS degree and applies to the graduate school following the standard schedule. Once admitted to the graduate school, a graduate transcript is constructed that includes the identified credits that were completed as an undergraduate.

<https://engineering.wayne.edu/academics/programs/undergrad-experience/agrade>

## Senior Rule

Students who complete their undergraduate degree at Wayne State are encouraged to remain at the University for a Graduate Degree. As an added bonus for students who are in the last semester of their undergraduate program, the University has developed a program called Senior Rule. In this program, graduate-level courses beyond the requirements for the bachelor's degree may be taken in the last undergraduate semester and then applied to a graduate degree program. All courses taken in the final semester will have upper division tuition rates applied, rather than graduate tuition rates.

Students interested in Senior Rule should meet with their academic advisor during the last semester of their junior year. *Interested students must have at least a 3.0 gpa in their upper division courses in order to be eligible for the program.* Students must register for at least one credit that is required for completion of the undergraduate degree, and only those courses taken in excess of the undergraduate degree requirements will be awarded graduate credit. Further information can be obtained at this link:

<https://engineering.wayne.edu/academics/programs/undergrad-experience/senior-rule>