Sample Electrical & Computer Engineering (ECE) and Biomedical Engineering (BME) Dual Major for Students Who Matriculate after 2010

[with AP credit for MATH 31 and one SS-H Course]

FIRST YEAR	
Fall Semester	**Spring Semester**
1. CHEM 31L Core Concepts in Chemistry	1. BIOLOGY 101L Molecular Biology*
2. MATH 32 Calculus II	2. PHYSICS 61L Mechanics
3. EGR 53L Computational Methods in Engineering	3. MATH 103 Intermediate Calculus
4. WRITING 20/SS-H 1	4. SS-H 1/WRITING 20
SOPHOMORE YEAR	
Fall Semester	**Spring Semester**
1. PHYSICS 62L Electricity, Magnetism & Optics	1. ECE 51L Microelectronic Devices & Circuits
2. ECE 27L Fundamentals of ECE	2. ECE 54L Signals & Systems
3. MATH 107 Linear Algebra & Differential Equations	3. MATH 108 Ordinary & Partial Differential Equations
4. COMPSCI 100E Program Design & Analysis II	4. EGR 75 Mechanics of Solids
5. BME 144L Quantitative Physiology	5. CHEM 32L Modern Applications *or* CHEM 151L Organic Chemistry
JUNIOR YEAR	
Fall Semester	**Spring Semester**
1. ME 83L Structure & Properties Solids*	1. ECE Concentration Elective (1)*
2. ECE 52L Digital Systems	2. BME 154L Medical Instrumentation
3. BME 100L Modeling Cellular & Molecular Systems	3. BME 201L Electrophysiology *or* BME 233 Diagnostic Imaging Systems*
4. STA 113 Probability & Statistics	4. SS-H 2
5. ECE 53L Electromagnetic Fields	
SENIOR YEAR	
Fall Semester	**Spring Semester**
1. ECE Concentration Elective (2)*	1. ECE Elective*
2. BME Design Course {236L *or* 264L} *or* BME General Elective*	2. BME General Elective *or* BME Design Course {236L *or* 264L}*
3. BME Area Elective*	3. SS-H 3
4. Life Science Elective*	4. SS-H 4

*** See NOTES for explanations.**

NOTES:

- **Pre-Med Students:** Students planning to attend medical school should consult with the Duke Office of Health Professions Advising about course planning.
- **Chemistry:** All BME majors are required to take two chemistry courses. Students who receive and accept AP credit (CHEM 19) for chemistry must take a second course, typically CHEM 32L or, if planning to attend medical school, the two courses CHEM 151L and CHEM 152L. These latter courses are usually taken in sophomore or junior year; fitting them courses into the dual major may require an

overload or summer school.

- **WRITING 20:** University Writing Program, required in the first year.
- **SS-H (Social Sciences and Humanities):** Five SS-H semester-course electives, appropriately distributed. Choices must cover 3 of 4 Areas of Knowledge (ALP, CZ, FL, SS), must include at least one SS course, and must include at least two courses from a single department (with at least one at the 100 level or above).The illustrated sample program assumes that one of the required SS-H courses is covered by an AP credit.
- **PHYSICS 61L & 62L:** Matriculating students who have AP credit for PHYSICS 61L (but not 62L) take PHYSICS 62L; those who have AP credit for PHYSICS 61L and 62L take PHYSICS 63L; and international students who have IPCs for GCE A-level physics take PHYSICS 63L *or* 143.
- **BIOLOGY 101L:** Students may **not** substitute BIOLOGY 19 (AP biology) in this dual major.
- **ME 83L:** Take EGR 75 first.
- **ECE Concentration Electives:** Two approved concentration courses from the same ECE Concentration Area.. (The three required courses BME 100L, 100L and 154L together are considered to be an approved ECE Elective and two ECE Concentration Electives in a special biomedical ECE Concentration, so the sample program meets all ECE Program Requirements.)
- **ECE Elective:** Any ECE course at the 100 level or above except ECE 148L, which latter course may be taken as a general Elective.
- **BME Electives BME 201L and 233:** See the BME Undergraduate Program Handbook for *BME Areas.*
    - If BME 201L Electrophysiology is elected:
        - **BME Area Elective** must be chosen from the Bioelectricity Area.
    - If BME 233 Diagnostic Imaging Systems is elected:
        - **BME Area Elective** must be chosen from the Imaging and Sensors Area.
- **BME Design Course:** A BME Design Course (BME 236L or BME 234L) must be taken.
- **BME General Elective:** The BME General Elective can be at any level.
- **Life Science Elective:** See the BME Undergraduate Program Handbook for a list of BME-approved *Life Science Electives.*
- **Independent Study:** Accepted for up to two Elective BME or ECE Courses and for any Free Electives, but not for any other required course in the dual-major Program. Independent Study and Undergraduate Research encouraged for qualified students, and required for Graduation with Departmental Distinction, but my require overload or summer study to fit into the dual-major program. A course overload is not recommended during the first year.