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To: Administrative Boards of the College of Arts and Sciences and the General College

From: Nancy Allbritton, Chair, and Richard Goldberg, Director of Undergraduate Studies, Joint Department of Biomedical Engineering

Re: Curriculum changes for BME track, New B.S. Degree

Date: September 30, 2015

New Degree Name

As approved by the Administrative Boards, and subsequently by the Board of Governors and SACS, we are phasing out the B.S. in Applied Sciences and Engineering, and using the same curriculum for the new B.S. in Biomedical and Health Sciences Engineering.

- Biomedical Engineering Major, B.S. in Biomedical and Health Sciences Engineering

Core Requirements

We propose the following changes to the Core Requirements:

- Change the current language in the UG Bulletin from "Choose one of BMME 341 .., 455… or 475…" to "Choose one of the following (take more than one and it counts as one of your BME electives): BMME 341 Thermodynamics, BMME 455 BioFluid Mechanics, or BMME 475 Transport Processes.

Explanation: We are changing the current language to make it clear for our students.

- Change COMP 116 to ""BMME 201 or COMP 116" (pending approval).

Explanation: We are creating BMME 201: MATHLAB for Scientists and Engineers. This will be comparable to COMP 116. Students will now have the option of fulfilling this requirement with either a BME faculty taught course, or COMP 116.

- Fix the typo for BMME 350 Electronics for BME. The correct title of the class is: BMME 350 Electronics for Biomedical Engineers.

- Reduce the number of credit hours for BMME 410 from 4 credits to 3 credits. Note, the extra credit will be fulfilled by the MATH 383L (see next bullet point for explanation).

Additional Requirements

We propose the following change to the Additional Requirements:

- The lab for MATH 383 (MATH 383L) is now required.

Explanation: This lab provides students with an opportunity to obtain hands-on experience in mathematical applications. In the past, students had this opportunity with the BMME 410 recitation section. By reducing BMME 410 from 4 to 3 credit hours and requiring this lab in its place, students will obtain this experience earlier in the program.

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TRACK CHANGES

Department of Biomedical Engineering

~~Applied Science Major, B.S. Biomedical Engineering Track (124 hours)~~ B.S. in Biomedical and Health Sciences Engineering (124 hours)

In this major, students learn to apply engineering principles to solve problems in medicine and biology. This is a field of great breadth that incorporates medical imaging, informatics, micro and nanosystems, prosthetics, medical devices, tissue engineering and genomics, drug delivery, and applications of signal processing and control.

The first two years of study have many courses in common with the B.S. programs in chemistry, physics, computer science, or mathematical sciences. The curriculum, as for all sciences, is vertically structured, with experience and knowledge from each course serving as a foundation for subsequent courses. Students' attention to prerequisites is important. The specific requirements are listed below. Students are also encouraged to engage in research in a laboratory at UNC–Chapel Hill or elsewhere, or have an internship experience in industry.

Core Requirements

• BMME 150 Introduction to Materials Science

• BMME 160 Statics

• BMME 210 BME Design and Manufacturing I

• BMME 310 BME Design and Manufacturing II

• ~~Choose one of BMME 341 Thermodynamics and Kinetics Applied to Solids, BMME 455 Biofluid Mechanics, or BMME 475 Transport Processes. After fulfilling this requirement, students may take additional courses from this list as biomedical specialty electives (see below).~~

o Choose one of the following (take more than one and it counts as one of your BME electives):

BMME 341 Thermodynamics

BMME 455 BioFluid Mechanics

BMME 475 Transport Processes

• BMME 410 Systems and Signals

• BMME 465 Biomedical Instrumentation I

• BMME 697 Senior Design Project I

• BMME 698 Senior Design Project II

• BIOL 202 and 252

• MATH 528

• BMME 350 Electronics for ~~BME~~ Biomedical Engineers

• BMME 351 Human Physiology and Biological Measurements for Engineers

• Choose one statistics class from STOR 435 or 455

Additional Requirements

• A choice of four biomedical specialty electives: Any BMME above 400, or PHYS 301, or ENVR 452/GEOL 560/MASC 560/PHYS 660

Students should take the following courses, preferably in their first two years:

• BMME 201 or COMP 116

• BIOL 101/101L

• CHEM 101/101L (physical and life sciences with laboratory Approaches requirement)

• CHEM 102/102L

• MATH 231 and 232 (quantitative reasoning Foundations and quantitative intensive Connections requirements)

• MATH 233 and 383/383L

• PHYS 116 or 118 (physical and life sciences Approaches requirement)

• PHYS 117 or 119

Students must satisfy all Foundations, Approaches, and Connections requirements, as outlined elsewhere in this bulletin. Some General Education requirements should be met with specific courses as listed above.