Duke

DEPARTMENT OF

Biomedical Engineering

Undergraduate Program Handbook

For use during the 2025-26 Academic Year

BME Undergraduate Program Handbook

For use during the 2025-2026 Academic Year

Duke
DEPARTMENT OF
Biomedical Engineering

Version 2025-26

The BME Undergraduate Program Handbook is updated annually. Students and faculty should always use the most recent version. If you find any errors or unclear information, please contact the DUS, Dr. Elizabeth Bucholz (ekb@duke.edu), or Associate DUS, Dr. Cameron Kim (cameron.kim@duke.edu).

This Handbook covers the BSE degree requirements for the BME undergraduate community.

Major Changes from the 2024-2025 BME Handbook

- Liberal Arts requirement changed for students entering Duke in Fall 2025 and was added to this handbook.
- Writing requirement changed for students entering Duke in Fall 2025. Effective Fall 2025, Writing 120 is the 1st year Duke Writing requirement and engineers will take Writing 120 in the spring semester only.
- The previous Math sequence for the **2020 matriculating class or before**: Math 111L, 112L or 122L, 212, 218, 353, has been removed from the current edition of the handbook.
- BME290L: Biomedical Electronic Measurements is offered as a substitution for ECE110L: Intro to Electrical and Computer Engineering. BME/ECE double majors and minors must take ECE110L.

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Introduction

This handbook outlines Duke University's Biomedical Engineering (BME) undergraduate program, including its mission, educational objectives, major requirements, second major options, pre-health requirements, and research opportunities. As one of the nation's first accredited and top-ranked BME programs, it emphasizes research and project-based learning to prepare students for careers in industry and professional schools.

BME Undergraduate Program Faculty

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Mission

The mission of the Department of Biomedical Engineering gets its foundation from Duke University. Thus, we seek to: (i) prepare our students for lives of skilled and ethical service to their communities by creating a free and open learning environment that fosters their intellectual growth, (ii) advance the frontiers of scientific inquiry, and (iii) contribute with distinction to the international community of scholarship. As biomedical engineers, our unique mission is to (a) create enabling technologies for the improvement of human health and health care and (b) create new knowledge at the interface between engineering and biomedical science.

We work closely with medical researchers to identify important problems that impact human health and solve them using our technical expertise. We engage motivated and talented students in the classroom, laboratory, and clinic, imparting to them the spirit of our mission as we prepare them for future careers as effective, knowledgeable, and ethical leaders in corporate, professional, and academic communities.

Program Educational Objectives (PEOs)

We expect that after graduation, graduates of our program will be on track to become leaders in corporate, professional, and academic communities. They will:

I. advance in their careers and assume leadership roles in biomedical engineering or related areas of industry, academia, and medicine.
II. engage in life-long learning, for example, by enrolling in graduate or professional degree programs or receiving advanced training for professional advancement.
III. utilize their engineering experience in creating new knowledge or enabling technologies for improvement of human health and health care.
IV. understand the social and ethical implications of their work.

These PEOs are reviewed annually by the DUS, assessed by an External Advisory Committee, and updated as needed through votes of the Undergraduate Affairs Committee and full BME faculty.

ABET Student Outcomes and BME Program Criteria

Outcomes*:* Upon completion of their degrees, our students will have the ability to:

1. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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. communicate effectively with a range of audiences.
4. recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.
7. acquire and apply new knowledge as needed, using appropriate learning strategies.

Criteria: In addition, as biomedical engineers, our students will have:

1. an understanding of biology and physiology.
2. the capability to apply advanced mathematics, science, and engineering to solve the problems at the interface of engineering and biology.
3. the capability to apply statistics to solve the problems at the interface of engineering and biology.
4. the ability to make measurements and interpret data from living systems.
5. the ability to address problems associated with the interaction between living and non-living materials and systems.

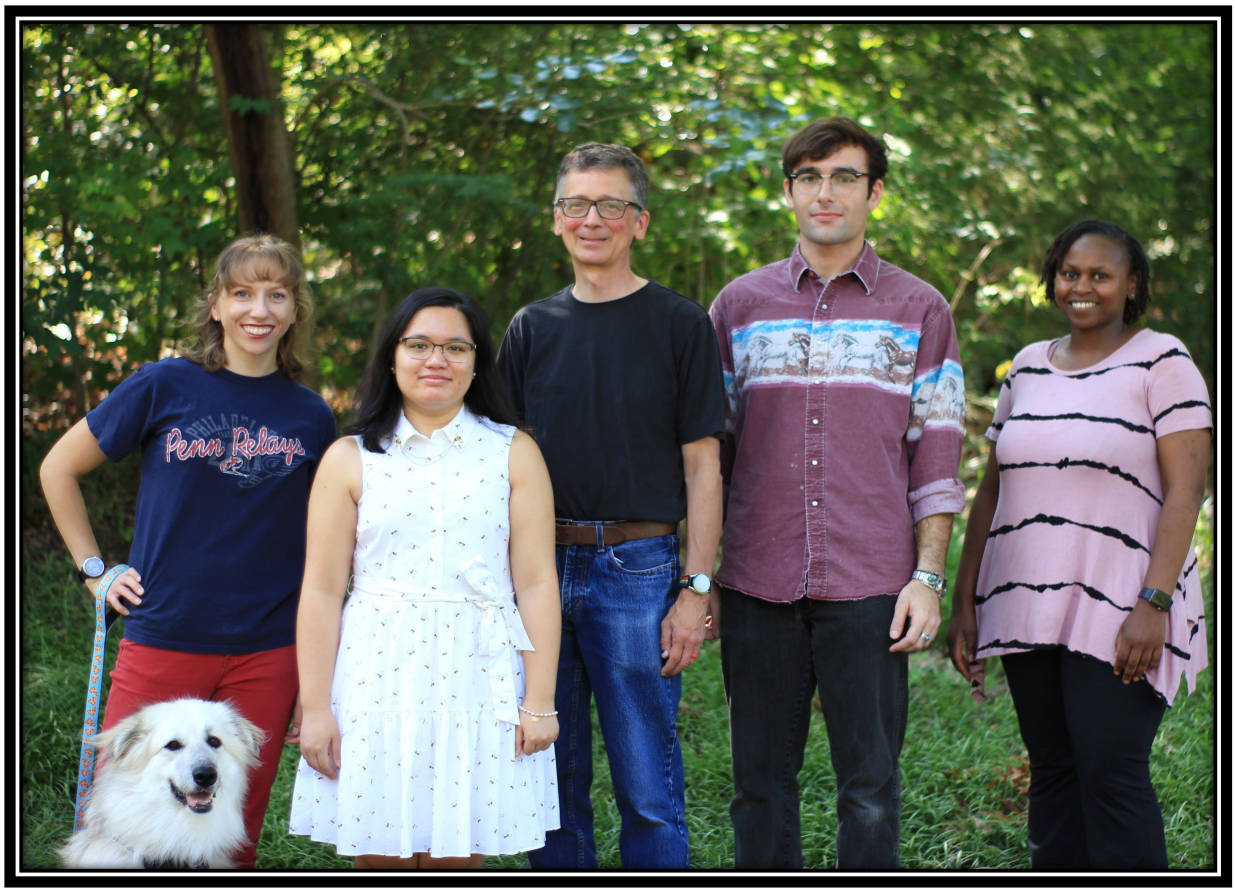
Accredited by the Engineering Accreditation Commission of ABET (www.abet.org)

Who's Who in BME & the Pratt School of Engineering

This is not a comprehensive list, but includes BME, Pratt, and Duke personnel you will likely interact with as a BME major.

BME Administration

Dr. Sharon Gerecht
Chair, Biomedical Engineering Department



BME Laboratory Staff

left to right: ***Liz Feeney*** *(Senior Lab Administrator),* ***Melanie Tran*** *(Research & Development Engineer),* ***Matt Brown*** *(Teaching Lab Manager),* ***Elbrus Batcha*** *(Research & Development Engineer), &* ***Maggie Gatongi*** *(Senior Lab Administrator)*

Pratt Dean & Undergraduate Education Team

Dr. Jerry Lynch
Dean, Pratt School of Engineering

Dr. Lisa Huettel
Associate Dean, Undergraduate Education

There are three Assistant Deans for Advising. Each student is assigned an Academic Dean at the start of their first year and keeps the same Dean throughout their entire time as undergraduates.

Carmen Rawls

Lupita McMillian

Ben Cooke

Assistant Deans
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Pratt Staff

The Director of Student Affairs is **Tarina Argese.** She provides support to engineering student organizations.

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allison.stocks@duke.edu

Pratt Liaisons

Duke's Career Center includes the Engineering Career Community, where students can find industry resources, career advice, and internship/job opportunities that are specific to engineering.

Catherine Allen, Asst Director, Career Insights, Assessment & Tech
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Undergraduate Library Services

BIOMEDICAL ENGINEERING DEGREE REQUIREMENTS

As an Accreditation Board of Engineering and Technology (ABET) accredited program, BME must meet core requirements in mathematics, science, and engineering. The Pratt School of Engineering also sets requirements for all engineering students. To meet these, the BME Department has defined specific course requirements. Sample curricula for different BME-related paths are shown in Tables 1-6. Required courses are listed below.

Chemistry

Two courses are required for BME students. For questions about Chemistry placement, see http://chem.duke.edu/undergraduate/placement-guidelines

IF:	1st CHEMISTRY COURSE OPTION	2ND CHEMISTRY COURSE REQUIRED
NO AP	CHEM 101DL	CHEM 201DL or CHEM 210DL
CHEM 20 AP*	CHEM 101DL or CHEM 110DL**	CHEM 201DL** or CHEM 210DL
CHEM 21 AP***	1st Chemistry course SATISFIED	CHEM 201DL or CHEM 210DL

*CHEM 20 is awarded for a 4 on AP CHEM and not accepted by BME.
** CHEM 201DL is the only option if CHEM 110DL is taken as 1st Chemistry course.
***CHEM 21 is awarded for a 5 on AP CHEM.

Physics

Two courses are required. At least one physics course must be taken after matriculation*, regardless of AP credit.

IF:	1st PHYSICS COURSE REQUIRED:	2ND PHYSICS COURSE REQUIRED:
No AP credit	PHY 151L	PHY 152L
PHY 25**	Satisfied with PHY 25	PHY 152L
PHY 26***	PHY 151L	Satisfied with PHY 26
PHY 25 & 26	Satisfied with PHY 25	1 course required after matriculation: If you are interested in 2nd major in Physics, follow the recommendations found here. _____ If you aren't planning a 2nd major or minor in physics, **AND** you have multivariable calculus credit, then take **PHY 264L** (Optics & Modern Physics) _____ If you aren't planning a 2nd major or minor in physics, and you do NOT have multivariable calculus credit, then take any of the following: >PHY 152L, or >any intermediate core physics course: PHY 361, 362D, 363, 464, 513, or > a Gateway Core Physics course: PHY 305, 320L, 380, or 414

*__Matriculation 2025__, **or later**, pre-matriculation credit may not be used as the one after matriculation physics requirement.
**PHY 25 is awarded for a 4 or 5 on AP PHY MECHANICS
***PHY 26 is awarded for 4 or 5 on AP PHY E&M. Students are not allowed to take PHY 151L and use PHY 26, unless they only have PHY 26

Math

Five courses are required. For questions about placement, go to https://math.duke.edu/undergraduate/course-placement.

Math sequence for the **2021 matriculating class, or after**: Math 111L, 112L or 122L, 218D-2, 219, 353

IF:	1st MATH COURSE:
No AP credit	Math 111L
Math 21*	1st Math course satisfied, then take Math 122L (fall only or take 112L if spring)
Math 22**	1st & 2nd Math courses satisfied, then take Math 218D-2

*Math 21 is awarded for a 4 on the BC AP exam or 5 on AB AP exam
**Math 22 is awarded for a 5 on BC AP exam

NOTE: *If you're approved by the Math department to skip any required math courses, you must replace them with additional approved Math courses. In total, you need 5 Math courses—this includes any combination of Duke courses, AP credits, or transfer credits.*

2nd Major or Minor in Math

Students wishing to complete Math as a second major or minor take: Math 111L, 112L or 122L, 212 or 222, 221, 356. Additional math major and minor requirements found here.

Digital Computation and Computer Programming

Fall 2023 matriculating class, and before: EGR 103L or CS 201 (for students with AP CompSci credit)

Fall 2024 matriculating class, and after: EGR 105L or CS 201 (for students with AP CompSci credit)

For placement, take the guided self-placement survey.

First-Year Design

EGR 101L: Engineering Design and Communication

Pratt students should take EGR 101L in their entering fall semester.

1st Year Writing

2024 Matriculating class, and before, take Writing 101 in the first year.

2025 Matriculating class, and after, take Writing 120 in the spring semester and must be taken in the 1st year.

Liberal Arts

5 courses are required.

2024 matriculating class, and before, the specific requirements for the SS/H requirement are as follows:

- At least one course must be a social science (SS).
- Other courses must be selected from at least two of the following three areas: arts, literature, and performance (ALP), civilization (CZ), and foreign language (FL).
- At least two courses must be taken from the same *department* with one being at 200-level or higher (e.g., two PSY, two VMS, etc., and NOT two SS, two CZ, etc.).
- AP credits with 200-level numbers do not count as an upper-level course.
- For departments grouped together such as AMES, Art, Art History, and Visual Media Studies, or Classical Studies (just to name a few), the depth requirement is satisfied by taking two courses in the same department, i.e two Chinese courses or two Korean courses, but not by taking a Chinese course and an AMES course.
- Table 9 lists the allowed SS/H departments and programs. SS/H courses taken in an engineering, science, or other department not in Table 9 (e.g., Environment, Global Health) count only if cross- listed in an approved SS/H department. Information about SS/H electives may by updated during the year. For the most current details, see http://www.pratt.duke.edu/undergrad/policies/3505.
- Skill courses cannot be used to fulfill the SS/H requirements except full-credit foreign language courses with an area code.
- Independent Studies do not satisfy SS/H requirements.
- At most, 2 of the 5 course credits for SS/H can be met by any combination of 2 from the following options:
    - Advanced Placement (AP) Credit
    - International Placement Credit (IPC)
    - Duke-offered courses that are only offered on a Satisfactory/Unsatisfactory grading basis.

Note: AP credits do not carry course codes, however, in the Pratt School of Engineering Areas of Knowledge are attributed to AP exams as follows: History (CZ), Psychology (SS), Political Science (SS), Language courses (FL), English (ALP), Economics (SS), and Music (ALP). Consult your academic dean if you have a question about AP credit.

2025 matriculating class, and after:

Five 1.0 credit courses from the following categories:

- Creating & Engaging with Art (CE)
- Humanistic Inquiry (HI)
- Interpreting Institutions, Justice & Power (IJ)
- Social & Behavioral Analysis (SB)
- Language (LG)

More specifically, each course must:

- carry at least one code of CE, HI, IJ, SB, or LG and that do not otherwise count towards the requirements of their Pratt major(s).
- cumulatively cover at least four of the five codes (CE, HI, IJ, SB, LG).
- be taken on a graded basis, unless the course is only offered on a mandatory Satisfactory/Unsatisfactory grading basis. For courses only offered on an S/U grading basis, up to two such S/U-only courses may contribute (course and/or code) to the Liberal Arts requirement.
- be satisfied by taking courses post-matriculation.

If a Century Course is taken that has two different codes, it may cover both of those codes, but still only counts as one of the five required courses.

BME Life Science and Physiology Course

Life Science: BIO 201L is required. AP credit for Biology does not satisfy Biology requirement for BME.

- BIO 203L was last offered in Spring 2024. Students who took BIO 203 satisfy the biology life science requirement.

Physiology: BME 244L is a major requirement for all BME majors.

BME Major Requirements

Required Courses for a BME major. If you choose to pursue a 2nd major, there will be additional required courses. Consult the 2nd major templates (Tables 2-5) or 2nd major departmental website for additional required courses.

REQUIRED COURSE	COURSE NOTE
EGR 201L	
BME 221L	• 2nd majors in ME must take BME 221L. • 2023 matriculants must take BME 221L. Earlier matriculants are strongly encouraged to take BME 221L for better preparation of BME 302 and other biomaterial-related materials.
BME 244L	
BME 260L	
ECE 110L or BME 290L	• 2nd majors and minors in ECE must take ECE 110L. • BME majors may take either course.
BME 271D	• 2nd majors in ECE must take ECE 280, not BME 271. It is also recommended to take ECE 381 as an ECE elective to cover the content of BME 271D. • BME majors must take BME 271.
BME 354L	
BME Area Core Courses* ◆	• Two Area Core Courses required. See next table
BME Design Course* ⊕	• Multiple options to choose from.
BME Electives* ⧗	

NOTE: 2nd majors in ECE, ME, CEE, and Computer Science should consult Tables 2-5 For specific requirements.

* ◆, ⊕, and ⧗ see pages 17 & 18 for more detail on these requirements.

The two **Area Core** Classes are chosen from the following five areas (see also Table 7):

AREA	CORRESPONDING CORE CLASS
EL (Electrobiology)	**BME 301L** Bioelectricity
BB (Biomechanics and Biomaterials)	**BME 302L** Fundamentals of Biomaterials & Biomechanics
IM (Imaging and Measurement System	**BME 303L** Modern Diagnostic Imaging Systems
MC (Molecular, Cellular and Tissue Eng)	*3 options*: ➢ **BME 305L** Molecular Engineering* ➢ **BME 306L** Cellular Engineering** ➢ **BME 307** Transport Phenomenon in Biological Systems
DS (Data Science)	**BME 390L** Biomedical Engineering Data Science

*BME 305L was previously offered as BME 390L (first offered in Fall 2022). The course was renumbered as BME 305L in 2025

**BME 306L was previously offered as BME 390L (first offered in Spring 2022). The course was renumbered as BME 306L in 2024

Design Course Options

1. A one-semester design course can be chosen from the following list:

- **BME 432L** Biomechanics and Vehicle Safety Engineering (typically fall only)
- **BME 436L** Biophotonics Instrumentation (typically spring only)
- **BME 462L** Design for the Developing World
- **BME 464L** Medical Instrument Design (typically fall only)
- **BME 490L** Special Topics in Biomedical Engineering Design (offered occasionally)

2. **Two-semester Design**

These courses form a year-long engineering design sequence and must be taken in order. For example, if the first course is taken in the Fall, the second must be taken in the Spring. Only students who complete the first course can register for the second.

There are 2 choices for a two-semester design option:

FALL SEMESTER 1st Course	**SATISFIES**	**SPRING SEMESTER 2nd Course**	**SATISFIES**
BME 405L (Biotech Design I)	Adv Elective (MC Area) or BME General Elective	**BME 406L** (Biotech Design II)	BME Design
	OR		
BME 473L* (Medical Device Design I)	Adv Elective (IM Area) or BME General Elective	**BME 474L*** (Medical Device Design II)	BME Design

**BME 473L & 474 can also be taken as part of the Design Fellows Program explained on page 20-21.*

⏳ **BME Electives**

Students choose electives to deepen their knowledge in specific BME areas. Over 50 electives are offered, but availability varies each semester based on faculty availability.

BME Electives are labeled as **Advanced Electives (AE)** or as **General Electives (GE)** based on engineering content. The AEs also have an Area Focus designation (BB, IM, EL, DS, or MC).

Four BME Elective courses are required.

- **3 AE courses:** two of which must have the same Area of Focus as one of the Area Core Courses taken.
- **1 GE course:** can be a GE or an additional AE of any Area of Focus.

✏️ *NOTE*

>Counting an Independent Study: an independent study can count as either one AE (without an Area of Focus), or a GE. Only two independent study credits can satisfy the BME degree.

>**Pratt Fellows:** Students who participate in Pratt Fellows can count 2 of their 3 semesters of independent study as 1 credit of BME GE and 1 credit of BME AE (without an Area of Focus.)

>Graduate courses (700 and higher): Undergraduates are not allowed to take courses 700 level and higher unless they receive permission from the BME DUS and their academic

dean.

Unrestricted Electives

Depending on your major choice, up to two unrestricted, "free," electives (2.0 credits) are required, (see Tables 1-6).

- Satisfactory/Unsatisfactory graded option is allowed for a free elective course.
- Only unrestricted electives can be 0.5-credit.
- A maximum of four 0.5-credit courses are allowed if:
  - No more than two half credits are from Physical Education (PE).
  - No more than two half credits are from music/dance.
- Students interested in medical school may use Biochem 301 & Chem 202DL to satisfy a free elective.
- Up to 2.0 credits can be from junior/senior ROTC coursework.

Note on AP credit

- Taking a course that matches AP credit will cancel that AP credit. Thus, the AP credit can no longer be used to satisfy degree requirements.
- If AP credit is used to meet a course prerequisite, then any Duke course that is equivalent to that AP credit may not be taken.
  - Example: AP Physics 26 gives credit for Physics 152L and Physics 152L is a prerequisite for BME 354L. A student who has utilized their AP credit for Physics 26 to gain enrollment in BME 354L cannot enroll in Physics 152L after completing BME 354L.

Independent Study Opportunities for Juniors & Seniors

Independent study is an integral and immensely popular component of the undergraduate education at Duke. Juniors and seniors may count **up to two** independent study courses [BME 394, BME 493, or 494] as their General or Advanced Electives without an Area of Focus This number depends on the choice of academic program(s). See Tables 1-6.

A research experience can be achieved in one of four ways:

1. **Directed BME research with a BME faculty member** as the project supervisor and receive BME Elective credits [BME 394, BME 493, and/or 494].

2. **Directed BME research with a non-BME faculty member** (for instance, a clinician). In such cases, the project must be sponsored by a BME faculty member. The sponsor is responsible for evaluating the quality of the project and student's performance.
3. **Pratt Research Fellow** during your junior year (to learn more, go to http://www.pratt.duke.edu/undergrad/students/research-fellows). Pratt Research Fellows perform research in a BME faculty's lab for three academic semesters plus a full summer term and receive two BME Elective credits [BME 493 and 494].
4. **BME Design Fellows Program**, like Pratt Fellows, is a multi-semester + summer experience. Unlike Pratt Fellows, the focus is on design and industry rather than research. As a fellow, you'll design and test a medical instrument based on a clinical need identified by a Duke Health clinician. See

complete information on BME Design Fellows on page 20

How to Sign-Up for Research Opportunities

Register for a BME Independent Study Course

1. Find a project supervisor. If the project supervisor is not a BME faculty (i.e., he/she is not listed as BME Faculty), find a BME faculty who will sponsor your independent study.

2. Fill out the "BME Independent Study Request" form found here, https://bme.duke.edu/undergrad/independent-study. Consult with the project supervisor about project title, description, biomedical area, engineering content, the nature of final product, and grading basis. Forms must be submitted 48 hours before the drop/add date of the semester.

3. Request approvals from the project supervisor, BME sponsor (if required), and the BME DUS.

4. After all approvals have been granted, the BME DUSA will generate a section of BME 394, 493, or 494 for the student and issue the permission number register. Students must register for the Independent Study using permission number.

Independent Study Opportunities For 1st YR & Sophomores (EGR 391 or 491)
BME independent studies aren't available to first-yr students and sophomores, instead they take EGR independent studies that are allowed to satisfy an unrestricted (free) elective. The registration is processed by the Pratt Dean's Undergraduate Education office (not the BME department). Fill out the "Pratt Independent Study Request" form found here, https://pratt.duke.edu/undergrad/research#independent-study, to register.

NOTE: Independent study credit in the summer or while abroad is not allowed unless the project supervisor obtains special permission from the BME DUS. Summer school registration is also required if pursued over the summer.

BME Design Fellows

Application process for Design Fellows opens in September and closes at the end of October. For more information and updated guidance, contact any of the following:

- Dr. Mark Palmeri, mark.palmeri@duke.edu
- Email BMEDesignFellows@duke.edu
- BME DUS, elizabeth.bucholz@duke.edu, or ADUS, cameron.kim@duke.edu
- Visit the program's website, https://bme.duke.edu/academics/undergrad/design-fellows/

Course Requirements for Design Fellows:

- **EGR 101L: Engineering Design and Technical Communication**

- **BME 254L: Medtech Device Prototyping Skills:** Recommended to take in the sophomore or junior year; counts as general BME elective.

- **Senior Capstone Design**

  Two options available:

  1. BME 473L + 474L (Medical Device Design I & II)
  - 473L can count as a BME general elective or IM advanced elective and 474L counts as the design requirement

  OR

  2. One-semester capstone design:
  a. Biophotonic Instrumentation (BME 463L)
  b. Design for People with Disabilities (BME 460L)
  c. Design for the Developing World (BME 462L)
  d. Medical Instrument Design (BME 464L)

- **Advanced Design Elective**
  Advanced Design Elective options are found here.

  - *One additional IM advanced elective is required if you take BME473L/474L, otherwise two advanced electives in one area are required if you choose to take a 1-semester capstone design course option*.

Graduation with Departmental Distinction

Graduation with Departmental Distinction (GWDD) is an honor awarded to BME majors in the Pratt school who shows outstanding achievement, as judged by the BME department and faculty committee.

Only students whose first major is BME are eligible. Applications are typically due in late March of senior year, with a poster presentation held the day after spring classes end. If you're graduating early or late, contact the Director of Undergraduate Studies (DUS) for guidance.

For graduation with distinction in BME, the students should:

1. **GPA:** Must have a minimum cumulative GPA 3.500 at graduation.

2. **Research Project:** Complete an original, independent BME research project under faculty supervision during the junior or senior year. The project:

   - Must include at least one BME-coded independent study. Note that not all independent studies automatically qualify, must be suitable for GWDD, and

approved by your supervisor.

3. **BME Focus:** Ensure your abstract, poster, and report clearly highlight BME content, especially if working with a non-BME faculty member.

4. **Faculty Committee:** Form a committee of three faculty members.
   - Two must be BME Primary Faculty, defined as anyone appearing on the **BME faculty list**. This includes Research Faculty, Professors of the practice, etc. but *excluding* Secondary Faculty.
   - Your project supervisor and BME sponsor (if applicable) usually serve on the committee.
   - All committee members vote and must be unanimous to award GWDD.

5. **Application & Abstract:**
   - Submit a one-page abstract and the online Application for Graduation with Departmental Distinction in BME signed by your faculty supervisor before the deadline.
   - Deadline: Early April (or early November for December graduates). Exact dates provided each year by the ADUS.

6. **Written Report:** Submit a research report, if requested by your faculty supervisor. Include:
   - the problem considered
   - methods used
   - results obtained
   - discussion the results and their significance
   - follow any additional supervisor guidelines

7. **Poster Session** (except for December graduates, see below)**:**
   - Prepare, attend, and present a poster at the GWDD Poster Session (in late April, usually a Thursday, 12-2 pm).
   - GWDD applicants and their faculty supervisors determine the format for the poster.
   - Set up begins at 11 AM when easels are available.
   - Your committee and others will ask questions and evaluate your work.
   - All committee members must approve for distinction to be awarded.

8. **Off-Cycle Graduates:**
   - September grads present posters the April before graduation.
   - December grads complete all requirements in the fall semester and present their poster to their committee before Thanksgiving break.

Preparation for Medical and Dental Schools

Students planning to attend medical and dental schools should thoroughly read the information provided on the Office of Health Professions Advising website, and consult with their prehealth advisor. The Health Professions Advising Office provides holistic advising to all Duke undergraduates interested in pursuing a career in the health professions.

The Advising page includes a Premedical Course Planning Checklist (Box login required) for Pratt.

Your academic dean can assist with course planning but all questions about the application process and medical school expectations should be directed to your Prehealth advisor.

Second Major, Minor, and Certificates

Meet with your Academic Dean to discuss how to incorporate the potential for 2nd major, minor, or certificate for your specific academic circumstances. First-year students declare their major after their first year. Thereafter, changes to your academic plan, can be made here, https://registrar.duke.edu/student-resources/student-forms/.

- **Within Pratt or Trinity College:** You can add a second major, minor, or certificate. Required courses are listed in Tables 2-5.
  - **Typical requirements:**
    - Second major: ~10 courses
    - Minor: 5 courses
    - Certificate: ~6 courses
- **Course Planning Tips:**
  - Some departments limit double-counting courses. Consult those department websites for restrictions.
  - Don't rely on specific electives being available in each semester—scheduling conflicts or limited seats may occur.
  - Plan and stay flexible.
- **Cross-Listed vs Paired Courses:** Be aware of the differences when planning for a 2nd major, minor, or certificate and choose the correct course code when registering. Changes are not permitted after the drop/add period ends.
  - Cross-listed: Can count as any of the listed departments (e.g., Neuroscience 301L or BME 301L).
  - Paired: Only counts for the department you register under (e.g., BME 567 can only count for BME vs CHEM 601 can only count for Chemistry major.

4 + 1 BSE + Master's Program

Students can earn both a Bachelor of Science in Engineering (BSE) and a master's degree in just five years. This is ideal for those looking to deepen their research experience or gain advanced training in engineering or management.

Available Options:

- BSE + Master of Science (MS)
- BSE + Master of Engineering (MEng)
- BSE + Master of Engineering Management (MEM)

How to Complete the 5-Year BSE + Master's Program

1. **Think Ahead:** Meet with your faculty advisor or academic dean to create a senior-year schedule that includes space for graduate-level courses. See sample plans in Tables 6a and 6b.
2. **Apply to a Master's Programs:** Choose your program (MS, Meng, or MEM) and apply in the fall of your senior year. Application processes and deadlines vary—check the program links for details.
3. **Get Support:** Contact Ms. Susan Brown (susan.brown@duke.edu), Assistant Director of Pratt Master's Admissions and advisor for the 4+1 program, for help with your application.

🌍 Planning for Study Abroad

Students interested in participating in the Global Education program are required to meet with their academic dean to make an academic plan for study away.

- Review Pratt study away policies, found here, along with advice on how to approach this process.
- Explore the Global Education website and review their Advising page.
- For information and directions to request a course approval, click here.

Common Courses Found Abroad—consult the GEO pre-approved database to confirm where these courses are pre-approved.

- BME 271D
- BME 221L
- BME General Elective Course
- SS/H (Liberal Arts for Fall 2025 entering class)
- Free Elective Course

Duke Pratt in Costa Rica

Because traditional study abroad can be hard to fit into a BME schedule, Duke Pratt in Costa Rica offers a flexible alternative. It's part of the Duke-in program, so all courses are taught by Duke faculty and count as Duke credit.

Students take:

- Spanish 92A, a required course on Spanish language and culture.
- Other courses vary from year to year, based on faculty availability. Second courses offered have been Math 353, BME 271D, and Chem 201DL. Confirm course options in the summer you intend to apply.

When You Return From Abroad—you must be prepared to take Area Core(s) when you return in the spring. Therefore, the following courses should be satisfied prior to going abroad, or while abroad. They may be a prerequisite course to your desired Area Core course.

AREA	If You Want To Take This Area Core Course When You Return:	You Must Have This Prerequisite Completed Before or While Abroad:
MC	BME 305L, BME 306L, 307L	BME 260L
BB	BME 302L	BME 221L
BB-302 EL-301	BME 302L, BME 301L	Math 353
IM	BME 303L	BME 271D

ADVISING

The Pratt School of Engineering uses a multi-layered advising approach. If you can't find the answer in this Handbook or need personalized guidance, the following resources are here to help.

The Pratt School

Academic Dean: You'll be assigned an Academic Dean (see p. 6) when you start at Duke and keep the same one all four years. Your academic dean can help with four-year planning, academic challenges, course load adjustments, and understanding Pratt policies and procedures.

360 Coach: As a first-year student, you'll be assigned a 360 Coach as your faculty advisor, who may or may not be from BME. 360 Coaches are knowledgeable about the first-year engineering experience and can guide you navigating your 1st year at Duke. Their name will appear in your DukeHub.

If you're interested in BME, additional advising opportunities include:

- Fall departmental information sessions.
- Guidance from the BME DUS & ADUS (see p 5) about the BME field, program, and course planning.

E-Team (Peer Advisors): The E-Team is a group of junior and senior engineering students who serve as peer advisors. They're happy to answer questions about classes, student groups, student life, and more. You can contact them through the E-Team website.

The BME Department

BME Director of Undergraduate Studies (DUS) and Associate Director of Undergraduate Studies (ADUS):

Elizabeth Bucholz (photo on p. 4)
252 Hudson Hall Annex
elizabeth.bucholz@duke.edu
919-684-7015

Cameron Kim (photo on p. 4)

176 Hudson Hall Annex
919-660-0328

The DUS and ADUS oversee all aspects of the BME undergraduate program, including curriculum, advising, and course scheduling. They can help when:

- your advisor can't answer a question.
- when you need course approvals (e.g., for study abroad or transfer credits.)
- you have course concerns.
- want to change your faculty advisor.

If the DUS or ADUS can't resolve your issue, contact your Academic Dean for assistance.

BME Faculty Advisor: After your first year, once you declare BME as your major, you'll be assigned a BME faculty advisor (listed in DukeHub). Your advisor is your main contact for exploring the field, planning your academic path, registering for courses, and discussing career goals.

While knowledgeable, your advisor may not have the answer to every question. For broader and unresolved issues, contact the DUS.

Advisor assignments are based on your interests and faculty availability. If your advisor is unavailable (e.g., on sabbatical or traveling), you'll be directed to meet with the DUS instead.

Duke University

Academic Resource Center (ARC): The Academic Resource Center (ARC) offers a variety of services including:

- Learning Consultations
- SAGE Learning Communities
- Peer Tutoring Groups
- Study Connect

Academic Guides: The Academic Guides program integrates academic coaching and whole student support into the fabric of the Duke campus residential experience. Their purpose is to listen to your concerns, support you in and out of the classroom, and connect you with any and all resources you need to thrive as a Duke student.

Student Disability Access Office: The Student Disability Access Office (SDAO) is committed to providing educational opportunities for students with disabilities. They work with each student individually to establish academic accommodations including adjustments, auxiliary aids and services for the purpose of mitigating barriers to students' access to campus facilities, programs, and activities. For more information about how to establish services with SDAO, contact their office.

Counseling and Psychological Services (CAPS): CAPS is your campus resource for 24/7 crisis intervention and mental wellness resources. Services include:

- Individual Counseling and Psychiatric Services: Meet with a provider and collaboratively work to determine and agree upon goals of treatment in a one-on-one setting.
- Group Counseling: Group therapy and discussion groups with a variety of goals that aim to promote wellbeing.
- Workshops and Discussions: A wide range of interactive, skill-building workshops on various mental health topics
- Referrals to Community Providers: Meet with a referral coordinator or browse our list of community providers.
- Timely Care: Virtual care from anywhere. Otherwise known as everywhere.

The Wellness Center: The Wellness Center delivers a broad approach to wellness in an integrated manner that supports students holistically. Specifically, DUWell engages student through a variety of wellness experiences across campus to promote wellness, manage stress, reduce anxiety and reduce risk.

MORE ON ADVISING

Course Registration Advising

Pre-Registration Advising for BME Students
To plan your degree path, use the BME Undergraduate Handbook and the Degree Progress tool at stellic.duke.edu. You must meet with your Faculty Advisor during:

- **March/April** for fall registration
- **October/November** for spring semester

In these meetings, your Faculty Advisor will review your academic progress, discuss any future career or continuing education goals, and help you choose next semester's courses. You can also meet with your Academic Dean anytime during the year to create or update a 4-yr plan. Be sure to inform your dean of any changes in your plan along the way.

Note: Find your Faculty Advisor and Academic Dean in DukeHub under the Academics tab > Advisor Information tab. There is also a help guide for registration.

Career Advising: Career Everywhere for Everyone

Internships and Employment

Students can discuss their career plans with their advisors who can help identify specific course sequences or complimentary programs based on their BME interests. A recent Duke BME graduate put together these resources that describe the various types of jobs a biomedical engineer might be well suited for and the skills that that type of position would regularly use. Students can also reach out to recent graduates at current companies by consulting the BME Internships and More Document that is regularly circulated to students.

The BME department strongly encourages all students to explore the resources at the **Duke Career Center**, Suite 036, Bryan Center.

The Career Hub is your one-stop shop for all things career—they create and curate career content; identify and amplify career resources; consult and collaborate with campus colleagues; and set the vision for a campus committed to career readiness and success. **Personalize your Hub here**, Log In – Career Hub | Duke University

The Engineering Career Community offers articles, resources, and opportunities to engage across different types of engineering. If you're curious about careers in engineering or actively searching for a job or internship, this community will support you through any phase of your career development. can help as you prepare for life after Duke. Catherine Allen (see page 11) is the Pratt liaison. Making an appointment with Ms. Allen is a good starting place to navigate the Engineering Career Community.

Information on internship and employment opportunities are:

- posted on Career Hub, https://careerhub.students.duke.edu/jobs/.
- found by going to the Upcoming Events tab found here, https://careeerhub.students.duke.edu.
- sent via email.
- posted on plasma screens in the engineering buildings.

Finally, Kirsten Shaw (kirsten.shaw@duke.edu, 919-660-5533), Director of Corporate and Industry Relations in the Pratt School of Engineering, is an additional resource to help Pratt students connect with corporations for internship opportunities. Her office is located at 322 Teer. For more information, see https://pratt.duke.edu/life/resources/career-services/.

Graduate School

There are multiple resources and websites available for students interested in attending graduate school. Discuss your graduate school goals with your BME faculty advisor for guidance.

Additional resources include:

- Graduate School Application Prep
- Duke Graduate School Programs and Degrees
- Pratt School of Engineering Master's Degree opportunities.
- Duke Pre-Law Advising
- Duke Pre-Health Advising

Transfer Credits

With prior approval from the DUS and their Academic Dean, an engineering student may receive transfer credit for up to four semester courses taken at other institutions either during the summer term, or up to two semester courses while on an approved leave of absence from Duke. Find the process and forms here, https://pratt.duke.edu/life/resources/policies/#transferCurrent.

Transfer to Trinity

If you are contemplating a transfer to Trinity, schedule an appointment with your academic dean. Additional information is available here, https://pratt.duke.edu/life/resources/policies/#transferTrinity.

APPENDICES

Tables 1-6: Sample Curriculum Schedules for BME Majors and Second Majors

Please be careful to check the Sample Schedule for *your* matriculating class!

Matriculating class of 2022 and 2023: current seniors and **juniors**

Matriculating class of 2024: current sophomores

Matriculating Class of 2025: current 1st year students

Index:

Tables 1a-d: BME Major (incl.

premed) Tables 2a-b: BME/ECE

Tables 3a-b: BME/ME

Tables 4a-b: BME/CEE

Tables 5a-d:

BME/CompSci

Tables 6a-b: BME planning for 4+1 BSE/Master's Programs

Note on AP/course notation: AP credits are documented as a 2-digit course number, e.g. Chem AP=5 is documented as Chem 21. For details see
https://registrar.duke.edu/student-resources/advanced-placement-credit/://pratt.duke.edu/undergrad/students/policies/3483

Table 1a BME Major (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **OR** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecul Systems
Liberal Arts Elective	Liberal Arts Elective
Junior Year	

Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Liberal Arts Elective	Liberal Arts Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	Liberal Arts Elective
Elective	Elective

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 12.
3. Selected from the Area Core classes listed in Table 7.
4. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety Engineering
   BME 436L Biophotonics Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
5. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
6. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
7. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 1b: BME Major planning for medical school (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng **OR** BME 290L Biomedical Electronic Measurements
EGR 201L Mechanics of Solids	Chem 210DL Modern Appl Chem Principles
	Math 219 Multivariable Calculus[1]
Math 218D-2 Matrices and Vectors[1]	BME 221L Biomaterials
Liberal Arts Elective	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Unless a student has AP credits, Organic Chemistry should be taken in the summer after the first or sophomore year	
Chem 201DL Organic Chemistry	Chem 202DL Organic Chemistry
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME Area Core Class I[4]
Biochem 301 Biochemistry	BME Area Core Class II[4]
Math 353 Ordinary and Partial Differential Eqn[1]	Liberal Arts Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[5] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[6]	BME Advanced Elective[7] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[6]
BME Advanced Elective[7]	BME General Elective[8]
BME Advanced Elective[7]	Liberal Arts Elective
Liberal Arts Elective	Liberal Arts Elective

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 12.
3. Recommended: Psychology 101 and Sociology 110 or similar courses.
4. Selected from the Area Core classes listed in Table 7.
5. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety
   Engineering BME 436L Biophotonics
   Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
6. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
7. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
8. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Please note: Students considering medical school should speak directly to their prehealth advisor for the most current information and visit the prehealth website for details: http://prehealth.duke.edu/prepare. Students may find that placing one or two semesters of organic chemistry into the summer, either at Duke or at home, can help with scheduling. While medical schools usually prefer to see organic chemistry taken at Duke, Pratt students can be an exception.

Table 1c: BME Major (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class, not 2024
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21 or 122	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/EGR 105 for 2024 matriculating class **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecul Systems
Social Science and Humanities Elective	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Social Science and Humanities Elective	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	Social Science and Humanities Elective
Elective	Elective

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 12
3. Selected from the Area Core classes listed in Table 7.
4. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety Engineering
   BME 436L Biophotonics Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
5. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
6. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
7. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 1d: BME Major planning for medical school (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/EGR 105 for 2024 matriculating class **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
EGR 201L Mechanics of Solids	Chem 210DL Modern Appl Chem Principles
	Math 219 Multivariable Calculus[1]
Math 218D-2 Matrices and Vectors[1]	BME 221L Biomaterials
Social Science and Humanities Elective[3]	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Unless a student has AP credits, Organic Chemistry should be taken in the summer after the first or sophomore year	
Chem 201DL Organic Chemistry	Chem 202DL Organic Chemistry
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME Area Core Class I[4]
Biochem 301 Biochemistry	BME Area Core Class II[4]
Math 353 Ordinary and Partial Differential Eqn[1]	Social Science and Humanities Elective[3]
Senior Year	
Fall Semester	**Spring Semester**
BME Design[5] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[6]	BME Advanced Elective[7] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[6]
BME Advanced Elective[7]	BME General Elective[8]
BME Advanced Elective[7]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective

9. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
10. See also the Physics requirements on p. 12.
11. Recommended: Psychology 101 and Sociology 110 or similar courses.
12. Selected from the Area Core classes listed in Table 7.
13. For 1-semester Design, select from the following list:
    BME 432L Biomechanics of Vehicle Safety Engineering
    BME 436L Biophotonics Instrumentation
    BME 462L Design for the Developing World
    BME 464L Medical Instrument Design
    BME 490L Special Topics in BME Design
14. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
15. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
16. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Please note: Students considering medical school should speak directly to their prehealth advisor for the most current information and visit the prehealth website for details: http://prehealth.duke.edu/prepare. Students may find that placing one or two semesters of organic chemistry into the summer, either at Duke or at home, can help with scheduling. While medical schools usually prefer to see organic chemistry taken at Duke, Pratt students can be an exception.

Table 1e: BME Major (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
ECE 110L Fund Electr and Comput Eng	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecul Systems
Social Science and Humanities Elective	Social Science and Humanities Elective
Junior Year	

Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Social Science and Humanities Elective	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	Social Science and Humanities Elective
Elective	Elective

8. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
9. See also the Physics requirements on p. 12.
10. Selected from the Area Core classes listed in Table 7.
11. For 1-semester Design, select from the following list:
    BME 432L Biomechanics of Vehicle Safety
    Engineering BME 436L Biophotonics
    Instrumentation
    BME 462L Design for the Developing World
    BME 464L Medical Instrument Design
    BME 490L Special Topics in BME Design
12. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
13. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
14. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 1f: BME Major planning for medical school (matriculating class 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng
EGR 201L Mechanics of Solids	Chem 210DL Modern Appl Chem Principles
	Math 219 Multivariable Calculus[1]
Math 218D-2 Matrices and Vectors[1]	BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids
Physics 152L Intro Electr Magn Opt **or** Phy 26[2]	Social Science and Humanities Elective[3]
Unless a student has AP credits, Organic Chemistry should be taken in the summer after the first or sophomore year	
Chem 201DL Organic Chemistry	Chem 202DL Organic Chemistry
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME Area Core Class I[4]
Biochem 301 Biochemistry	BME Area Core Class II[4]
Math 353 Ordinary and Partial Differential Eqn[1]	Social Science and Humanities Elective[3]
Senior Year	
Fall Semester	**Spring Semester**
BME Design[5] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[6]	BME Advanced Elective[7] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[6]
BME Advanced Elective[7]	BME General Elective[8]
BME Advanced Elective[7]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 12
3. Recommended: Psychology 101 and Sociology 110 or similar courses.
4. Selected from the Area Core classes listed in Table 7.
5. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety
   Engineering BME 436L Biophotonics
   Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
6. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 15.
7. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
8. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Please note: Students considering medical school should speak directly to their prehealth advisor for the most current information and visit the prehealth website for details: http://prehealth.duke.edu/prepare. Students may find that placing one or two semesters of organic chemistry into the summer, either at Duke or at home, can help with scheduling. While medical schools usually prefer to see organic chemistry taken at Duke, Pratt students can be an exception.

Table 2a: BME/ECE Second Major (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
ECE 110L Fund Electr and Comput Egr	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	ECE 230L Intro Microelectr Devices & Circuits
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry	ECE 280L Intro to Signals & Systems
EGR 201L Mechanics of Solids	CompSci 201 Data Structures and Algorithms (if not already taken to replace EGR 103L)
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME 301L Bioelectricity **or** BME 303L Modern Diagnostic Imaging Systems
Math 353 Ordinary and Partial Diff. Equations	ECE Concentration Elective 1[2]
ECE 250L Computer Architecture	Statistics course[3]
ECE 270L Intro to Electromagnetic Fields	Liberal Arts Elective
Senior Year	
Fall Semester	**Spring Semester**
BME design: BME 436L, BME 464L, **or** BME 474L[4]	BME General Elective[6]
BME Advanced Elective[5]	ECE Elective
ECE Concentration Elective 2[2]	Liberal Arts Elective
Liberal Arts Elective	Liberal Arts Elective
Liberal Arts Elective	

1. See also the Physics requirements on p. 12.
2. At least two ECE Concentration Electives must be from the same Concentration Area
3. Statistics course should be chosen from the ECE options: Stat 130, Stat 240L, Math 230, Math 238L/EGR 238L, ECE 380, ECE 555
4. BME 474L is the second course in a two-semester design sequence; BME 473L is pre-req for it and must also be taken (p. 15).
5. If BME 301L is taken, the Advanced Elective must be in the Electrobiology (EL) Area of Focus.
6. If BME 303L is taken, the Advanced Elective must be in the Imaging and Measurements (IM) Area of Focus. See Tables 7-8 for lists of Advanced Electives with EL and IM Areas of Focus.
7. The BME General Elective can be at any level. An Advanced Elective may be taken instead.

Table 2b: BME/ECE Second Major (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/105 for 2024 matriculating class **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry
ECE 110L Fund Electr and Comput Egr	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	ECE 230L Intro Microelectr Devices & Circuits
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	ECE 280L Intro to Signals & Systems
EGR 201L Mechanics of Solids	CompSci 201 Data Structures and Algorithms (if not already taken to replace EGR 103L)
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME 301L Bioelectricity **or** BME 303L Modern Diagnostic Imaging Systems
Math 353 Ordinary and Partial Diff. Equations	ECE Concentration Elective 1[2]
ECE 250L Computer Architecture	Statistics course[3]
ECE 270L Intro to Electromagnetic Fields	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME design: BME 436L, BME 464L, **or** BME 474L[4]	BME General Elective[6]
BME Advanced Elective[5]	ECE Elective
ECE Concentration Elective 2[2]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective
Social Science and Humanities Elective	

1. See also the Physics requirements on p. 12.
2. At least two ECE Concentration Electives must be from the same Concentration Area
3. Statistics course should be chosen from the ECE options: Stat 130, Stat 240L, Math 230, Math 238L/EGR 238L, ECE 380, ECE 555
4. BME 474L is the second course in a two-semester design sequence; BME 473L is pre-req for it and must also be taken (p. 15).
5. If BME 301L is taken, the Advanced Elective must be in the Electrobiology (EL) Area of Focus.
6. If BME 303L is taken, the Advanced Elective must be in the Imaging and Measurements (IM) Area of Focus. See Tables 7-8 for lists of Advanced Electives with EL and IM Areas of Focus.
7. The BME General Elective can be at any level. An Advanced Elective may be taken instead.

Table 2c: BME/ECE Second Major (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry
ECE 110L Fund Electr and Comput Egr	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	ECE 230L Intro Microelectr Devices & Circuits
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	ECE 280L Intro to Signals & Systems
EGR 201L Mechanics of Solids	CompSci 201 Data Structures and Algorithms (if not already taken to replace EGR 103L)
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids	BME 301L Bioelectricity **or** BME 303L Modern Diagnostic Imaging Systems
Math 353 Ordinary and Partial Diff. Equations	ECE Concentration Elective 1[2]
ECE 250L Computer Architecture	Statistics course[3]
ECE 270L Intro to Electromagnetic Fields	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME design: BME 436L, BME 464L, **or** BME 474L[4]	BME General Elective[6]
BME Advanced Elective[5]	ECE Elective
ECE Concentration Elective 2[2]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective
Social Science and Humanities Elective	

8. See also the Physics requirements on p. 12.
9. At least two ECE Concentration Electives must be from the same Concentration Area
10. Statistics course should be chosen from the ECE options: Stat 130, Stat 240L, Math 230, Math 238L/EGR 238L, ECE 380, ECE 555
11. BME 474L is the second course in a two-semester design sequence; BME 473L is pre-req for it and must also be taken (p. 15).
12. If BME 301L is taken, the Advanced Elective must be in the Electrobiology (EL) Area of Focus.
13. If BME 303L is taken, the Advanced Elective must be in the Imaging and Measurements (IM) Area of Focus. See Tables 7-8 for lists of Advanced Electives with EL and IM Areas of Focus.
14. The BME General Elective can be at any level. An Advanced Elective may be taken instead.

Table 3a: BME/ME Second Major (matriculating class of 2025)

Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
	EGR 121L Engineering Innovation
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
EGR 201L Mechanics of Solids	BME 221L Biomaterials
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Liberal Arts Elective	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME 302L Fund Biomechanics/Biomaterials
Math 353 Ordinary and Partial Diff Equations	ME 336L Fluid Mechanics
ME 331L Thermodynamics	Liberal Arts Elective
ME 321L ME Analysis for Design	
Senior Year	
Fall Semester	**Spring Semester**
ME 344L Control of Dynamic Systems	ME 424L Mechanical Design[2]
ME 421L Mechanical Design	BME Advanced Elective in BB Area of Focus[3]
ME 431L Heat and Mass Transfer	ME Elective 2
ME Elective 1	Liberal Arts Elective
Liberal Arts Elective	Liberal Arts Elective

Students with AP credits should pay particular attention to prerequisites when rearranging the schedule.

1. See also the Physics requirements on p. 12.
2. ME 424L with BME project.
3. Selected from Tables 7-8.

Table 3b: BME/ME Second Major (matriculating class of 2023 and 2024)

Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/105 for 2024 matriculating class **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
	EGR 121L Engineering Innovation
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng
EGR 201L Mechanics of Solids	BME 221L Biomaterials
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Social Science and Humanities Elect	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME 302L Fund Biomechanics/Biomaterials
Math 353 Ordinary and Partial Diff Equations	ME 336L Fluid Mechanics
ME 331L Thermodynamics	Social Science and Humanities Elective
ME 321L ME Analysis for Design	
Senior Year	
Fall Semester	**Spring Semester**
ME 344L Control of Dynamic Systems	ME 424L Mechanical Design[2]
ME 421L Mechanical Design	BME Advanced Elective in BB Area of Focus[3]
ME 431L Heat and Mass Transfer	ME Elective 2
ME Elective 1	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective

Students with AP credits should pay particular attention to prerequisites when rearranging the schedule.
4. See also the Physics requirements on p. 12.
5. ME 424L with BME project.
6. Selected from Tables 7-8.

Table 3c: BME/ME Second Major (matriculating class of 2022)

Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
	EGR 121L Engineering Innovation
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng
EGR 201L Mechanics of Solids	BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	Social Science and Humanities Elect
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals & Systems	BME 302L Fund Biomechanics/Biomaterials
Math 353 Ordinary and Partial Diff Equations	ME 336L Fluid Mechanics
ME 331L Thermodynamics	Social Science and Humanities Elective
ME 321L ME Analysis for Design	
Senior Year	
Fall Semester	**Spring Semester**
ME 344L Control of Dynamic Systems	ME 424L Mechanical Design[2]
ME 421L Mechanical Design	BME Advanced Elective in BB Area of Focus[3]
ME 431L Heat and Mass Transfer	ME Elective 2
ME Elective 1	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective

Students with AP credits should pay particular attention to prerequisites when rearranging the schedule.

1. See also the Physics requirements on p. 12.
2. ME 424L with BME project.
3. Selected from Tables 7-8.

Table 4a: BME/CEE Second Major (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
EGR 201L Mechanics of Solids	BME 221L Biomaterials
Chem 210DL Mod Apps Chem Principle **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Liberal Arts Elective	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals and Systems	BME 302L Fund Biomechanics/Biomaterials **or** BME 307 Transport Phenom in Biological Systems
Math 353 Ordinary and Partial Diff Equations	CEE 462L Bio Principles in Environmental Egr
CEE 461L Chem Principles in Env Egr	CEE 201L Uncertainty Design and Optimization
CEE 301L Fluid Mechanics	Stat 130 Probability and Statistics in Engineering
Senior Year	
Fall Semester	**Spring Semester**
CEE 463L Water Resources Engineering	BME/CEE Design[3]
EGR 305 Egr System Optim Econ	BME Advanced Elective[4]
CEE Elective[2]	Liberal Arts Elective
Liberal Arts Elective	Liberal Arts Elective
Liberal Arts Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the following list of CEE electives:
   - CEE 561 Environmental Aquatic Chemistry
   - CEE 562 Biological Processes in Environ Engineering
   - Biotech CEE 563 Chemical Fate of Organic Compounds
   - in CEE 564 Physical Chemical Processes in Environ Egr
   - CEE 571 Control of Hazardous and Toxic Waste
   - CEE 575 Air Pollution Control Engineering
   - CEE 581 Pollutant Transport Systems
   - CEE 661L Environmental Molecular
   - CEE 671 Physicochemical Unit Operations Water Treatment
   - CEE 672 Solid Waste Engineering
   - CEE 685 Water Supply Engineering Design
3. Currently the only option is CEE 469 Integrated Environmental Design, but contact the CEE DUS in case of updates.
4. If BME 302L is taken, the Advanced Elective must be in the Biomaterials/Biomechanics (BB) Area of Focus.
   If BME 307 is taken, the Advanced Elective must be in the Molecular, Cellular and Tissue Engineering (MC) Area of Focus.

Table 4b: BME/CEE Second Major (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/105 for 2024 matriculating class **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
EGR 201L Mechanics of Solids	BME 221L Biomaterials
Chem 210DL Mod Apps Chem Principle **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Social Science and Humanities Elective	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals and Systems	BME 302L Fund Biomechanics/Biomaterials **or** BME 307 Transport Phenom in Biological Systems
Math 353 Ordinary and Partial Diff Equations	CEE 462L Bio Principles in Environmental Egr
CEE 461L Chem Principles in Env Egr	CEE 201L Uncertainty Design and Optimization
CEE 301L Fluid Mechanics	Stat 130 Probability and Statistics in Engineering
Senior Year	
Fall Semester	**Spring Semester**
CEE 463L Water Resources Engineering	BME/CEE Design[3]
EGR 305 Egr System Optim Econ	BME Advanced Elective[4]
CEE Elective[2]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective
Social Science and Humanities Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the following list of CEE electives:
   CEE 561 Environmental Aquatic Chemistry
   CEE 562 Biological Processes in Environ Engineering
   Biotech CEE 563 Chemical Fate of Organic Compounds in CEE 564 Physical Chemical Processes in Environ Egr
   CEE 571 Control of Hazardous and Toxic Waste
   CEE 575 Air Pollution Control Engineering
   CEE 581 Pollutant Transport Systems
   CEE 661L Environmental Molecular
   CEE 671 Physicochemical Unit Operations Water Treatment
   CEE 672 Solid Waste Engineering
   CEE 685 Water Supply Engineering Design
3. Currently the only option is CEE 469 Integrated Environmental Design, but contact the CEE DUS in case of updates.
4. If BME 302L is taken, the Advanced Elective must be in the Biomaterials/Biomechanics (BB) Area of Focus.
   If BME 307 is taken, the Advanced Elective must be in the Molecular, Cellular and Tissue Engineering (MC) Area of Focus.

Table 4c: BME/CEE Second Major (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	ECE 110L Fund Electr and Comput Eng
EGR 201L Mechanics of Solids	BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids
Chem 210DL Mod Apps Chem Principle **or** Chem 201DL Organic Chemistry	Math 219 Multivariable Calculus
Math 218D-2 Matrices and Vectors	EGR 244L Dynamics
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 260L Modeling Cellul and Molecul Systems	BME 354L Intro to Medical Instrumentation
BME 271D Signals and Systems	BME 302L Fund Biomechanics/Biomaterials **or** BME 307 Transport Phenom in Biological Systems
Math 353 Ordinary and Partial Diff Equations	CEE 462L Bio Principles in Environmental Egr
CEE 461L Chem Principles in Env Egr	CEE 201L Uncertainty Design and Optimization
CEE 301L Fluid Mechanics	Stat 130 Probability and Statistics in Engineering
Senior Year	
Fall Semester	**Spring Semester**
CEE 463L Water Resources Engineering	BME/CEE Design[3]
EGR 305 Egr System Optim Econ	BME Advanced Elective[4]
CEE Elective[2]	Social Science and Humanities Elective
Social Science and Humanities Elective	Social Science and Humanities Elective
Social Science and Humanities Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the following list of CEE electives:
   CEE 561 Environmental Aquatic Chemistry
   CEE 562 Biological Processes in Environ Engineering
   Biotech CEE 563 Chemical Fate of Organic Compounds in CEE 564 Physical Chemical Processes in Environ Egr
   CEE 571 Control of Hazardous and Toxic Waste
   CEE 575 Air Pollution Control Engineering
   CEE 581 Pollutant Transport Systems
   CEE 661L Environmental Molecular
   CEE 671 Physicochemical Unit Operations Water Treatment
   CEE 672 Solid Waste Engineering
   CEE 685 Water Supply Engineering Design
3. Currently the only option is CEE 469 Integrated Environmental Design, but contact the CEE DUS in case of updates.
4. If BME 302L is taken, the Advanced Elective must be in the Biomaterials/Biomechanics (BB) Area of Focus.
   If BME 307 is taken, the Advanced Elective must be in the Molecular, Cellular and Tissue Engineering (MC) Area of Focus.

Table 5a: BME(BSE)/CompSci (BA)Second Major (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecular Systems
CS 201 (if not already taken to replace EGR 103L)	Liberal Arts Elective
Junior Year	
Fall Semester	**Spring Semester**
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	One of CS 310, 316, 356, 351, or 350
BME 271D Signals & Systems	BME Area Core Class I[2]
BME 221L Biomaterials	BME Area Core Class II[2]
Math 353 Ordinary and Partial Diff Equations	BME 354L Intro to Medical Instrumentation
Liberal Arts Elective	Liberal Arts Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective[5]	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective[7]
CS Elective[7] **or** CS 330 Introduction to Design and Analysis of Algorithms	Liberal Arts Elective
Liberal Arts Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the Area Core classes listed in Table 7.
3. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety
   Engineering BME 436L Biophotonics
   Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
4. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
5. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
6. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.
7. CS Elective must be a CS course that is 200 level or higher and cannot be an independent study

Table 5b: BME(BSE)/CompSci (BA)Second Major (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	EGR 201L Mechanics of Solids
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
Social Science and Humanities Elective	BME 260L Modeling Cellul and Molecular Systems
CS 201 (if not already taken to replace EGR 103L)	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	One of CS 310, 316, 356, 351, or 350
BME 271D Signals & Systems	BME Area Core Class I[2]
BME 221L Biomaterials	BME Area Core Class II[2]
Math 353 Ordinary and Partial Diff Equations	BME 354L Intro to Medical Instrumentation
Social Science and Humanities Elective	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective[5]	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective[7]
CS Elective[7] **or** CS 330 Introduction to Design and Analysis of Algorithms	Social Science and Humanities Elective
Social Science and Humanities Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the Area Core classes listed in Table 7.
3. For 1-semester Design, select from the following list: BME
   432L Biomechanics of Vehicle Safety Engineering
   BME 436L Biophotonics Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
4. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
5. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
6. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.
7. CS Elective must be a CS course that is 200 level or higher and cannot be an independent study

Table 5c: BME(BSE)/CompSci (BA)Second Major (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms **or** Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	EGR 201L Mechanics of Solids
ECE 110L Fund Electr and Comput Eng	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	BME 260L Modeling Cellul and Molecular Systems
CS 201 (if not already taken to replace EGR 103L)	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	One of CS 310, 316, 356, 351, or 350
BME 271D Signals & Systems	BME Area Core Class I[2]
BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids	BME Area Core Class II[2]
Math 353 Ordinary and Partial Diff Equations	BME 354L Intro to Medical Instrumentation
Social Science and Humanities Elective	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective[5]	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective[7]
CS Elective[7] **or** CS 330 Introduction to Design and Analysis of Algorithms	Social Science and Humanities Elective
Social Science and Humanities Elective	

1. See also the Physics requirements on p. 12.
2. Selected from the Area Core classes listed in Table 7.
3. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety Engineering
   BME 436L Biophotonics Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
4. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
5. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
6. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.
7. CS Elective must be a CS course that is 200 level or higher and cannot be an independent study

Table 5d: BME(BSE)/CompSci (BS) Second Major (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
AP CS credit (or prior programming experience) or CS 201 Data Structures & Algorithms[7]	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecular Systems
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	Liberal Arts Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	One of CS 310, 316, 356, 351, or 350
BME 221L Biomaterials	BME Area Core Class I[2]
Math 353 Ordinary and Partial Diff Equations	BME Area Core Class II[2]
Liberal Arts Elective	BME 354L Intro to Medical Instrumentation
CS Elective[8]	Liberal Arts Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective &CS Elective: BME 547 Medical Software Design	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective
CS Elective[8] **or** CS 330 Introduction to Design and Analysis of Algorithms	Liberal Arts Elective
Liberal Arts Elective	CS Elective[8]

1. See also the Physics requirements on p. 12.
2. Selected from the Area Core classes listed in Table 7.
3. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety Engineering
   BME 436L Biophotonics Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
4. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
5. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
6. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.
7. CS Elective must be a CS course that is 200 level or higher and cannot be an independent study
8. CS Elective must be a CS course that is 200 level or higher and cannot be an independent study

Table 5e: BME(BSE)/CompSci (BS) Second Major (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating class
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	AP CS credit, CS 201 Data Structures & Algorithms[7] or Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
AP CS credit (or prior programming experience), CS 201 Data Structures & Algorithms[7] or Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	EGR 201L Mechanics of Solids
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
Physics 152L Intro Electr Magn Opt **or** Phy 26[1]	BME 260L Modeling Cellul and Molecular Systems
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	One of CS 310, 316, 356, 351, or 350
BME 221L Biomaterials	BME Area Core Class I[2]
Math 353 Ordinary and Partial Diff Equations	BME Area Core Class II[2]
Social Science and Humanities Elective	BME 354L Intro to Medical Instrumentation
CS Elective[8]	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective &CS Elective: BME 547 Medical Software Design	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective
CS Elective[8] **or** CS 330 Introduction to Design and Analysis of Algorithms	Social Science and Humanities Elective
Social Science and Humanities Elective	CS Elective[8]

Table 5f: BME(BSE)/CompSci (BS) Second Major (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	AP CS credit, CS 201 Data Structures & Algorithms[7] or Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
AP CS credit, CS 201 Data Structures & Algorithms[7] or Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	EGR 201L Mechanics of Solids
ECE 110L Fund Electr and Comput Eng	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem
Math 218D-2 Matrices and Vectors	Math 219 Multivariable Calculus
Social Science and Humanities Elective	BME 260L Modeling Cellul and Molecular Systems
CS 210 Introduction to Computer Systems **or** CS 250 Computer Architecture	Physics 152L Intro Electr Magn Opt **or** Phy 26[1]
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	One of CS 310, 316, 356, 351, or 350
BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids	BME Area Core Class I[2]
Math 353 Ordinary and Partial Diff Equations	BME Area Core Class II[2]
Social Science and Humanities Elective	BME 354L Intro to Medical Instrumentation
CS Elective[8]	Social Science and Humanities Elective
Senior Year	
Fall Semester	**Spring Semester**
BME Design[3] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[4]	BME Advanced Elective[5] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[4]
BME Advanced Elective &CS Elective: BME 547 Medical Software Design	BME General Elective[6]
BME Advanced Elective[5]	CS 330 Introduction to Design and Analysis of Algorithms **or** CS Elective
CS Elective[8] **or** CS 330 Introduction to Design and Analysis of Algorithms	Social Science and Humanities Elective
Social Science and Humanities Elective	CS Elective[8]

Table 6a: BME Major planning for 4+1 BSE/Master's Programs (matriculating class of 2025)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	Academic Writing 120
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 105L Computing for Engineers **or**, with AP CS credit, CS 201 Data Structures & Algorithms	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecul Systems
Liberal Arts Elective	Liberal Arts Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Liberal Arts Elective	Liberal Arts Elective
Elective	
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	***500-level or above Course for Master's degree***
Liberal Arts Elective	***500-level or above Course for Master's degree***
Elective	

NOTES

- For more details, see p. 23, the site https://pratt.duke.edu/undergrad/degrees/bse-masters,
- For the 4+1 **BME/MS** program, only 500-level courses or higher taken in the Senior Spring semester that are not used for the BSE degree can be applied toward the MS degree (in addition to courses taken in the 5th year as an MS student).
- For the 4+1 **BSE/Meng** and **BME/MEM** programs, 500-level courses or higher taken in any undergraduate semester that are not used for the BSE degree can be applied toward the MEM or Meng degree (in addition to courses taken in the 5th year as an Meng or MEM student).
- The BSE degree requirements are the same as for majoring in BME without 4+1 (i.e. Table 1a). The same undergraduate graduation checklist applies.
- **Courses used for the BSE degree cannot count for any 4+1 Master's degree requirements**. However, they may double count for BME Master's certificates (e.g., Medical Device Design and Biotechnology).

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 12.
3. Selected from the Area Core classes listed in Table 7.
4. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety
   Engineering BME 436L Biophotonics
   Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
5. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
6. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
7. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 6b: BME Major planning for 4+1 BSE/Master's Programs (matriculating class of 2023 and 2024)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L for 2023 matriculating students
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L/105L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms or Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering/105 for 2024 matriculating students **or**, with AP CS credit, CS 201 Data Structures & Algorithms or Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	Physics 152L Intro Electr Magn Opt **or** Phy 26[2]
Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem	ECE 110L Fund Electr and Comput Eng **or** BME 290L Biomedical Electronic Measurements
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
EGR 201L Mechanics of Solids	BME 260L Modeling Cellul and Molecul Systems
Social Science and Humanities Elective	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Social Science and Humanities Elective	Social Science and Humanities Elective
Elective	
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	***500-level or above Course for Master's degree***
Social Science and Humanities Elective	***500-level or above Course for Master's degree***
Elective	

NOTES

- For more details, see p. 23, the site https://pratt.duke.edu/undergrad/degrees/bse-masters.
- For the 4+1 **BME/MS** program, only 500-level courses or higher taken in the Senior Spring semester that are not used for the BSE degree can be applied toward the MS degree (in addition to courses taken in the 5th year as an MS student).
- For the 4+1 **BSE/Meng** and **BME/MEM** programs, 500-level courses or higher taken in any undergraduate semester that are not used for the BSE degree can be applied toward the MEM or Meng degree (in addition to courses taken in the 5th year as an Meng or MEM student).
- The BSE degree requirements are the same as for majoring in BME without 4+1 (i.e. Table 1a). The same undergraduate graduation checklist applies.
- **Courses used for the BSE degree cannot count for any 4+1 Master's degree requirements**. However, they may double count for BME Master's certificates (e.g., Medical Device Design and Biotechnology).

1. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
2. See also the Physics requirements on p. 9.

3. Selected from the Area Core classes listed in Table 7.
4. For 1-semester Design, select from the following list:
   BME 432L Biomechanics of Vehicle Safety
   Engineering BME 436L Biophotonics
   Instrumentation
   BME 462L Design for the Developing World
   BME 464L Medical Instrument Design
   BME 490L Special Topics in BME Design
5. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 12.
6. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
7. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 6c: BME Major planning for 4+1 BSE/Master's Programs (matriculating class of 2022)

First Year	
Fall Semester	**Spring Semester**
EGR 101L Engineering Design and Communication	Bio 201L Gateway to Biol: Molecular Biology **or**, with Bio AP=5, Bio 203L
Chem 101DL Core Concepts in Chemistry **or** Chem 110DL **or** Chem 21	EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms or Academic Writing 101
Math 111L Laboratory Calculus I **or** Math 21	Math 112L Lab Calculus II **or** Math 22
EGR 103L Computational Methods in Engineering **or**, with AP CS credit, CS 201 Data Structures & Algorithms or Academic Writing 101	Physics 151L Intro Mechanics **or** Phy 25
Sophomore Year	
Fall Semester	**Spring Semester**
BME 244L Quant Physiology with Biostat Appl	EGR 201L Mechanics of Solids
ECE 110L Fund Electr and Comput Eng	Chem 210DL Mod Apps Chem Principles **or** Chem 201DL Organic Chem
Math 218D-2 Matrices and Vectors[1]	Math 219 Multivariable Calculus[1]
Physics 152L Intro Electr Magn Opt **or** Phy 26[2]	BME 260L Modeling Cellul and Molecul Systems
Social Science and Humanities Elective	Social Science and Humanities Elective
Junior Year	
Fall Semester	**Spring Semester**
BME 271D Signals & Systems	BME 354L Intro to Medical Instrumentation
BME 221L Biomaterials **or** ME 221L Structure and Properties of Solids	BME Area Core Class I[3]
Math 353 Ordinary and Partial Diff Equations[1]	BME Area Core Class II[3]
Social Science and Humanities Elective	Social Science and Humanities Elective
Elective	
Senior Year	
Fall Semester	**Spring Semester**
BME Design[4] **or** 1st course of 2-semester BME Design (counts as an Advanced Elective)[5]	BME Advanced Elective[6] **or** 2nd course of 2-semester BME Design (counts as the Design Requirement)[5]
BME Advanced Elective[6]	BME General Elective[7]
BME Advanced Elective[6]	***500-level or above Course for Master's degree***
Social Science and Humanities Elective	***500-level or above Course for Master's degree***
Elective	

NOTES

- For more details, see p. 23, the site https://pratt.duke.edu/undergrad/degrees/bse-masters,
- For the 4+1 **BME/MS** program, only 500-level courses or higher taken in the Senior Spring semester that are not used for the BSE degree can be applied toward the MS degree (in addition to courses taken in the 5th year as an MS student).
- For the 4+1 **BSE/Meng** and **BME/MEM** programs, 500-level courses or higher taken in any undergraduate semester that are not used for the BSE degree can be applied toward the MEM or Meng degree (in addition to courses taken in the 5th year as an Meng or MEM student).
- The BSE degree requirements are the same as for majoring in BME without 4+1 (i.e. Table 1a). The same undergraduate graduation checklist applies.

- **Courses used for the BSE degree cannot count for any 4+1 Master's degree requirements**. However, they may double count for BME Master's certificates (e.g., Medical Device Design and Biotechnology).

8. Students with BME/Math Second-major need to take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.
9. See also the Physics requirements on p. 12.
10. Selected from the Area Core classes listed in Table 7.
11. For 1-semester Design, select from the following
    list: BME 432L Biomechanics of Vehicle Safety
    Engineering BME 436L Biophotonics
    Instrumentation
    BME 462L Design for the Developing World
    BME 464L Medical Instrument Design
    BME 490L Special Topics in BME Design
12. For details of 2-semester design options consisting of a specific Advanced Elective + Design class pairing, see p. 17.
13. Two of the Advanced Electives must have the same Area of Focus (Tables 7-8).
14. The BME General Elective can be at any level. A fourth Advanced Elective can be taken instead.

Table 7: BME Advanced Electives with an Area of Focus

(BB)	**Biomechanics and Biomaterials** *Core Class: BME 302L Fundamentals of Biomaterials and Biomechanics*	**(EL)**	**Electrobiology** *Core Class: BME 301L Bioelectricity*
BME 507	Cardiovasc System Egr, Disease, Therapy*	BME 503	Computational Neuroengineering
BME 520L	Computing Foundations for Large-Scale Biomedical Simulation	BME 504	Fundamentals of Electrical Stimulation of the Nervous System
BME 521	Biomaterials: Biointerfaces	BME 505L	Biopotential Amplifiers and Implant Devices
BME 527	Cell Mechanics and Mechanotransduction	BME 506	Measurement and Control of Cardiac Electr Events
BME 528	Biofluid Mechanics*	BME 507	Cardiovasc System Egr, Disease, Therapy
BME 529	Theoretical and Applied Polymer Science	BME 510	Bayesian Analysis on Biomed Engineering
BME 530	Intro to Tissue Biomechanics	BME 513	Introduction to Neurodynamics
BME 531	Intermediate Biomechanics	BME 515	Neural Prosthetic Systems
BME 532	Viscoelastic Biomechanics	BME 517	Neuronal Control of Movement
BME 535	Biomedical Aspects of Blasts and Ballistics		
BME 563	Transport Proc in HIV Transm & Prevention*		
BME 570L	Introduction to Biomolecular Engineering		
BME 577	Drug Delivery*		
BME 578	Quantitative Cell and Tissue Engineering		
		`	
(IM)	**Imaging and Measurement Systems** *Core Class: BME 303L, Modern Diagnostic Imaging Systems*	**(MC)**	**Molecular, Cellular and Tissue Eng** *Core Classes: BME 307, Transport Phenomena in Biological Systems or the new 306L, 305L/390L courses*
		BME 405L	Biotech Design I
BME 473L	Medical Device Design I (first class of a two- semester design sequence; see p. 12)	BME 520L	Computing Foundations for Large-Scale Biomedical Simulation
BME 505L	Biopotential Amplifiers and Implant Devices*	BME 521	Biomaterials: Biointerfaces
BME 506	Measurem and Control Cardiac Electr Events*	BME 527	Cell Mechanics and Mechanotransduction
BME 515	Neural Prosthetic Systems*	BME 528	Biofluid Mechanics
BME 540	Mobile Devices for Biomedicine	BME 562	Biology by Design
BME 542	Principles of Ultrasound Imaging	BME 563	Transport Proc in HIV Transm & Prevention
BME 543L	Cardiac Ultrasound Imaging and Function	BME 564L	Gene Engineering Laboratory
BME 544	Digital Image Processing	BME 565L	Environmental Molecular Biotechnology
BME 546	MRI: Physical Principles and Sequence Design	BME 566	Transport Phenomena in Cells and Organs
BME 547	Medical Software Design	BME 567	Biosensors
BME 548L	Machine Learning and Imaging	BME 568	Lab in Cellular and Biosurface Eng
BME 550	Modern Microscopy	BME 569	Cell Transport Mechanisms
BME 551L	Biomed Opt Spectroscopy and Tissue Optics	BME 570L	Intro. To Biomolecular Engineering
BME 552	Advanced Optics	BME 574	Modeling and Engineering Gene Circuits
BME 553	Principles of Biomedical Optics	BME 577	Drug Delivery
BME 555	Advances in Photonics	BME 578	Quantitative Cell and Tissue Engineering
BME 567	Biosensors		
(DS)	**Data Science** *Core Class: BME 390L, BME Data Science*	(DS)	Data Science
BME 520L	Computing Foundations for Large-Scale Biomedical Simulation	BME 544	Digital Image Processing
BME 547	Medical Software Design	BME 548L	Machine Learning and Imaging
BME 574	Modeling and Engineering Gene Circuits		

(See also Table 10)

NOTE: Not all electives are offered every year.

*This course has a prerequisite that is *beyond* BME required courses or this area's Core Class.

Table 8: BME Advanced Electives with no Area of Focus

BME 580	Introduction to Biomedical Data Science

Table 9: BME General Electives

BME 230L	Global Women's Health Technologies

NOTE: Not all electives are offered every year.

Table 10: Area Designations of BME Special Topics Courses
(taught within last four years)

Course Section	Areas*
BME 290 Ethics of Biomedical Engineering	GE
BME 290L Design Prototyping Skills	GE
BME 290L Laparoscopic Surgery	GE
BME 290L Medtech Prototyping Skills	GE
BME 290L Biotech Prototyping Skills	GE
BME 490L Biomedical and Clinical Design†	
BME 490L Engineering Health Solutions	
BME 490L Biopot Amps and Implant Devices†	
BME 590 Biodesign	GE
BME 590 Biomechanics of Neurotrauma	BB, GE
BME 590 Engineering Health Solutions	GE
BME 590 Engineering Living Systems	MC, GE
BME 590 Introduction to Polymer Physics	BB, GE
BME 590 Quality Management Systems	GE
BME 590 Synaptic Biology Synthetic Technology	EL, MC, GE
BME 590 Deep Net Models of the Brain	DS, EL, GE
BME 590 Quality Systems for BME	GE
BME 590L Biomanufacturing 1: Upstream	MC, GE
BME 590L Machine Learning in Pharmacology	DS, MC, GE
BME 590 Fund and Design of Biomaterials	BB, GE
BME 590L Tech Rehab Engineering Research I	BB, GE
BME 590 Vascular Bioengineering	AE, MC, GE
BME 590 Protein Design with Deep Learning	DS, AE, MC, GE
BME 590 Spatial Omics	DS, MC, GE
BME 590 Business Fundamentals in Medtech	GE
BME 590 Automation and High-throughput Biology	DS, MC, GE
BME 590 Aberration Theory Lens Design	AE, IM, GE
BME 590L Medical Electrical Equipment	AE, IM,EL, GE
BME 590 Protein structure, function, and modeling	DS, MC, GE
BME 590 Adv Comp Modeling of Biological Networks	DS, MC, GE

NOTE: Not all electives are offered every year.

*Elective designations: BB: Biomechanics and Biomaterials; EL: Electrobiology; IM: Imaging and Measurement Systems; MC: Molecular, Cellular, and Tissue Engineering; DS: Data Science; GE: General Elective.

†Satisfies Design Requirement.

Table 9: BME Required Courses That Are Prerequisites for Other BME Courses

EGR 103L/105L **or** CS 201	Computational Methods in Engineering/ Computing for Engineers	BME 244L, BME 577
ECE 110L **or** BME290L	Fundamentals of Electrical and Computer Engineering **or** Biomedical Electronic Measurements	BME 271D, BME 301L, BME 354L, BME 515
EGR 201L	Mechanics of Solids	BME 221L, BME 526, BME 530, BME 531
BME 221L	Biomaterials	BME 302L, BME 571L
BME 244L	Quantitative Physiology with Biostatistical Applications	BME 260L*, BME 301L, BME 302L, BME 303L, BME 307, BME 354L, BME 562, BME 580
BME 260L	Modeling Cellular and Molecular Systems	BME 301L, BME 306L, BME 307, BME 390L (305L) BME 560, BME 570L, BME 574
BME 271D	Signals and Systems	BME 303L, BME 354L, BME 544, BME 545, BME 547
BME 354L	Introduction to Medical Instrumentation	BME 436L, BME 460L, BME 464L, BME 473L*, BME 502, BME 506, BME 543L BME 550
BME 301L	Bioelectricity	BME 503, BME 504L, BME 505L, BME 506, BME 507, BME 511L, BME 512L, BME 513, BME 515, BME 517
BME 302L	Fundamentals of Biomaterials and Biomechanics	BME 432L, BME 507, BME 521, BME 522, BME 523, BME 524, BME 525, BME 527, BME 530, BME 535, BME 578
BME 303L	Modern Diagnostic Imaging Systems	BME 542, BME 546, BME 548L, BME 550
BME 307 **or** BME 306L or BME 305L	Transport Phenomena in Biological Systems **or** Cellular Engineering **or** Molecular Engineering	BME 507, BME 521, BME 524, BME 527, BME 528, BME 563, BME 563, BME 566, BME 568, BME 569, BME 577, BME 578

* May be taken as a co-requisite

Table 10: Complete list of BME and Relevant Courses and Course Titles

Required:

BME 221L	Biomaterials
BME 244L	Quantitative Physiology with Biostatistical Applications
BME 260L	Modeling Cellular and Molecular Systems
BME 271D	Signals and Systems (or BME 271A offered in summer)
BME 354L	Introduction to Medical Instrumentation

Area Core:

BME 301L	Bioelectricity
BME 302L	Fundamentals of Biomaterials and Biomechanics
BME 303L	Modern Diagnostic Imaging Systems
BME 305L	Molecular Engineering (previously taught as BME 390L)
BME 306L	Cellular Engineering
BME 307	Transport Phenomena in Biological Systems
BME 390L	BME Data Science (offered first time Fall of 2024)

Design:

BME 406L	Biotech Design II
BME 432L	Biomechanics and Vehicle Safety Engineering
BME 436L	Biophotonic Instrumentation
BME 462L	Design for the Developing World
BME 464L	Medical Instrumentation Design
BME 474L	Medical Device Design II

Area Electives*:

BME 405L	Biotech Design I
BME 473L	Medical Device Design I (first course of 2-semester design seq.; counts as IM Adv. El.)
BME 502	Neural Signal Acquisition
BME 503	Computational Neuroengineering
BME 504	Fundamentals of Electrical Stimulation of the Nervous System
BME 505L	Biopotential Amplifiers and Implant Devices
BME 506	Measurement and Control of Cardiac Electrical Events
BME 507	Cardiovascular Systems Engineering, Disease and Therapy
BME 510	Bayesian Analysis in Biomedical Engineering
BME 511L	Intermediate Bioelectricity
BME 512L	Cardiac Bioelectricity
BME 513	Introduction to Neurodynamics
BME 515	Neural Prosthetic Systems
BME 517	Neuronal Control of Movement
BME 521	Biomaterials: Interfaces between Materials and Biology
BME 522	Advanced Biomaterials
BME 523	Biomedical Polymers
BME 524	Nanotechnology in Medicine
BME 525	Biomedical Materials and Artificial Organs (C-L: ME 518)
BME 526	Elasticity (C-L: CEE 521)
BME 527	Cell Mechanics and Mechanotransduction
BME 528	Biofluid Mechanics

BME 529 Theoretical and Applied Polymer Science (C-L: ME 514)
BME 530 Introduction to Tissue Biomechanics
BME 531 Intermediate Biomechanics
BME 535 Biomedical Aspects of Blasts and Ballistics
BME 542 Principles of Ultrasound Imaging
BME 543L Cardiac Ultrasound Imaging and Function
BME 544 Digital Image Processing
BME 545 Acoustics and Hearing
BME 546 MRI: Physical Principles and Sequence Design
BME 547 Medical Software Design
BME 548L Machine Learning and Imaging
BME 550 Modern Microscopy
BME 551L Biomedical Optical Spectroscopy and Tissue Optics
BME 552 Advanced Optics (C-L: Physics 621 and ECE 541)
BME 553 Deep Tissue Optics
BME 555 Advances in Photonics
BME 560 Molecular Basis of Membrane Transport
BME 561L Genome Science and Technology Lab
BME 562 Biology by Design
BME 563 Transport Process in HIV Transmission and Prevention
BME 564L Gene Engineering Lab
BME 565L Environmental Molecular Biotechnology (C-L: CEE 661L)
BME 566 Transport Phenomena: Cells and Organs
BME 567 Biosensors
BME 568 Laboratory in Cellular and Biosurface Engineering
BME 569 Cell Transport Mechanisms
BME 570L Introduction to Biomolecular Engineering
BME 571L Biotechnology and Bioprocess Engineering
BME 574 Modeling and Engineering Gene Circuits
BME 577 Drug Delivery
BME 578 Quantitative Cell and Tissue Engineering
BME 580 An Introduction to Biomedical Data Science

*Cross-listing (C-L) is shown if the course is administered by another department.

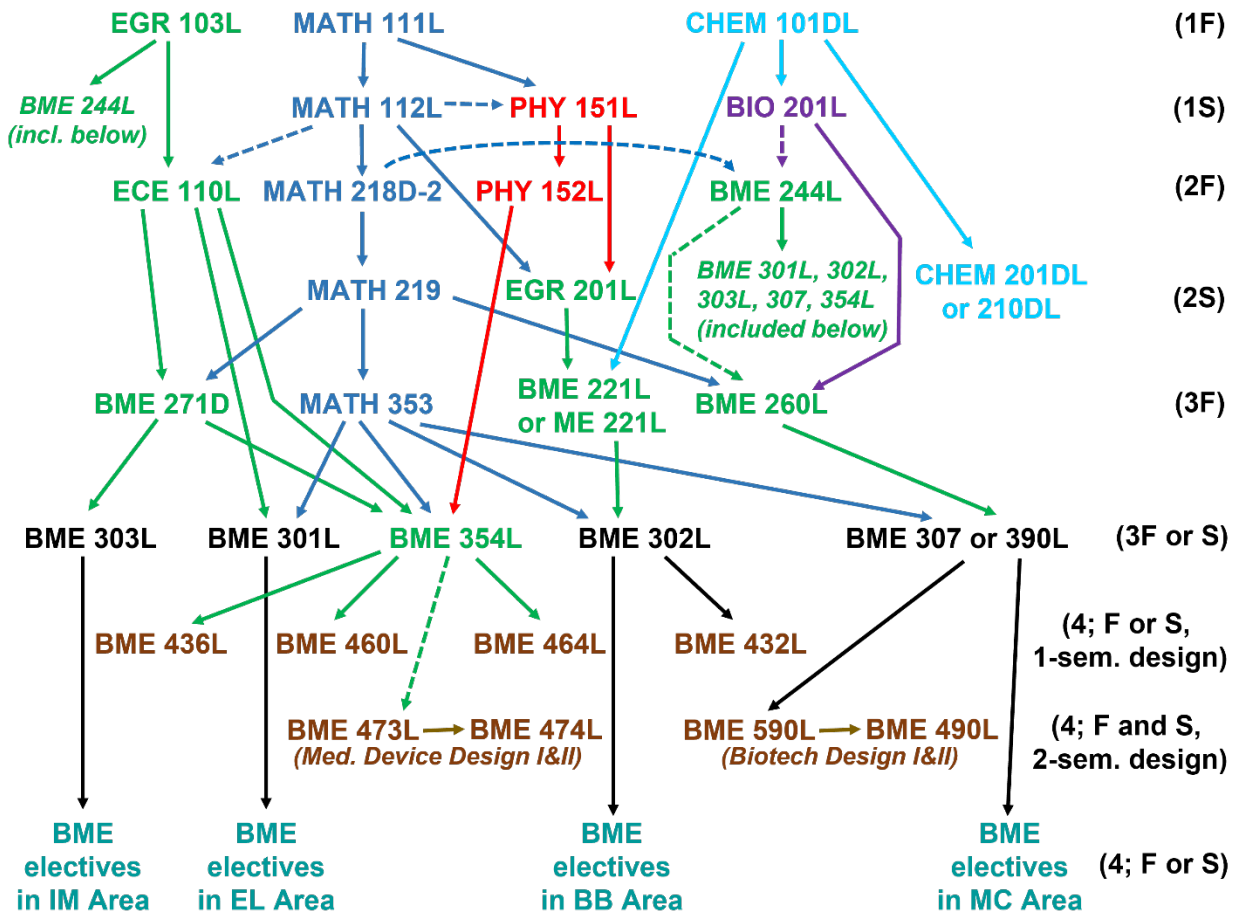
General Electives:
BME 195FS Medical Instrumentation in the Developing
World BME 230L Global Women's Health
Technologies
BME 500-1 Regulation and Reimbursement of Medical Products: Practice and Policy

BME 290, 490, and 590 Special Topics Courses:
See Table 8. For announcements of even newer courses see notifications emailed prior to each semester.

Courses Taught by Other Departments:
Bio 201L Gateway to Biology: Molecular Biology
Bio 203L Molecular Biology, Genetics, and
Evolution Chem 101DL Core Concepts in Chemistry
Chem 110L Core Concepts in Chemistry, Honors
Section Chem 201DL Organic Chemistry 1

Chem 202L Chemistry 2
Chem 210DL Modern Applications of Chemical Principles
CompSci 201 Data Structures & Algorithms
ECE 110L Fundamentals of Electrical and Computer Engineering
ECE 280L Introduction to Signals and Systems
EGR 101L Engineering Design and Communication
EGR 103L Computational Methods in Engineering EGR 105L Computing for Engineers
EGR 201L Mechanics of Solids
Math 111L Laboratory Calculus I
Math 112L Laboratory Calculus II
Math 122L Introductory Calculus II with Applications
Math 212 Multivariable Calculus
Math 216 Linear Algebra and Differential Equations
Math 218D-2 Matrices and Vectors
Math 219 Multivariable Calculus
Math 353 Ordinary and Partial Differential Equations
ME 221L Structure and Properties of Solids
Physics 151L Introductory Mechanics
Physics 152L Introductory Electricity, Magnetism, and Optics Statistics 130 Probability and Statistics in Engineering Writing 101 Academic Writing

Flowchart of Prerequisites: Matriculating class of 2021 and 2022

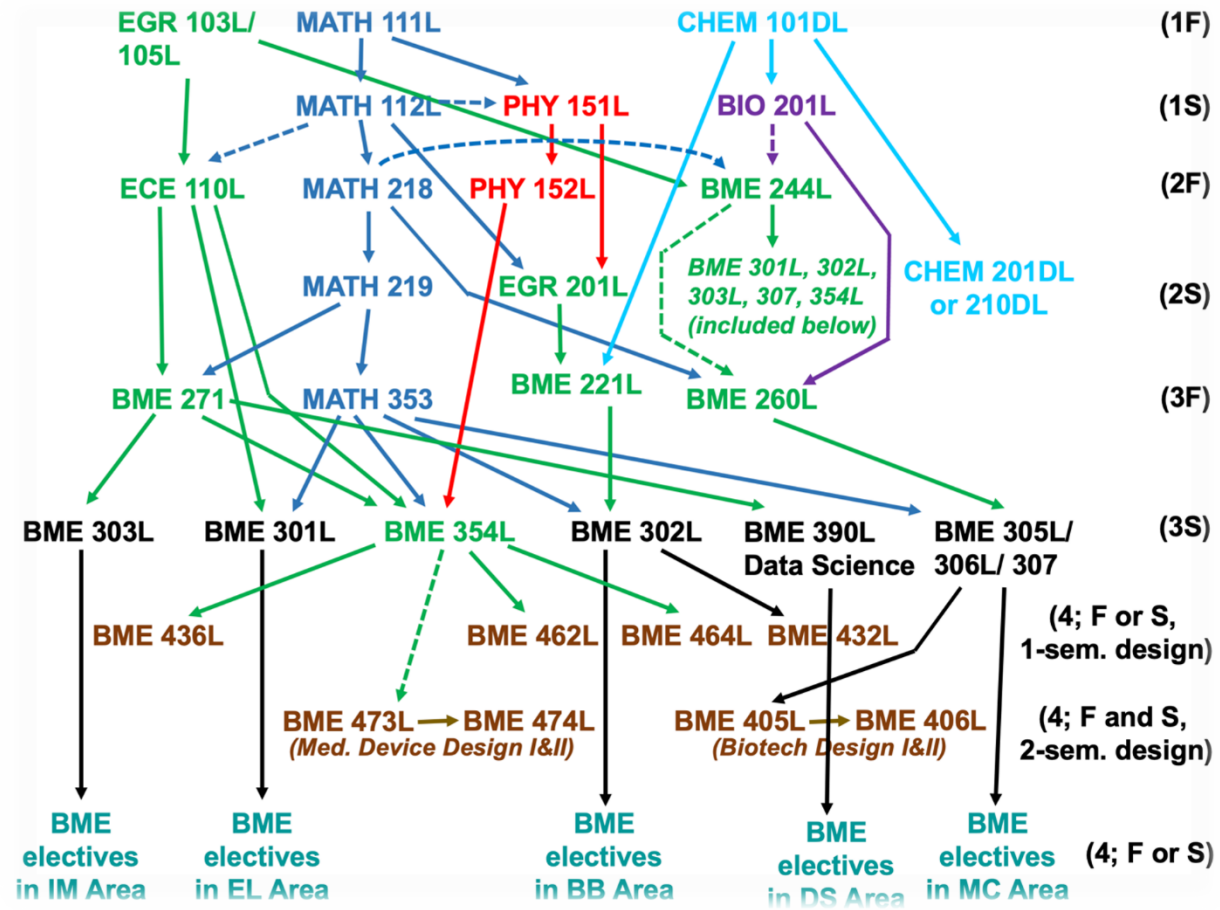


blue:	Math
red:	Physics
cyan:	Chemistry
purple:	Biology
green:	required Engineering courses
black:	BME Area Core courses
brown:	BME design courses
aqua:	BME Advanced Electives with an Area of Focus

dashed arrows -----→ Co-requisites

NOTE: Some courses in the flowchart are prerequisites for *specific BME electives* that are not shown; for example, BME 271D is a prerequisite for BME 547 "Medical Software Design." See Table 10 and the elective course descriptions each semester for the most current information.

Flowchart of Prerequisites: Matriculating class of <u>2023, 2024, and 2025</u>



blue:	Math
red:	Physics
cyan:	Chemistry
purple:	Biology
green:	required Engineering courses
black:	BME Area Core courses
brown:	BME design courses
aqua:	BME Advanced Electives with an Area of Focus

dashed arrows -----▸ Co-requisites

NOTE: Some courses in the flowchart are prerequisites for *specific BME electives* that are not shown; for example, BME 271D is a prerequisite for BME 547 "Medical Software Design." See Table 10 and the elective course descriptions each semester for the most current information.

Graduation Checklists

The following pages show graduation checklists for BME majors and Second majors for the **Graduating Classes of 2025, 2026, 2027, and 2028** (matriculating classes of 2021, 2022, 2023, and 2024, i.e. current seniors, juniors, sophomores, and freshmen)

Checklists are also posted on the BME web site, https://bme.duke.edu/undergrad/curriculum.

Find your checklist:

BME Major, Graduating Classes of **2025 and 2026**: p. 64
BME with ECE as a second major, Graduating Classes of **2025 and 2026**: p. 66
BME with ME as a second major, Graduating Classes of **2025 and 2026**: p. 68
BME with CEE as a second major, Graduating Classes of **2025 and 2026**: p. 69
BME with CompSci as a second major, Graduating Classes of **2025 and 2026**: p. 70

BME Major, Graduating Class of **2027:** p. 75
BME with ECE as a second major, Graduating Class of **2027**: p. 77
BME with ME as a second major, Graduating Class of **2027:** p. 79
BME with CEE as a second major, Graduating Class of **2027**: p. 80
BME with CompSci as a second major, Graduating Class of **2027**: p. 82

Note, students opting for a 4+1 BSE/Master's Program use the same checklists as above; the BSE degree requirements are the same whether you do 4+1 or not.

BME Major

Graduating class of **2025-2026** Course Requirements

(Matriculating Class of 2021 and 2022)

_____ Name

		Area	Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
4.	MATH 218D-2*		_____	_____	
5.	MATH 219*		_____	_____	
6.	MATH 353*		_____	_____	
7.	CHEM 101DL or 110DL or 21		_____	_____	
8.	CHEM 210DL or 201DL		_____	_____	
9.	PHY 151L or 25		_____	_____	
10.	PHY 152L or [26 + PHY_____]**		_____	_____	
11.	Biology 201L or [if Bio AP=5, Bio 203L]***		_____	_____	
	Engineering				
12.	EGR 101L		_____	_____	
13.	EGR 103L [if AP CS credit, CS 201]		_____	_____	
14.	ECE 110L		_____	_____	
15.	EGR 201L		_____	_____	
16.	BME 221L or ME 221L		_____	_____	
17.	BME 244L		_____	_____	
18.	BME 260L		_____	_____	
19.	BME 271D		_____	_____	
20.	BME 354L		_____	_____	
21.	BME Design course _____		_____	_____	BME 432L, 436L, 460L, 464L, 490L or 2nd course of 2-semester design sequence (e.g. BME 474L)
22.	BME Area Core Class _____	____	_____	_____	
23.	BME Area Core Class _____	____	_____	_____	BME 301L, 302L, 303L, or 307/390L
24.	BME Advanced El.****_____	____	_____	_____	
25.	BME Advanced El.****_____	____	_____	_____	
26.	BME Advanced El. _____		_____	_____	
27.	BME General Elective*****_____		_____	_____	BME General Electives can be at any level.
	Humanities and Social Sciences	**Area**			
28.	_____	____	_____	_____	
29.	_____	____	_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same department, and 1 of those must be at the 200 level or higher. Limit of 2 Aps.
30.	_____	____	_____	_____	
31.	_____	____	_____	_____	
32.	_____	____	_____	_____	
	Electives				
33.	_____		_____	_____	
34.	_____		_____	_____	

* BME/MATH dual-majors take Math 221+(212 or 222)+356 in place of Math 218D-2+219+353.

** One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP for 152L.

*** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.

**** Two of the Advanced Electives must be from the same Area of Focus (BB, EL, IM or MC) as one of the Area Core Classes taken. See Tables 7-8 of the BME Undergraduate Handbook.

BME with ECE as a Second Major

Graduating class of **2025-2026** Course Requirements

(Matriculating Class of 2021 and 2022)

_____ Name

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
4.	MATH 218D-2		_____	_____	
5.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
7.	STA 130 or [_____]*		_____	_____	
8.	CHEM 101DL or 110DL or 21		_____	_____	
9.	CHEM 210DL or 201DL		_____	_____	
10.	PHY 151L or 25		_____	_____	
11.	PHY 152L or [26 + PHY_____]**		_____	_____	
12.	Biology 201L or [if Bio AP=5, Bio 203L]***		_____	_____	
	Engineering				
13.	CompSci 201		_____	_____	
14.	EGR 101L		_____	_____	
15.	EGR 103L [if AP CS credit, CompSci 201]		_____	_____	
16.	EGR 201L		_____	_____	
17.	BME 221L or ME 221L		_____	_____	
18.	ECE 110L		_____	_____	
19.	ECE 230L		_____	_____	
20.	ECE 250L		_____	_____	
21.	ECE 270L		_____	_____	
22.	ECE 280L		_____	_____	
23.	ECE Concentration elective _____		_____	_____	Two approved concentration electives in *one* area of ECE concentration.
24.	ECE Concentration elective _____		_____	_____	
25.	ECE Elective _____		_____	_____	Any ECE course at 300 level or above.
26.	BME 244L		_____	_____	
27.	BME 260L		_____	_____	
28.	BME 354L		_____	_____	
29.	BME 436L, BME 464L, or BME 474L		_____	_____	
		Area			
30.	BME 301L or BME 303L**** _____	_____	_____	_____	
31.	BME Advanced Elective**** _____		_____	_____	
32.	BME General Elective*****_____		_____	_____	BME General Elective can be at any level.
	Humanities and Social Sciences	**Area**			
33.	_____		_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same department, and 1 of those must be at the 200 level or higher. Limit of 2 AP.
34.	_____		_____	_____	
35.	_____		_____	_____	
36.	_____		_____	_____	
37.	_____		_____	_____	

* Alternatives to Sta 130 include Sta 240L, Math 230, Math 238L/EGR 238L, ECE 380, or ECE 555

** One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

BME with ME as a second major

Graduating class of **2025-2026** Course Requirements

(Matriculating Class of 2021 and 2022)

_____ Name

		Term/Yr Taken	Grade
	Writing		
1.	Writing 101	_____	_____
	Mathematics and Natural Science		
2.	MATH 111L or 21	_____	_____
3.	MATH 112L or 122L or 22	_____	_____
4.	MATH 218D-2	_____	_____
5.	MATH 219	_____	_____
6.	MATH 353	_____	_____
7.	CHEM 101DL or 110DL or 21	_____	_____
8.	CHEM 210DL or 201DL	_____	_____
9.	PHY 151L or 25	_____	_____
10.	PHY 152L or [26 + PHY_____]*	_____	_____
11.	Biology 201L or [if Bio AP=5, Bio 203L]**	_____	_____
	Engineering		
12.	EGR 101L	_____	_____
13.	EGR 103L/105L or [if AP CS credit, CS 201]	_____	_____
14.	EGR 201L	_____	_____
15.	EGR 121L	_____	_____
16.	EGR 244L	_____	_____
17.	ECE 110L	_____	_____
18.	BME 244L	_____	_____
19.	BME 260L	_____	_____
20.	BME 271D	_____	_____
21.	BME 354L	_____	_____
22.	BME 302L	_____	_____
23.	BME/ME Design course*** _____	_____	_____
24.	BME Advanced Elective in BB Area****_____	_____	_____
25.	BME 221L or ME 221L	_____	_____
26.	ME 321L	_____	_____
27.	ME 331L	_____	_____
28.	ME 336L	_____	_____
29.	ME 344L	_____	_____
30.	ME 421L	_____	_____
31.	ME 431L	_____	_____
32.	ME elective 1 _____	_____	_____
33.	ME elective 2 _____	_____	_____

	Humanities and Social Sciences	**Area**			
34.	_____	_____	_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same dept., and 1 of those must be at the 200 level or higher. Limit of 2 Aps.
35.	_____	_____	_____	_____	
36.	_____	_____	_____	_____	
37.	_____	_____	_____	_____	
38.	_____	_____	_____	_____	

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.

*** ME 424L with BME project.

**** Listed in Tables 7-8 of the BME Undergraduate Handbook.

BME with CEE as a second Major

Graduating class of **2025-2026** Course Requirements

(Matriculating Class of 2021 and 2022)

_____ Name

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
4.	MATH 218D-2		_____	_____	
5.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
7.	STA 130		_____	_____	
8.	CHEM 101DL or 110L or 21		_____	_____	
9.	CHEM 210DL or 201DL		_____	_____	
10.	PHY 151L or 25		_____	_____	
11.	PHY 152L or [26 + PHY_____]*		_____	_____	
12.	Biology 201L or [if Bio AP=5, Bio 203L]**		_____	_____	
	Engineering				
13.	EGR 101L		_____	_____	
14.	EGR 103L/105L or [if AP CS credit, CS 201]		_____	_____	
15.	EGR 201L		_____	_____	
16.	EGR 244L		_____	_____	
17.	EGR 305		_____	_____	
18.	BME 221L or ME 221L		_____	_____	
19.	ECE 110L		_____	_____	
20.	BME 244L		_____	_____	
21.	BME 260L		_____	_____	
22.	BME 271D		_____	_____	
23.	BME 354L		_____	_____	
24.	BME/CEE Design course: _____		_____	_____	Currently only CEE 469, but check with CEE DUS for any updates.
		Area			
25.	BME 302L or BME 307*** _____	_____	_____	_____	
26.	BME Advanced Elective*** _____	_____	_____	_____	
27.	CEE 201L		_____	_____	
28.	CEE 301L		_____	_____	
29.	CEE 461L		_____	_____	
30.	CEE 462L		_____	_____	
31.	CEE 463L		_____	_____	
32.	CEE elective**** _____		_____	_____	
	Humanities and Social Sciences	**Area**			
33.	_____	_____	_____	_____	Five required. At least 1 SS and at least 2 from the 3 remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same dept., and at least 1 of those must be at the 200 level or higher. Limit 2 Aps.
34.	_____	_____	_____	_____	
35.	_____	_____	_____	_____	
36.	_____	_____	_____	_____	
37.	_____	_____	_____	_____	

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.

*** If BME 302L is taken, the Area Elective must come from the Biomaterials/Biomechanics (BB) Area of Focus. If BME 307 is taken, the Area Elective must come from the Molecular, Cellular and Tissue Engineering (MC) Area of Focus. See Tables 7-8 of the BME Undergraduate Handbook.

**** CEE 661L, 563, 564, 561, 671, 562, 581, 685, 575, 672, 571.

Please note: One of the 37 credits taken for this degree must have an ethical inquiry code (EI)

BME with CompSci(BA) as a second Major _____

Graduating class of **2025-2026** Course Requirements Name
(Matriculating Class of 2021 and 2022)

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21				
3.	MATH 112L or 122L or 22		_____	_____	
4.	MATH 218D-2		_____	_____	
5.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
7.	CHEM 101DL or 110DL or 21		_____	_____	
8.	CHEM 210DL or 201DL		_____	_____	
9.	PHY 151L or 25		_____	_____	
10.	PHY 152L or [26 + PHY_____]*		_____	_____	
11.	Biology 201L or [if Bio AP=5, Bio 203L]**		_____	_____	
	Engineering				
12.	EGR 101L		_____	_____	
13.	EGR 103L or [if AP CS credit, CS 201]		_____	_____	
14.	ECE 110L		_____	_____	
15.	EGR 201L		_____	_____	
16.	BME 221L or ME 221L		_____	_____	
17.	BME 244L		_____	_____	
18.	BME 260L		_____	_____	
19.	BME 271D		_____	_____	
20.	BME 354L		_____	_____	
21.	BME Design course _____		_____	_____	BME 432L, 436L, 460L, 464L, 490L or 2nd course of 2-semester design sequence
		Area			
22.	BME Area Core Class _____	____	_____	_____	BME 301L, 302L, 303L, or 307/390L
23.	BME Area Core Class _____	____	_____	_____	BME 301L, 302L, 303L, or 307/390L
24.	BME Advanced El.*** _____	____	_____	_____	
25.	BME Advanced El.***_____	____	_____	_____	
26.	BME Advanced El.***_____	____	_____	_____	
27.	BME General Elective****_____		_____	_____	BME General Electives can be at any level.
28.	CS 201		_____	_____	
29.	CS 210 or 250		_____	_____	
30.	CS 310, CS 316, or CS 356		_____	_____	
31.	CS 330		_____	_____	
32.	CS Elective*****		_____	_____	
	Humanities and Social Sciences	**Area**			
33.	_____	____	_____	_____	
34.	_____	____	_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same department, and 1 of those must be 200 level or higher. Limit of 2 APs.
35.	_____	____	_____	_____	
36.	_____	____	_____	_____	
37.	_____	____	_____	_____	

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP for 152L.
** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.
*** Two of the Advanced Electives must be from the same Area of Focus. See Tables 7-8 of the BME Undergraduate Handbook for lists of Advanced Electives with an Area of Focus.

BME with ECE as a Second Major

Graduating class of **2027 and beyond** Course Requirements

(Matriculating Class of 2023 and beyond)

_____ Name

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
6.	MATH 218D-2		_____	_____	
7.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
7.	STA 130 or [_____]*		_____	_____	
8.	CHEM 101DL or 110DL or 21		_____	_____	
9.	CHEM 210DL or 201DL		_____	_____	
10.	PHY 151L or 25		_____	_____	
11.	PHY 152L or [26 + PHY_____]**		_____	_____	
12.	Biology 201L or [if Bio AP=5, Bio 203L]***		_____	_____	
	Engineering				
13.	CompSci 201		_____	_____	
14.	EGR 101L		_____	_____	
15.	EGR 103L/105L [if AP CS credit, CompSci 201]		_____	_____	
16.	EGR 201L		_____	_____	
17.	BME 221L		_____	_____	
18.	ECE 110L		_____	_____	
19.	ECE 230L		_____	_____	
20.	ECE 250L		_____	_____	
21.	ECE 270L		_____	_____	
22.	ECE 280L		_____	_____	Two approved concentration electives in *one* area of ECE concentration.
23.	ECE Concentration elective _____		_____	_____	
24.	ECE Concentration elective _____		_____	_____	Any ECE course at 300 level or above.
25.	ECE Elective _____		_____	_____	
26.	BME 244L		_____	_____	
27.	BME 260L		_____	_____	
28.	BME 354L		_____	_____	
29.	BME 436L, BME 464L, or BME 474L		_____	_____	
		Area			
30.	BME 301L or BME 303L**** _____	_____	_____	_____	
31.	BME Advanced Elective**** _____		_____	_____	
32.	BME General Elective***** _____		_____	_____	BME General Elective can be at any level.
	Humanities and Social Sciences	**Area**			
33.	_____		_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same department, and 1 of those must be at the 200 level or higher. Limit of 2 AP.
34.	_____		_____	_____	
35.	_____		_____	_____	
36.	_____		_____	_____	
37.	_____		_____	_____	

* Alternatives to Sta 130 include Sta 240L, Math 230, Math 238L/EGR 238L, ECE 380, or ECE 555

** One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

BME with ME as a second major

Graduating class of **2027 and beyond** Course Requirements

(Matriculating Class of 2023 and beyond)

_____ Name

		Term/Yr Taken	Grade
	Writing		
1.	Writing 101	_____	_____
	Mathematics and Natural Science		
2.	MATH 111L or 21	_____	_____
3.	MATH 112L or 122L or 22	_____	_____
4.	MATH 218D-2	_____	_____
5.	MATH 219	_____	_____
6.	MATH 353	_____	_____
7.	CHEM 101DL or 110DL or 21	_____	_____
8.	CHEM 210DL or 201DL	_____	_____
9.	PHY 151L or 25	_____	_____
10.	PHY 152L or [26 + PHY_____]*	_____	_____
11.	Biology 201L or [if Bio AP=5, Bio 203L]**	_____	_____
	Engineering		
12.	EGR 101L	_____	_____
13.	EGR 103L/105L or [if AP CS credit, CS 201]	_____	_____
14.	EGR 201L	_____	_____
15.	EGR 121L	_____	_____
16.	EGR 244L	_____	_____
17.	ECE 110L	_____	_____
18.	BME 244L	_____	_____
19.	BME 260L	_____	_____
20.	BME 271D	_____	_____
21.	BME 354L	_____	_____
22.	BME 302L	_____	_____
23.	BME/ME Design course***	_____	_____
24.	BME Advanced Elective in BB Area**** _____	_____	_____
25.	BME 221L	_____	_____
26.	ME 321L	_____	_____
27.	ME 331L	_____	_____
28.	ME 336L	_____	_____
29.	ME 344L	_____	_____
30.	ME 421L	_____	_____
31.	ME 431L	_____	_____
32.	ME elective 1 _____	_____	_____
33.	ME elective 2 _____	_____	_____

	Humanities and Social Sciences	**Area**		
34.	_____	_____	_____	_____
35.	_____	_____	_____	_____
36.	_____	_____	_____	_____
37.	_____	_____	_____	_____
38.	_____	_____	_____	_____

Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same dept., and 1 of those must be at the 200 level or higher. Limit of 2 Aps.

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.

*** ME 424L with BME project.

**** Listed in Tables 7-8 of the BME Undergraduate Handbook.

BME with CEE as a second Major

Graduating class of **2027 and beyond** Course Requirements

(Matriculating Class of 2023 and beyond)

_____ Name

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
6.	MATH 218D-2		_____	_____	
7.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
7.	STA 130		_____	_____	
8.	CHEM 101DL or 110L or 21		_____	_____	
9.	CHEM 210DL or 201DL		_____	_____	
10.	PHY 151L or 25		_____	_____	
11.	PHY 152L or [26 + PHY_____]*		_____	_____	
12.	Biology 201L or [if Bio AP=5, Bio 203L]**		_____	_____	
	Engineering				
13.	EGR 101L		_____	_____	
14.	EGR 103L/105L or [if AP CS credit, CS 201]		_____	_____	
15.	EGR 201L		_____	_____	
16.	EGR 244L		_____	_____	
17.	EGR 305		_____	_____	
20.	BME 221L		_____	_____	
21.	ECE 110L		_____	_____	
20.	BME 244L		_____	_____	
21.	BME 260L		_____	_____	
22.	BME 271D		_____	_____	
23.	BME 354L		_____	_____	
24.	BME/CEE Design course: _____		_____	_____	Currently only CEE 469, but check with CEE DUS for any updates.
		Area			
25.	BME 302L or BME 307*** _____	_____	_____	_____	
26.	BME Advanced Elective*** _____	_____	_____	_____	
27.	CEE 201L		_____	_____	
28.	CEE 301L		_____	_____	
29.	CEE 461L		_____	_____	
30.	CEE 462L		_____	_____	
31.	CEE 463L		_____	_____	
32.	CEE elective**** _____		_____	_____	
	Humanities and Social Sciences	**Area**			
33.	_____	_____	_____	_____	Five required. At least 1 SS and at least 2 from the 3 remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same dept., and at least 1 of those must be at the 200 level or higher. Limit 2 Aps.
34.	_____	_____	_____	_____	
35.	_____	_____	_____	_____	
36.	_____	_____	_____	_____	
37.	_____	_____	_____	_____	

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP credit for Phys 152L.

** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.

*** If BME 302L is taken, the Area Elective must come from the Biomaterials/Biomechanics (BB) Area of Focus. If BME 307 is taken, the Area Elective must come from the Molecular, Cellular and Tissue Engineering (MC) Area of Focus. See Tables 7-8 of the BME Undergraduate Handbook.

**** CEE 661L, 563, 564, 561, 671, 562, 581, 685, 575, 672, 571.

Please note: One of the 37 credits taken for this degree must have an ethical inquiry code (EI)

BME with CompSci(BA) as a second Major _____

Graduating class of **2027 and beyond** Course Requirements Name
(Matriculating Class of 2023 and beyond)

			Term/Yr Taken	Grade	
	Writing				
1.	Writing 101		_____	_____	
	Mathematics and Natural Science				
2.	MATH 111L or 21		_____	_____	
3.	MATH 112L or 122L or 22		_____	_____	
4.	MATH 218D-2		_____	_____	
5.	MATH 219		_____	_____	
6.	MATH 353		_____	_____	
9.	CHEM 101DL or 110DL or 21		_____	_____	
10.	CHEM 210DL or 201DL		_____	_____	
9.	PHY 151L or 25		_____	_____	
10.	PHY 152L or [26 + PHY_____]*		_____	_____	
11.	Biology 201L or [if Bio AP=5, Bio 203L]**		_____	_____	
	Engineering				
12.	EGR 101L		_____	_____	
13.	EGR 103L/105L or [if AP CS credit, CS 201]		_____	_____	
16.	ECE 110L		_____	_____	
17.	EGR 201L		_____	_____	
16.	BME 221L		_____	_____	
17.	BME 244L		_____	_____	
18.	BME 260L		_____	_____	
19.	BME 271D		_____	_____	
20.	BME 354L		_____	_____	
21.	BME Design course _____		_____	_____	BME 432L, 436L, 460L, 464L, 490L or 2nd course of 2-semester design sequence
		Area			
22.	BME Area Core Class _____	____	_____	_____	BME 301L, 302L, 303L, or 307/390L
23.	BME Area Core Class _____	____	_____	_____	BME 301L, 302L, 303L, or 307/390L
24.	BME Advanced El.*** _____	____	_____	_____	
25.	BME Advanced El.***_____	____	_____	_____	
26.	BME Advanced El.***_____	____	_____	_____	
27.	BME General Elective****_____		_____	_____	BME General Electives can be at any level.
30.	CS 201		_____	_____	
31.	CS 210 or 250		_____	_____	
30.	CS 310, CS 316, or CS 356		_____	_____	
31.	CS 330		_____	_____	
32.	CS Elective*****		_____	_____	
	Humanities and Social Sciences	**Area**			
33.	_____	____	_____	_____	
34.	_____	____	_____	_____	Five required. At least 1 SS and 2 from remaining Areas of Knowledge (FL, CZ, ALP). For depth, 2 must be from the same department, and 1 of those must be 200 level or higher. Limit of 2 APs.
35.	_____	____	_____	_____	
36.	_____	____	_____	_____	
37.	_____	____	_____	_____	

* One Physics course must be taken. If AP for both, should take 152L, 163, 175, 264, 361, or 362. Can't take Phys 151L and use AP for 152L.
** Students with Biology AP=5 may take Bio 203L instead of Bio 201L. Bio 203L counts for both Bio 201L and the optional Bio 202L.
*** Two of the Advanced Electives must be from the same Area of Focus. See Tables 7-8 of the BME Undergraduate Handbook for lists of Advanced Electives with an Area of Focus.