

**TO:** The Faculty of the College of Engineering

**FROM:** The Faculty of the School of Biomedical Engineering

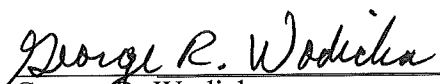
**RE:** Changes in Undergraduate Program Degree Requirements for the Bachelor of Science in Biomedical Engineering

The Faculty of the School of Biomedical Engineering has approved the following changes to the curriculum for the B.S. degree in Biomedical Engineering effective for students entering the Weldon School for the Fall Semester 2018. This action is now submitted to the Engineering Faculty with a recommendation for Fast-Track approval. A revised Suggested Plan of Study is attached. New courses and changes in required courses are shown in bold.

The proposed changes are as follows:

- A. Modify the Technical Engineering Electives requirements to include *two Quantitative Breadth* courses, one of which must also be designated as *Data Science focused*** – The Quantitative Breadth course list has been expanded from 8 courses to 27 courses from the Technical Engineering Electives list that match the definition of a quantitative breadth course, which will accommodate the two-course requirement. Additionally, eleven courses on the Quantitative Breadth list have been designated as Data Science focused.

**Reason:** The proposed program changes to degree requirements for the Bachelor of Science in Biomedical Engineering are to update the technical engineering elective requirements for this program, which will strengthen the academic rigor of the program and bring our program into the University initiative to infuse data science literacy into curricula.

  
George R. Wodicka  
Dane A. Miller Head and Professor  
Weldon School of Biomedical Engineering

## [Approved] Suggested Plan of Study - Effective Fall 2017

**Credit hours required for graduation: 130**

### First Year

#### ***First Semester***

(4) MA 16500 Analytical Geom. & Calc. I  
(4) CHM 11500 General Chemistry  
(2) ENGR 13100 Transforming Ideas to Innov I  
(3) Oral or Written Communication  
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#### ***Second Semester***

(4) MA 16600 Analytical Geom & Calc. II  
(4) Science Selective~  
(4) PHYS 17200 Modern Mechanics  
(2) ENGR 13200 Transforming Ideas to Innov II  
(3) Oral or Written Communication  
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### Second Year

#### ***Third Semester***

(3) BME 20100 Biomol: Strct, Funct & Engr Apl  
(1) BME 20500 Biomolec & Cellular Syst Lab  
(1) BME 29000 Frontiers in BME  
(3) BIOL 23000 Biology of the Living Cell  
(4) MA 26100 Multivariate Calculus  
(3) ME 27000 Basic Mechanics I  
(3) Science Selective~  
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#### ***Fourth Semester***

(3) BME 20400 Biomechanics Hard/Soft Tissue  
(1) BME 20600 Biomechanics & Biomaterial lab  
(3) BME 25600 Physiol. Modeling of Human Health  
(3) PHYS 24100 Electricity and Optics  
(4) MA 26200+ Linear Algebra & Ordinary Diff. Eq.  
(3) ABE 20200^ Thermodynamics in Bio Sys II  
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### Third Year

#### ***Fifth Semester***

(3) BME 30100 Bioelectricity  
(3) BME 30400 Biomedical Transport Fundamentals  
(3) BME 30500 Bioinstr Circuit & Meas Princip  
(3) STAT 35000 Intro to Statistics (or equivalent^^)  
(3) Gen. Ed. or Ethics/Policy Elective  
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#### ***Sixth Semester***

(2) BME 30600 Biotransport Laboratory  
(2) BME 39000 Profes Devlp & Design in BME  
(3) ECE 30100 Signals and Systems  
(3) Technical Elective  
(3) Technical Elective (Quantitative Breadth++)  
(3) Gen. Ed. or Ethics/Policy Elective  
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### Fourth Year

#### ***Seventh Semester***

(3) BME 48901 Senior Design Lab  
(1) BME 49000 Professional Elements of Design  
(3) Technical Elective  
(3) Life Science Elective  
(3) General Education Elective  
(3) General Education Elective  
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#### ***Eighth Semester***

(3) Technical Elective  
(3) Technical Elective  
(3) Life Science Elective  
(3) General Education Elective  
(3) General Education Elective  
(3) Unrestricted Elective  
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**Note:** ENGR 141/142 fulfills ENGR 131/132 and CS 159; ENGR 161/162 fulfills ENGR 131/132 and PHYS 172

~ Both CS 15900 and CHM 11600 are required for the BME program, however CHM 11600 is preferred to be taken in the first year.

+ MA 26500: Linear Algebra and MA 26600: Ordinary Differential Equations combined fulfill the MA 26200 requirement.

++ Taken from the list of Quantitative Breadth courses

^ ABE 20200 is a temporary designation that will be changed to ABE 24200

^^ Equivalents include CHE 32000, IE 33000, STAT 51100, or STAT 41600 and STAT 41700 combined

## **[Current] B.S. Biomedical Engineering Degree Requirements**

**Credit Hours Required for Graduation: 130**

**All required First Year Engineering courses\* must be completed with a C- or above for entry into the BME undergraduate program = 30 credits**

\* No more than 8 credit hours of first-year calculus can be applied toward the BME degree.

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**Science Selectives (3 credit hours#): CHM 11600 and CS 15900**

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**Core Biomedical Engineering (BME) Courses (25 credit hours);**  
**BME 20100, 20400, 20500, 20600, 25600, 29000, 30100, 30400, 30500, 30600, 39000**

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**BME Breadth Requirement (28 credit hours):**

**Core Engineering: ABE 24200, ECE 30100, and ME 27000 = 9 credits**

**Technical Engineering Electives:** Five (5) additional BME or other Engineering courses.† At most 6 credits at the 300 level; must include at least one 3-credit 400-level BME course; must include at least one 3-credit course chosen from the Quantitative breadth list†. = 15 credits.

**Senior Design Capstone Requirements: BME 48901 (3), 49000 (1) = 4 credits**

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**Advanced Science and Math, (23 credit hours):**

**BIOL 23000, PHYS 24100, MA 26100 and MA 26200 or (MA 26500 and MA 26600), STAT 35000 (or equivalent), and two (2) additional Life Science courses†**

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**General Education Program (18 credits\*\*):**

• *University Core Curriculum Foundational Learning Outcomes:*

- Students must select from the university's list of courses to satisfy the following UCC FLOs: written communication, oral communication, information literacy, human cultures: humanities, human cultures: behavioral/social sciences, and science, technology and society.
- Students must earn a C- or better to receive credit towards the Foundational Learning Outcome

• *Programmatic Requirements:*

- Sufficient credit hours to meet the minimum 18 credit hour requirement†
- At least 12 credit hours must be in the College of Liberal Arts, Krannert School of Management, and/or Honors College Courses (FYE general education included)†
- At least 6 credit hours must be non-introductory (courses at the 30000-level or above, or with a required prerequisite in the same department)
- At least one 3 credit ethics, medical or healthcare policy elective to be chosen from our Ethics and Policy Healthcare (EPH) List†

\*\* In addition to the 6 credits of Written Communication and Oral Communication foundational learning outcomes from the University Core Curriculum taken in First Year Engineering.

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**Unrestricted Electives (3 credit hours):** Unrestricted elective credits intended for curricular flexibility counted towards the total number of credits required for graduation.

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**GPA Requirement:** A minimum Graduation Index of at least 2.0 is required for graduation with a BSBME. A minimum BME Major GPA\*\*\* of at least 2.0 is also required for graduation with a BSBME. \*\*\*Courses included in BME Major GPA: BME 20100, BME 20400, BME 20500, BME 20600, BME 25600, BME 29000, BME 30100, BME 30400, BME 30500, BME 30600, BME 39000, BME 48901, BME 49000, ABE 24200 (or ABE 20200, or ME 20000), ME 27000, ECE 30100, STAT 35000 (or equivalent), (BME 48800, BME 48900, MSE 23000 if applicable)

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# 3-4 science selective credits will count toward the 30 credits of First Year Engineering requirements.

† Selected from a list of courses approved by the Biomedical Engineering Undergraduate Curriculum Committee and maintained by the undergraduate advising office. Must complete a 40000-level BME elective with at least a B- or above before student can take a BME 50000-level course as a technical elective.

**[Revised] Suggested Plan of Study - Effective Fall 2018****Credit hours required for graduation: 130****First Year*****First Semester***

(4) MA 16500 Analytical Geom. & Calc. I  
 (4) CHM 11500 General Chemistry  
 (2) ENGR 13100 Transforming Ideas to Innov I  
 (3) Oral or Written Communication  
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***Second Semester***

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 (4) Science Selective~  
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**Second Year*****Third Semester***

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