



GALLOGLY COLLEGE OF ENGINEERING  
STEPHENSON SCHOOL  
OF BIOMEDICAL ENGINEERING  
*The UNIVERSITY of OKLAHOMA*

# UNDERGRADUATE ADVISING HANDBOOK

LAST UPDATED: APRIL 2024

The information and policies contained in this handbook supersede all prior versions of the handbook.

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## Mission Statement

The mission of the Stephenson School is to educate the next generation of biomedical engineers and to create new technologies that advance human health.

## Student Outcomes

Students are expected to acquire the following knowledge, skills, and behaviors as they progress through the SBME program and should be able to perform each of the following by the time of graduation:

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.

## Program Educational Outcomes

Program educational objectives for BME B.S. graduates to attain within a few years of graduation:

1. **Successful career advancement:** Graduates are advancing in their careers, either in technical roles in the healthcare/life sciences industry, or continuing their education in professional school (e.g., medicine, dentistry, law, business) or graduate school.
2. **Positive contributors to society:** Graduates are solving healthcare problems with the goal of benefiting the quality of life for people of varied communities, infusing creative, technically competent, evidence-based, and global perspectives.
3. **Interdisciplinary team contributors:** Graduates are communicating effectively, valuing the views and contributions of interdisciplinary team members, and contributing to team success.

## General Advising Plan

### Freshman Advising

Freshmen (as defined by the program, not necessarily credit hours) are advised once per semester (i.e., fall and spring) by University College or the OU Scholars office. Any freshman that wishes to be advised by an SBME Faculty Advisor may contact the SBME Undergraduate Student Programs Coordinator to seek an available appointment with an SBME Faculty Advisor.

The SBME Chair of Undergraduate Studies will meet with the advisors of University College and the Honors College twice per year to brief them on changes and answer any questions.

### Overall Advising Plan for SBME Sophomores, Juniors, & Seniors

Students are advised once per semester (i.e., fall & spring) during academic & career advising sessions. The overall advising process specific to SBME sophomores, juniors, and seniors is done in two sequential steps:

1. Academic advising at Williams Student Services Center (WSSC)
2. Career advising by an SBME Faculty Advisor

Academic advising takes place before the career advising sessions. After meeting with the academic advisor, the student attends career advising with an SBME faculty advisor. The enrollment hold is released only after the student completes both academic advising and career advising.

### Academic Advising at WSSC

SBME students who have been admitted to the Gallogly College of Engineering are assigned a WSSC academic advisor. SBME students must meet with a WSSC academic advisor every semester, prior to enrollment for the subsequent semester. WSSC advisors communicate information about scheduling academic advising sessions to students via email each semester. Academic advising sessions are typically completed at WSSC, and sessions focus on course plans, curriculum, and student progress towards educational goals.

After meeting with an academic advisor, the student must still attend career advising with an SBME faculty advisor before their enrollment hold will be released.

### Career Advising with SBME Faculty

Sophomores, juniors, and seniors who have been admitted to the major are assigned to one SBME Faculty Advisor who provides career advising until graduation\*. Faculty advisor assignment is random, and by the need to balance the number of advisees per faculty member.

Although sophomores are assigned a faculty advisor, sophomores receive career advising through group advising sessions in the fall semester. Topics discussed at the group career advising sessions include discussion of common BME career paths, skills desired by future employers, and timeline for gaining skills. Attendance is taken at the group career advising session and a list of student attendees is provided to the SBME Undergraduate Programs Coordinator and SBME academic advisors at WSSC to ensure that enrollment holds are subsequently lifted. In addition to completing the required group career advising session, sophomores are encouraged to meet with their faculty advisor in a one-on-one setting to start building community in the fall semester. Sophomores are required to meet with their assigned faculty advisor for career advising in the spring semester.

Juniors and seniors are required to meet one-on-one with their faculty advisor each semester. The primary role of the faculty advisor is to discuss overall career directions, research opportunities, summer plans (e.g., REUs,

internships, study abroad), leadership opportunities, pre-med strategies (e.g., shadowing physicians), and other professional development topics. Course plans and curriculum are only a small focus of the career advising meeting, with conversations typically focused on selecting electives to support the student's career goals.

Students unsure of their assigned SBME faculty advisor, may contact the SBME Undergraduate Student Programs Coordinator. If the student wishes to change their faculty advisor, they may contact the SBME Undergraduate Student Programs Coordinator, who will coordinate with the SBME Undergraduate Studies Committee to review the request. As noted above, only students who have attended both academic advising and career advising are able to enroll in classes.

*\*Some professors may designate other faculty colleagues to see their advisees should they be out of town, or otherwise unavailable during an advising period (sabbatical, leave, etc.).*

### Scheduling Appointments with Faculty Advisors & Using iAdvise

Faculty must complete the FERPA training (OnPoint.ou.edu), before participating in advising. Faculty who experience issues while using iAdvise, please contact the SBME Undergraduate Student Programs Coordinator.

Faculty advisors will schedule blocks of time during the advising period (beginning ~2 to 3 weeks before enrollment opens) for students to sign-up for appointments. Faculty advisors will offer select windows on different days at different times of the day to accommodate students with varying course and work schedules to attend faculty advising. Note: students cannot make same day appointments. If it is after 3:00 pm, they are only able to make it for the day after the following day. The SBME Undergraduate Student Programs Coordinator will send out reminder e-mails as necessary during the sign-up period.

Academic advisors and faculty are required to document every official advising session in iAdvise by logging the appointment and creating notes within the appointment. Faculty advising notes are accessible to WSSC academic advisors. These notes may include overall discussions with students about academic interests, internships, etc. The notes further serve as secondary documentation that academic and career advising sessions took place.

### Removal of Enrollment Holds

The Undergraduate Student Programs Coordinator will routinely audit iAdvise to verify that students attended advising appointments. Students that have attended iAdvise appointments will be noted and the Undergraduate Student Programs Coordinator will e-mail batches of the OU IDs of the students to the SBME academic advisors (Ann Gettys & Craig Swan). The SBME academic advisors will remove holds for the students, and the students will be able to register for classes once their registry window is open. The Undergraduate Student Programs Coordinator will follow-up via e-mail with any students (cc: their Faculty Advisor) who were logged as having missed advising.

## Williams Student Services Center (WSSC)

Academic advising is typically completed at WSSC. WSSC can answer student questions about degree requirements, prerequisites, and enrollment. WSSC provides many services to engineering undergraduates including: assisting with transfer credit evaluation, choosing a major, graduation verification, as well as information about University policies and procedures, academic support services such as tutoring and mentoring, and student organizations and leadership.

### Williams Student Services Center Contact:

865 Asp Ave, Felgar Hall 112

Norman, OK 73019-1052

Website: <https://www.ou.edu/coe/academics/advising>

Phone: (405) 325-4096

Toll Free: (800) 522-0772

Extension: 4096

### SBME Academic Advisors:

Ann Gettys

E-mail: [ann.gettys@ou.edu](mailto:ann.gettys@ou.edu)

Phone: (405) 325-4096

(last names A-H)

Craig Swan

E-mail: [cswan@ou.edu](mailto:cswan@ou.edu)

Phone: (405) 325-4096

(last names I-Z)

## SBME Faculty Advisors

### Faculty Advisors Contact Information

Faculty Advisor	Office Location	E-mail	Office Phone
Handan Acar, PhD	GLG 319	<a href="mailto:hacar@ou.edu">hacar@ou.edu</a>	(405) 325-2186
Sarah Breen, PhD	GLG 321	<a href="mailto:sabreen@ou.edu">sabreen@ou.edu</a>	(405) 325-1543
Wei Chen, PhD	GLG 309	<a href="mailto:wei-r-chen@ou.edu">wei-r-chen@ou.edu</a>	(405) 325-1166
John Clegg, PhD	SRTC 2069	<a href="mailto:clegg@ou.edu">clegg@ou.edu</a>	(405) 325-5318
Michael Detamore, PhD	GLG 101	<a href="mailto:detamore@ou.edu">detamore@ou.edu</a>	(405) 325-2144 (405) 325-0392
Lei Ding, PhD	2PP 280 / GLG 308	<a href="mailto:leiding@ou.edu">leiding@ou.edu</a>	(405) 325-4577
Alex Frickenstein, PhD	GLG 420	<a href="mailto:africk256@ou.edu">africk256@ou.edu</a>	(405) 325-1881
Rebecca Scott, PhD	GLG 320	<a href="mailto:rebecca.scott@ou.edu">rebecca.scott@ou.edu</a>	(405) 325-3861
Qinggong Tang, PhD	GLG 407	<a href="mailto:qtang@ou.edu">qtang@ou.edu</a>	(405) 325-6246
Stefan Wilhelm, PhD	GLG 318	<a href="mailto:stefan.wilhelm@ou.edu">stefan.wilhelm@ou.edu</a>	(405) 325-4982
Han Yuan, PhD	2PP 125 / GLG 308	<a href="mailto:hanyuan@ou.edu">hanyuan@ou.edu</a>	(405) 325-4665
Farnaz Zamani Esfahlani, PhD	GLG 307	<a href="mailto:fzamani@ou.edu">fzamani@ou.edu</a>	(405) 325-6246

Each Student is assigned to a faculty member, who will remain their "SBME Faculty Advisor" during their academic career.

**Undergraduate Student Programs Coordinator:** Hailey Spencer, BS, [hailey.spencer@ou.edu](mailto:hailey.spencer@ou.edu), (405) 325-5453

**SBME Office:** Gallogly Hall, Suite 101

# General Curriculum

## Degree Requirement Checksheet

The checksheet corresponding to the student's 1<sup>st</sup> year at OU is the governing document for degree requirements. Checksheets for the Gallogly College of Engineering, including past versions can be found here: <http://www.ou.edu/checksheets/engineering>. Students are required to fulfill the requirements for the year they entered. The most recent checksheet for Biomedical Engineering can be found in [Appendix A](#).

The flowchart is an additional document of value. Flowcharts for the Gallogly College of Engineering, including past versions can be found here: [https://www.ou.edu/coe/sbme/about\\_sbme/flowcharts](https://www.ou.edu/coe/sbme/about_sbme/flowcharts). The most recent flowchart for Biomedical Engineering can be found in [Appendix B](#).

## Overrides for Course Enrollment

Some graduate or 5000 level courses require instructor or sometimes departmental permissions prior to enrollment. If a student wishes to enroll in a graduate level/5000+ elective offered through the College of Engineering, e-mail the instructor of the course, cc your academic advisor (Craig Swan or Ann Gettys), and request permission to enroll in the course. Your WSSC advisor will be able to provide the override. To enroll in graduate level/5000+ in a science or other course outside the college of engineering (MATH, CHEM, PHYS, BIO, etc.), instructor permission is required, and the advisor for that department will have to provide the override. The instructor of the course or your WSSC advisor will be able to assist you in determining who that person is.

## SBME Pre-Approved Electives

In general, electives need to be at a 3000-level or above. The sections below serve as a source of pre-approved course options; however, approval from an SBME faculty advisor is recommended when selecting 'Math, Science, & Engineering' electives. Other courses not on this list may be approved with permission by the SBME faculty via the Undergraduate Studies Committee.

Not all classes are offered frequently. **Students are responsible for ensuring that courses will be offered in the semester they intend to take it, and that all prerequisites or other permissions are acquired before enrolling in electives.** Courses less than 3 credit hours will have to be supplemented with another course to account for the credit hour discrepancy.

Student should refer to their degree plans to determine the number of credit hours required for BME electives. For student on the 2019-degree plan or earlier, a total of at least 6 credit hours are required for BME electives. For students on the 2020-degree plan or later, a total of at least 12 credit hours are required for BME electives. For all students, a total of at least 6 credit hours are required for 'Science, Math, & Engineering' electives. BME elective course credits in excess of the required number of credit hours can be counted toward 'Science, Math, & Engineering' elective credit hours.

### Courses not approved as electives:

- Anything below 3000 level
- Courses cannot be double counted for the 'Upper-Level Biology Elective' and a 'Science, Math, & Engineering' Elective
- Courses cannot be double counted for 'Science, Math, & Engineering' and 'BME' electives
- Any other courses already fulfilling another graduation requirement (e.g., ENGR 3511 Transfer Engineering Experience)



List of Approved Courses for 'BME' Electives

Course Code	Course Title	Offered		Undergrad Credit only	Undergrad / Grad Credit	Grad Credit only	NOTES
BME 3111	Bioimaging Lab	Spring	Annual	✓			# ^
BME 3121	Biotransport Lab	Spring	Annual	✓			# ^
BME 3131	Bioelectricity Lab	Fall	Annual	✓			# ^
BME 3141	Biomechanics Lab	Fall	Annual	✓			# ^
BME 3151	Molecular, Cellular, and Tissue Engineering Lab	Fall	Annual	✓			# ^
BME 3161	Biomedical Micro- and Nanotechnology Lab	Spring	Annual	✓			# ^
BME 3113	Bioimaging	Spring	Annual	✓			
BME 3133	Bioelectricity	Fall	Annual	✓			
BME 3153	Molecular, Cellular, and Tissue Engineering	Fall	Annual	✓			
BME 3163	Biomedical Micro- and Nanotechnology	Spring	Annual	✓			
BME 3243	Biomechanics of Human Movement	Spring	Annual	✓			
BME 3440 / 3980	Mentored Research	All	Annual	✓			See Research for Credit Policy
BME 4050	Design Projects in BME	All	Annual	✓			See Research for Credit Policy
BME 4281	Engineering Co-Op Program	All	Annual	✓			See Internships & Co-Ops Policy
BME 4013 / 5013	Introduction to Medical Device Design	Spring	Bi-Annual		✓		*
BME 4533 / 5533	Neural Engineering	Fall	Annual		✓		*
BME 4873 / 5873	Network Modeling & Analysis of Complex Systems	Spring	Bi-Annual		✓		*
BME 4970 / 5970	Special Topics in Biomedical Engineering	Fall / Spring	Annual		✓		*
BME 5123	Biophotonics Imaging & Microscopy	Fall	Bi-Annual		✓		
BME 5133	Therapeutic Biophotonics	Spring	Bi-Annual		✓		
BME 5143	Biosensors: Fundamentals & Application	Spring	Bi-Annual		✓		
BME 5283	Immunoengineering	Fall	Annual		✓		
BME 5413	Nanomedicine	Fall	Annual		✓		
BME 5443	Neural System & Rehabilitation Engineering	Spring	Irregular		✓		
AME / BME 4213 / 5213	Biomechanics I	Spring	Bi-Annual		✓		*
AME / BME 4970 / 5970	Ear Mechanics	Fall	Bi-Annual		✓		*
CHE / BME 5243	Biochemical Engineering	Spring	Bi-Annual		✓		
CHE / BME 5293	Transport in Biological Systems	Fall	Irregular		✓		
CHE / BME 5373	Tissue Engineering	Fall	Irregular		✓		
CHE 5453	Polymer Science & Engineering	Spring	Annual		✓		
CHE / BME 5970	Genetic Eng & Biotechnology	Fall	Bi-Annual		✓		
ECE 4823	Engineering Principles of the Human Body	Spring	Bi-Annual		✓		
ECE / BME 5843	Medical Imaging Systems	Fall	Annual		✓		
ECE / BME 5853	Biomedical Signals & Systems	Spring	Irregular		✓		
BME 5971	Biomedical Engineering Seminar	Fall / Spring	Annual			✓	
BME 5990	Independent Study	All	Annual			✓	&
ECE 6813	Advanced Topics in Biomedical Engineering	Spring	Bi-Annual			✓	

ECE 5973	Special Topics in Electrical & Computer Engineering	Fall/ Spring	Annual			✓	&
ECE/BME 6213	Optical Information Processing	Spring	Irregular			✓	&

# Last Offering was in 2021/2022 Academic Year

^ Needs to be combined with other 1 credit courses to make 3 credits

\* Undergrad Credit = 4000 level | Grad credit = 5000 level

& Can be approved for undergrad credit in special cases with petition

## List of Approved Courses for 'Upper Division Biology' Electives

- BIOL 3113 - Cell Biology
  - Prerequisite: 1114, or 1124, or Biology 1134, or Botany 1114, and Chemistry 3053.
- BIOL 3333 - Genetics
  - Prerequisite: ZOO/BIOL 1124, or ZOO/BIOL 1114 and ZOO/BIOL 1121; Biology 1134 recommended
- BIOL 3833 - Introduction to Neurobiology
  - Prerequisite: BIOL 1124
- BIOL 4843 - Intro to Molecular Biology
  - Prerequisite: 1114 or 1124, or Botany/PBIO 1114, or Microbiology 3813 and 3812, and one course in organic chemistry
- CHEM 3053 - Organic Chemistry I: Biological Emphasis
  - **\*\*Only applies to students on the 2021-degree plan or later**
  - Prerequisite: CHEM 1415 or CHEM 1425 or CHEM 1435.
- CHEM 3653 - Introduction to Biochemistry
  - Prerequisite: CHEM 3013, CHEM 3053, or CHEM 3064.
- MBIO 3813: Fundamentals of Microbiology
  - Prerequisite: BIOL 1005 or BIOL 1114 or BIOL 1124 or BIOL 1134 or PBIO 1114; and CHEM 1315 and CHEM 1415, or CHEM 1335 and CHEM 1435
- MBIO 4833 – Basic Immunology
  - Prerequisite: one semester of organic chemistry, and an introductory biology course, plus one of the following: 3813 and 3812, Zoology 2124, 3113, 3204, 3333.

## List of Approved Courses for 'Science, Math, and Engineering' Electives

### **Anthropology**

§ANTH 5273 Bioethics, Biotechnology, Biomedicine

ANTH 4823 Medical Anthropology

### **Biology**

BIOL 3103 Principles of Physiology

\*BIOL 3113 Cell Biology

#BIOL 3201 Animal Development Lab

BIOL 3203 Animal Development

\*BIOL 3333 Genetics

\*BIOL 3833 Intro to Neurobiology

BIOL 4233 Neurobiology of Disease

BIOL 4244 Animal Histology

\*BIOL 4843 Intro to Molecular Biology

BIOL 4853 Neurobiology of Memory

BIOL 4893 Behavioral Neurobiology

BIOL 4913 Quantitative Biology

BIOL 5153 Endocrine Physiology

BIOL 5293 Cytology Ultrastructure

BIOL 5343 Developmental Genetics

BIOL 5364 Transmission Electron Microscopy

BIOL 5374 Scanning Electron Microscopy

BIOL 5843 Molecular Biology

§BIOL 5923 Programming in R for Biology

MBIO 3673 Practical Bioinformatics

#MBIO 3812 Fund. Microbiology Lab

\*MBIO 3813 Fundamentals of Microbiology

\*MBIO 4833 Basic Immunology

### **Chemical, Biological, & Materials Engineering**

CHE 3313 Structure & Properties of Materials

CHE 5463 Polymer Processing

### **Chemistry**

\*&CHEM 3053 Organic Chemistry I: Biological

CHEM 3153 Organic Chemistry II: Biological

CHEM 3423 Physical Chemistry

CHEM 3523 Physical Chemistry II

\*CHEM 3653 Biochemistry

CHEM 3753 Intro to Biochemical Methods

CHEM 4023 Instrumental Methods in Chemical  
Analysis

CHEM 4333 Advanced Inorganic Chemistry

CHEM 5453 Polymer Science

CHEM 5753 Principles of Biochem I

CHEM 5853 Principles of Biochem II

CHEM 6813 Intro to Biochemical Methods

CHEM 6823 Protein, Nucleic Acids, & Gene  
Expression

CHEM 6833 Structure & Function of Membranes  
& Hormones

CHEM 6843 Enzyme Mechanisms & Metabolic  
Regulation

CHEM 6853 Protein Structure & Function

### **Computer Science**

CS 4013 Artificial Intelligence

CS 4033 Machine Learning

CS 4063 Human Computer Interaction

CS 4433 Computational Methods in Discrete Optimization

CS 5043 Advanced Machine Learning

CS 5073 Artificial Neural Networks Evolution

CS 5593 Data Mining

CS 5703 Machine Learning Practice

### **Data Science & Analytics**

DSA 3013 Machine Learning for Data Science

DSA 3023 Big Data Engineering

^DSA 5013 Fundamentals of Engineering Statistical Analysis

^DSA 5103 Intelligent Data Analytics

DSA 5011 Introduction to R

DSA 5203 Time Series Analysis

^DSA 5503 Healthcare Analytics

DSA 5403 Bayesian Statistic

### **Engineering**

#ENGR 3401 Engineering Economics

#ENGR 3431 Electromechanical Systems

#ENGR 3441 Fluid Mechanics

ENGR 4003 Engineering Practice

ENGR 4013 Leadership & Management for Engineers

ENGR 4023 Disruptive & Innovative Technology Ideation

§ENGR G4510 Global Environmental Health

### **Electrical and Computer Engineering**

ECE 3323 Intro-Solid State Elec Devices

ECE 3813 Introductory Electronics

ECE 4813 Electronics

ECE 5213 Digital Signal Processing

ECE 5273 Digital Image Processing

ECE 5523 Random Signals

ECE 5363 Optical Engineering

### **Health & Exercise Science**

HES 3513 Health Promotion Planning

HES 3583 Sociocultural Aspects of Health

HES 3843 Biomechanics

HES 4543 Comprehensive Stress Management

HES 4553 Measurement and Evaluation in Health  
Promotion

HES 4573 Chronic Disease Intervention

^HES 5823 Exercise Physiology

**Industrial Systems Engineering**

ISE 4223 Fundamentals of Engineering Economics

ISE 4553 Data Driven Decision Making I

ISE 4804 Ergonomics in Systems Design

^ISE 5013 Fundamentals of Engineering  
Statistical Analysis

ISE 5033 Systems Engineering

^ISE 5103 Intelligent Data Analytics

ISE 4553 Data Driven Decision Making

ISE 5373 Additive Manufacturing

^ISE 5503 Healthcare Analytics

^ISE 5823 Exercise Physiology

**Math**

MATH 3333 Linear Algebra

MATH 3423 Physical Math II

MATH 4163 Intro Partial Diff. Equations

MATH 4373/5373 Abstract Linear Algebra

MATH 4383/5383 Modern Algebra

**Meteorology**

METR 4990-024 Foundations of Academic Research  
Creative Activity

**Physics**

PHYS 3043 Physical Mechanics

PHYS 3233-001 Modern Physics for Engineers

**Psychology**

PSY 3203 Cognitive Psychology

PSY 3803 Physiological Psychology

**Notes:**

\* *If not taken as Upper-Level Biology Requirement*

# *Needs to be combined with other 1 credit courses to  
make 3 credits.*

& *Only applies to students on the 2021-degree plan or later.*

^ *No student may earn credit for both sections of cross-  
listed courses.*

§ *These courses are offered on an irregular basis.*

## Potential Minor Degrees

Talk to your advisor about potential minors. Many intro classes and/or classes used for [Science, Math, & Engineering electives](#) can be used toward a minor degree. Some minors that complement the BME degree are:

- Physics
- Mathematics
- Computer Science
- Biology
- Chemistry
- Health and Exercise Science
- General Business for Non-Business Majors
- Entrepreneurship for Non-Business Majors
- Water and Sanitation for Health and Sustainable Development

There is a list of many more minors available online: <http://www.ou.edu/checksheets/minors>

## Career Advising and Professional Development Topics

### Research

Research is a balance between collaborative and individual work. Being involved to this experience as early as possible gives undergraduate students a perspective of collaborative work. They can understand the way of scientific development and appreciate the published research. Also, by demonstrating their individual contribution to the collaborative work in a lab, they can apply variety of awards and fellowships. Students can have an opportunity to understand their own interest to graduate school, any particular field of science, and collaborative work. If the student finds interest in research, then this experience can be beneficial for obtaining research related recommendation letters from the principal investigators that they worked with. Moreover, based on their contribution, undergraduate students' names can be added to the scientific papers, which is an important contribution for landing a high-level graduate college and application for awards and fellowships.

Undergraduate students can work in the lab by helping a graduate student in the beginning. It is important to watch and understand the procedure for at least a couple of months. Students can help the procedure by doing simple lab works under a graduate supervisor. Students, who prefer to work in the same lab more than a semester, can start to be independent in the lab work and produce their results. Under these circumstances, these students can be encouraged to present their results as a poster or a presentation in the OU campus, undergraduate related research seminars. If the student is at senior level and has produced results as an undergraduate researcher in the same lab in more than two semesters, then those students should be encouraged to attend BMES undergrad symposium and present their results as a poster. Such attempt can increase the graduating successful graduate students from SBME.

Moreover, the students in the senior level and working in a research lab can be encouraged to apply graduate school fellowships from NSF and NIH.

Current research opportunities for undergraduates are listed on the SBME website:

<https://www.ou.edu/coe/sbme/undergraduate/research>

Research for Credit: BME 3440/3980/4050 Research Credit Policy

Mentored research credit (BME 3440 or BME 3980, honors) or Design Projects in BME (BME 4050) may count for a maximum 3 hours of BME elective OR a maximum of 3 hours Science, Math, Engineering elective credit for a maximum total of 3 hours of research/project credit counting toward the degree.

To count as a BME elective, mentored research must be completed under the mentorship of either an SBME faculty member, IBEST faculty member, or BME RM3+ graduate faculty member. BME 4050 projects are counted only as a BME elective.

Mentored research in other departments may be applied toward a Science, Math, Engineering Elective with advisor approval. For research credit outside of SBME/IBEST/BME RM3+ status, in the areas of science, engineering, or math, enrollment in a designated 'SME' section of BME 3440/3980 will be required. Students with external research advisors will provide written feedback as a 1-page summary to the BME 3440/3980 section advisor for official grade entry. Grading will be on an A/B/C/D/F scale as opposed to Pass/Fail.

An SBME faculty member shall be the instructor of record for students enrolling in BME 3440/3980 to perform research for a primary advisor in another department. In those cases, in addition to the 1-page summary, a written statement (e.g., email) from the primary advisor to the SBME faculty instructor to assess the student's performance will be required.

The responsibility for identifying and documenting the primary advisor of each student enrolled in BME 3440/3980/4050 and accurate recording of BME vs. SME credit will reside with the Undergraduate Studies Chair

with the assistance of the Student Program Coordinator and will be documented in Degree Navigator.

## Senior Thesis

### *Overview*

The Senior Thesis is an option for seniors who are especially interested in research and/or intending to continue to a PhD program. Students from this program will be selected and invited by their faculty advisor. These selected students will continue on an established research project and complete a written thesis at the end of the academic year. The thesis will be defended orally in front of a committee of 2-3 faculty, and revisions will be incorporated into the final written thesis, which will go on file with the department.

### *Benefits to the Student*

- 1) For students interested in pursuing a PhD, the experience of writing and defending a thesis will be outstanding preparation for the PhD dissertation.
- 2) Excellent for the resume, and for personal statements and essays for fellowship and graduate school applications.
- 3) Closer connection with primary mentor and committee, which may lead to greater professional development and stronger recommendation letters.
- 4) Go more in depth into a problem, with greater opportunity to make an impact, and possibly produce a manuscript for publication in a peer-reviewed journal.
- 5) Opportunity to meet as a group with SBME faculty to discuss topics related to graduate schools (e.g., applying for NSF Fellowships, what to look for during graduate school visits, choosing between offers, etc.)

### *Logistics*

#### Selection/Invitation Process:

- SBME will provide faculty with a list of rising seniors and their GPAs.
- Based on GPA, past research performance, and relevance to career goals, faculty shall invite prospective students no later than **September 1**.
- Students may request an invitation. However, faculty are encouraged to limit the number of senior theses in their group, so invitations will be highly selective.

#### Committee

- 2 faculty minimum, 3 preferred. Established no later than **October 1**.
- One faculty member serves as the Faculty Advisor for the Senior Thesis program. The Faculty Advisor serves as the contact point for Senior Thesis students and their advisors and other committee members if any questions or issues arise.



Course credit: Students enroll in BME 3440/3980 for both semesters.

- Students must complete at least 6 hours of research credit (BME 3440/3980) in total (including Freshman – Junior years) by the end of their undergraduate career to satisfy the Senior Thesis requirement.
- As long as these 6 total hours are achieved, students may elect to take only 1 hour of BME 3440/3980 in one or both semesters in the Senior year (e.g., to stay under 18 hours).
- The Fall semester grade will include the Semester Report (see below), and the Spring semester grade will include the Final written thesis.

#### Requirements/Expectations of Students

- Full academic year commitment, with a time commitment of ~10-15+ hours/week.
- Work must be novel and independent (as opposed to “service work”, e.g., to make materials or collect data on a given piece of equipment for a grad student’s project). The committee is responsible for ensuring these criteria are met.
- Semester report (5 pages maximum) due to committee in early December (before dead week) as a “check point.” Satisfactory progress is required to continue to the following Spring (determined by committee). For students with unsatisfactory progress or who elect to opt out, the exit is to discontinue the Senior Thesis in the Spring semester.
- Written thesis submitted to the committee in April no later than 3 weeks before dead week ends. Target = 20-30 pages, limit = 60 pages, double spaced (Tables, Figures, References excluded). Content may include work prior to the senior year. Format comparable to a Master’s thesis.
- Oral defense (public) defended before dead week (written thesis must be submitted at least 1 week prior to oral defense). Any revisions to the written thesis must then be submitted in final form by the end of dead week. This final thesis will form the basis for the grade for the course in the Spring semester (grade assigned by primary advisor, with input from committee).
- Expected, but not required, to attend the SBME department seminars (course schedule permitting). Will sign attendance log along with the grad students to document attendance.
- Expected to attend a lecture/discussion on thesis writing.

*Honors:* Honors students will need to enroll in 3 hours of BME 3980 for their Honors research requirement, before they can enroll they must return an Honors research form, which can be found at the following website: [http://ou.edu/content/dam/honors/docs/Honors%20Research%20w\\_Instructions.pdf](http://ou.edu/content/dam/honors/docs/Honors%20Research%20w_Instructions.pdf)

Honors students must provide the Honors College with a copy of their final thesis paper.

#### Internships and Co-Ops

SBME has developed a Co-Op course which can count for credit toward the BS degree. A Co-op (cooperative education) experience is an excellent way to obtain industrial experience and perspective while progressing in the BME degree. The typical co-op program will have you working for a company full-time during three semesters while you are away from campus, but still a student in SBME. During the co-op, you are paid for your work. This typically extends your time for the bachelor’s by a year; however, it provides an opportunity to grow professionally. Co-ops are a great way to gain work

experience before you graduate, get your foot in the door in industry, and help you stand out while looking for a job after graduation.

BME students can receive 'BME 4281: Engineering Co-Op Program' course credit for Co-Op/Internship experiences. Participation in the Co-Op Program is optional and open to students enrolled full-time in BME who have completed all the requirements of the first and second year of their degree program with a minimum 2.50 GPA. The student must make the request for BME 4281 course credit *before beginning* the experience.

The Co-Op experience can be considered as either a 'Science, Math, Engineering' elective, or BME elective depending on the nature of the work. In coherence with other GCoE Co-Op programs, BME 4281 counts for a total of 3 credit hours, when taken for 3 semesters (Spring, Summer, Fall).

As part of their application for course credit, students must submit an endorsement letter from the Co-Op supervisor outlining the Co-Op duties, and commit to submit two written status reports and make an oral presentation at OU in the semester following the Co-Op. The SBME faculty members, via the SBME Undergraduate Studies Committee, will review technical details of the request for course credit and approve the course credit if the Co-Op experience meets the technical plan and documentation requirements agreed to in the petition.

### Preparation for Medical School

Pre-Medical students should contact the OU Pre-Med office for pre-med advising. Pre-Med Office: 415 Cate Center #1, (405) 325-2457.

In addition to pre-med courses in the SBME program, students will need:

- CHEM 3053 – Organic Chemistry I
- CHEM 3153 – Organic Chemistry II
- PHYS 1311 and 1321 – Physics Lab
- PSY 1113 – Elements of Psychology
- SOC 1113 – Introduction to Sociology
- CHEM 3653 – Introduction to Biochemistry
- BIOL 3113 - Cell Biology or BIOL 4843 – Intro to Molecular Biology
- BIOL 3333 - Genetics
- BIOL 3103 – Principles of Physiology (recommended)

CHEM 3053, BIOL 3113, BIOL 4843, and BIOL 3333 can satisfy the 'Science, Math, Engineering' Elective credits required in the BME degree, as long as they are not already being used to satisfy the 'Upper-Level Biology' Elective. CHEM 3153 and BIOL 3103 can be used to satisfy the 'Science, Math, Engineering' Elective credits required in the BME degree. PSY 1113 or SOC 1113 can satisfy the 'Social Science' credits required in the BME degree.

Students should plan to take the MCAT in April of their Junior Year.

### Study Abroad

Please see current information at: <https://www.ou.edu/coe/explore/student-life/study-abroad>

## Other Student Resources

### Scholarships

CASH – the Centralized Academic Scholarship Hub – is where current OU students can apply for all merit and financial need-based OU scholarships from October 1 to February 1 each year.

College-wide scholarships, departmental scholarships, financial aid scholarships, study abroad scholarships, Sooner Parents scholarships, and campus awards are all housed in CASH. Undergraduate, graduate, liberal studies, international, and study abroad populations are encouraged to access the system to apply for scholarships.

To apply for scholarships through CASH, visit the [Scholarships homepage](#).

### University Counseling Center

Students are eligible for affordable counseling services at Goddard Health. For counseling related to mental health, please visit: <http://www.ou.edu/ucc>

OU Advocates - Dial 911 (on campus) or (405) 615-0013 (off campus or by cell) and ask for OU Advocates regarding sexual assault issues.

### Academic Life Coaching

The Academic Life Coaching program at The University of Oklahoma is an innovative mentoring approach designed to provide individualized student support.

The program provides a specially trained coaching mentor who meets regularly with their students throughout the semester. In those sessions, the student and the Academic Life Coach work together to identify stressors and establish goals that lead to academic success and degree completion.

To learn more about the Academic Life Coaching program and/or to request a coach, please visit: <https://www.ou.edu/alc>.

# Appendices

## Appendix A: 2023-2024 Degree Requirement [Checksheet](#)

### REQUIREMENTS FOR THE BACHELOR OF SCIENCE GALLOGLY COLLEGE OF ENGINEERING THE UNIVERSITY OF OKLAHOMA

Academic Year	General Requirements	Program
For Students Entering the Oklahoma State System for Higher Education <b>Summer 2023 through Spring 2024</b>	Minimum Total Credit Hours ..... 130 <b>Minimum Retention/Graduation Grade Point Averages:</b> Overall - Combined and OU ..... 2.00 Major - Combined and OU ..... 2.00 Curriculum - Combined and OU ..... 2.00	<b>Biomedical Engineering</b>  <b>B108</b>  Bachelor of Science

OU encourages students to complete at least 33 hours of applicable coursework each year to have the opportunity to graduate in 4 years.

#### GENERAL EDUCATION AND COLLEGE REQUIREMENTS

Courses designated as Core I, II, III, IV, or V are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list, including at least one upper-division Gen. Ed. course outside of the student's major. **Courses graded P/NP will not apply.**

**A grade of C or better is required in each course in the curriculum, including all prerequisite courses.**

Code	Title	Credit Hours
<b>Core Area I: Symbolic and Oral Communication</b>		
<i>English Composition</i>		
ENGL 1113	Principles of English Composition	3
ENGL 1213 or EXPO 1213	Principles of English Composition Expository Writing	3
<i>Language (0-10 hours in the same language)</i>		
This requirement can be met by two years of the same language in high school:		0-10
Beginning Course (0-5 hours)		
Beginning Course, continued (0-5 hours)		
<i>Mathematics</i>		
MATH 1914	Differential and Integral Calculus I (Core I) <sup>1,2</sup>	4
<b>Core Area II: Natural Science (including one laboratory)</b>		
PHYS 2514	General Physics for Engineering and Science Majors (Core II) <sup>2</sup>	4
CHEM 1315 or CHEM 1335	General Chemistry (Core II-Lab) <sup>2</sup> General Chemistry I: Signature Course	5
<b>Core Area III: Social Science</b>		
P SC 1113	American Federal Government	3
Choose one course <sup>3</sup>		
<b>Core Area IV: Arts &amp; Humanities</b>		
<i>Artistic Forms</i>		
Choose one course <sup>3</sup>		
<i>Western Culture</i>		
HIST 1483 or HIST 1493	United States to 1865 United States, 1865 to the Present	3
Choose one course (excluding HIST 1483 and HIST 1493) <sup>3</sup>		
<i>World Culture</i>		
Choose one course <sup>3</sup>		
<b>Core Area V: First-Year Experience</b>		
Choose one course <sup>3</sup>		
<b>Total Credit Hours</b>		<b>40-50</b>

<sup>1</sup>MATH 1914, MATH 2924, and MATH 2934 can be substituted with MATH 1823, MATH 2423, MATH 2433, and MATH 2443.

<sup>2</sup>Major support requirements that also satisfy University General Education requirements.

<sup>3</sup>To be chosen from the University-Wide General Education Approved Course List. Three of these hours must be upper-division (3000-4000). See list in the Class Schedule.

#### FREE ELECTIVES

Electives to bring total applicable hours to the minimum total required for the degree including a minimum of 40 upper-division hours.

#### ACCREDITED BY THE ENGINEERING ACCREDITATION COMMISSION OF ABET, [HTTPS://WWW.ABET.ORG](https://www.abet.org)

In order to progress in your curriculum in the Gallogly College of Engineering, and as a specific graduation requirement, a **grade of C or better** is required in each course in the curriculum, including all prerequisite courses.

#### MAJOR REQUIREMENTS

Code	Title	Credit Hours
<b>Required Courses</b>		
BME 1421	Introduction to Biomedical Engineering	1
BME 2333	Biomedical Engineering Fundamentals	3
BME 2433	Signals and Systems for Biomedical Engineering	3
BME 3143	Biomechanics	3
BME 3722	Numerical Methods in Biomedical Engineering	2
BME 3533	Biomedical Instrumentation	3
BME 3531	Bioinstrumentation Lab	1
BME 3171	Biomedical Engineering Lab 1	1
BME 3123	Biotransport	3
BME 3233	Biomaterials	3
BME 4813	Quantitative Physiology	3
BME 3181	Biomedical Engineering Lab 2	1
BME 4713	Biomedical Engineering Design I	3
BME 4823	Biomedical Engineering Design II	3
<b>Total Credit Hours</b>		<b>33</b>

#### MAJOR SUPPORT REQUIREMENTS

Code	Title	Credit Hours
<b>Math and Science</b>		
BIOL 1124	Intro Biol: Molecule/Cell/Phys	4
CHEM 1415	General Chemistry (Continued)	5
C S 1213	Programming for Non-Majors with Python	3
ECE 2723	Electrical Circuits I	3
ISE 3293	Applied Engineering Statistics	3
MATH 2924	Differential and Integral Calculus II	4
MATH 2934	Differential and Integral Calculus III	4
MATH 3113	Introduction to Ordinary Differential Equations	3
PHYS 2524	General Physics for Engineering and Science Majors	4
<b>Upper-Division Biology Elective</b>		
Course chosen per BME faculty approval		3
<b>BME Electives</b>		
Choose 12 hours of electives from the list of approved courses maintained by the department		12
<b>Science, Math, and Engineering Electives</b>		
Choose 6 hours of electives from the list of approved courses maintained by the department		6
<b>Additional College Requirements</b>		
ENGR 1411	Pathways to Engineering Thinking <sup>1</sup>	1
ENGR 2002	Professional Development	2
<b>Total Credit Hours</b>		<b>57</b>

<sup>1</sup>Engineering transfer students may take ENGR 3511 in place of ENGR 1411.

More information in the catalog: (<http://ou-public.courseleaf.com/gallogly-engineering/stephenson-biomedical-engineering/biomedical-engineering-standard-bachelor-science/>).

## Appendix A: 2023-2024 Degree Requirement [Checksheet](#) continued

### Accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>

In order to progress in your curriculum in the Gallogly College of Engineering, and as a specific graduation requirement, a grade of C or better is required in each course in the curriculum, including all prerequisite courses.

Two college-level courses in a single world language are required; this may be satisfied by successful completion of 2 years in a single world language in high school. Students who must take a language at the University will have an additional 6-10 hours of coursework.

Courses designated as Core I, II, III, IV or V are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list.

Year	FIRST SEMESTER		Hours	SECOND SEMESTER		Hours
FRESHMAN	ENGL 1113	Principles of English Composition ( Core I )	3	ENGL 1213 or EXPO 1213	Principles of English Composition ( Core I ) or Expository Writing	3
	CHEM 1315	General Chemistry ( Core II-Lab ) <sup>1</sup>	5	CHEM 1415	General Chemistry (Continued) ( Core II-Lab ) <sup>1</sup>	5
	MATH 1914	Differential and Integral Calculus I ( Core I ) <sup>2</sup>	4	MATH 2924	Differential and Integral Calculus II <sup>2</sup>	4
	ENGR 1411	Pathways to Engineering Thinking <sup>3</sup>	1	PHYS 2514	General Physics for Engineering and Science Majors ( Core II )	4
		Approved Elective: First-Year Experience (Core V) <sup>5</sup>	3	BME 1421	Introduction to Biomedical Engineering	1
	<b>CREDIT HOURS</b>		<b>16</b>	<b>CREDIT HOURS</b>		<b>17</b>
SOPHOMORE	MATH 2934	Differential and Integral Calculus III <sup>2</sup>	4	MATH 3113	Introduction to Ordinary Differential Equations	3
	PHYS 2524	General Physics for Engineering and Science Majors	4	C S 1213	Programming for Non-Majors with Python	3
	BIOL 1124	Intro Bio: Molecule/Cell/Phys ( Core II-Lab )	4	HIST 1483 or HIST 1493	United States to 1865 ( Core IV ) or United States, 1865 to the Present	3
	ENGR 2002	Professional Development	2	ECE 2723	Electrical Circuits I	3
	BME 2333	Biomedical Engineering Fundamentals	3	BME 2433	Signals and Systems for Biomedical Engineering	3
			ISE 3293	Applied Engineering Statistics	3	
	<b>CREDIT HOURS</b>		<b>17</b>	<b>CREDIT HOURS</b>		<b>18</b>
JUNIOR	BME 3143	Biomechanics	3	BME 3123	Biotransport	3
	BME 3722	Numerical Methods in Biomedical Engineering	2	BME 3233	Biomaterials	3
	BME 3533	Biomedical Instrumentation	3	BME 4813	Quantitative Physiology	3
	BME 3531	Bioinstrumentation Lab	1	BME 3181	Biomedical Engineering Lab 2	1
	BME 3171	Biomedical Engineering Lab 1	1		BME Elective 6	3
	BME Elective 6	3		BME Elective 6	3	
	Upper-Division Biology Elective (per BME faculty approval)	3				
	<b>CREDIT HOURS</b>		<b>16</b>	<b>CREDIT HOURS</b>		<b>16</b>
SENIOR	BME 4713	Biomedical Engineering Design I	3	BME 4823	Biomedical Engineering Design II	3
		Science, Math, Engineering Elective (Per Advisor Approval)	3		BME Elective 6	3
		Approved Elective: Social Science (Core III) <sup>5</sup>	3		Science, Math, Engineering Elective, (Per Advisor Approval)	3
		Approved Elective: Western Culture (Core IV) <sup>5</sup>	3	P SC 1113	American Federal Government ( Core III )	3
	Approved Elective: Artistic Forms (Core IV) <sup>5</sup>	3		Approved Elective: World Culture (Core IV) <sup>5</sup>	3	
	<b>CREDIT HOURS</b>		<b>15</b>	<b>CREDIT HOURS</b>		<b>15</b>

<sup>1</sup> CHEM 1315 and CHEM 1415 can be substituted with CHEM 1335 (Fall only) and CHEM 1435 (Spring only), respectively.

<sup>2</sup> MATH 1823, MATH 2423, MATH 2433, and MATH 2443 sequence can be substituted for MATH 1914, MATH 2924, and MATH 2934.

<sup>3</sup> Engineering transfer students may take ENGR 3511 in place of ENGR 1411.

<sup>4</sup> Pre-medical students should contact the OU Pre-Med Office, 415 Cate Center #1, (405) 325-2457.

<sup>5</sup> To be chosen from the University-Wide General Education Approved Course List. Three of these hours must be upper-division (3000-4000).

<sup>6</sup> BME Electives to be chosen from approved list of courses maintained by the School of Biomedical Engineering.

# Appendix B: 2023-2024 Degree Flow Chart

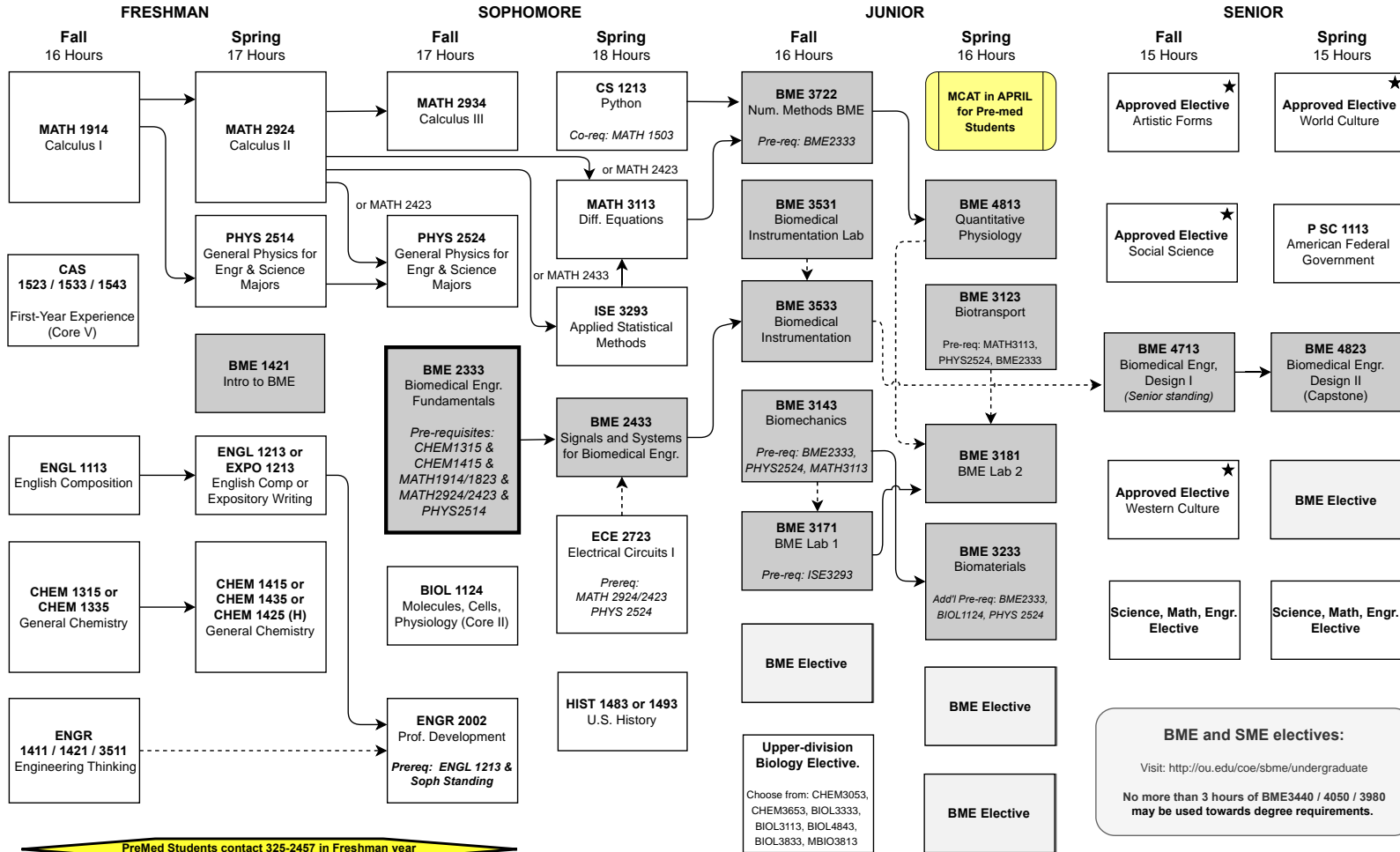
Name: \_\_\_\_\_

Sooner ID: \_\_\_\_\_

## Bachelor of Science in Biomedical Engineering (Standard Option) B108

Summer 2023 through Spring 2024 – Total Credit Hours: 130

This flowchart is not an official check sheet of degree requirements. It is meant to be used as a supplemental visual guide to be used along with the official University of Oklahoma degree check sheet.



### Key and Important Notes

★ One of these Gen. Ed. courses must be 3000-4000 level.  HS History Deficiency

Fall or Spring ONLY

Foreign Language: 2 semesters college level or 2 years of high school.

← - - - → Co-requisite

← → Prerequisite