TO: The Engineering Faculty

FROM: The Faculty of the Department of Biomedical Engineering

RE: New Undergraduate-Level Course

The faculty of the Department of Biomedical Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

BME 201 Biomolecules: Structure, Function, and Engineering Applications

Sem. 1. Class 3, cr. 3.

Prerequisite: CHM 116, CS 156, ENGR 106, and MA 166 or equivalencies;
Corequisite: BIOL 295E, BME 205

Classes of molecules (biomolecules) such as sugars, lipids, proteins, and nucleic acids that form the cellular components of living organisms. Explores the chemistry behind the structure and function of these important classes of biological molecules. Hydrogen-bonding, hydrophobic forces, electrostatic interactions along with other weak interactions discussed with reference to their importance in biomolecular systems in an engineering context.

Reason: This course teaches students the properties of the fundamental building blocks of biological systems and exposes them to the possibilities for engineering design with these components. An understanding of these concepts is essential for engineering, controlling, and manipulating biomedical platforms.

George Wodicka
Professor and Head

Supporting Documentation:

1. Level: Undergraduate – sophomore year

2. Course Instructor: Albena Ivanisevic

3. Course Outline:

Topics in order	*Lectures*
– *Introduction to saturated and unsaturated carbons*	*3*
– *Alcohols, phenols, ethers, thiols*	*3*
– *Aldehydes and Ketones*	*2*
– *Carboxylic Acids and Esters*	*3*
– *Amines and Amides*	*3*
– *Carbohydrates* **Exam I will be given this week**	*3*
– *Complex Carbohydrates*	*3*
– *Lipids: fats and oils*	*2*
– *Phospholipids, steroids, and biological membranes*	*3*
– *Amino acids and peptide bonds* **Exam II**	*3*
– *Peptide synthesis*	*3*
– *Primary and secondary structure of proteins*	*3*
– *Enzymes and Vitamins*	*3*
– *Nucleic acids, DNA and RNA in detail*	*3*
– *DNA engineering* **Exam III**	*1*
– *Review theme: systems level vs. molecular level*	*3*
– *Finals Week* **Comprehensive Final**	Total
	44

4. Text: formed by combining chapters from the following books: Biochemistry, by Stryer, and Organic Chemistry, by Vollhardt and Shore; both are published by Freeman.

5. Grading: based on exams, homework, and computational projects.