BME 130 Course Syllabus (Fall 2019)

Likely to change in the next couple of weeks

Lecture	Social Science Plaza A (SSPA) 1100 (Interactive map) **Tuesday** and **Thursdays** from 8:00 am to 9:20 am (Course Code 13540)
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Instructor	Prof. Zoran Nenadic, znenadic@uci.edu, Engineering Hall (EH) 3416 (Interactive map) Office Hours: **TBD**
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TA #1	Haoran Pu, haoranp1@uci.edu Discussions: TBD
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TA #2	Yue Yin, yyin17@uci.edu Discussions: **TBD**
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Required Text	**None**
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Reference Text	Robert B. Northrop, **Signals and Systems in Biomedical Engineering**, CRC Press, 2003 B. P. Lathi, **Linear Systems and Signals**, 2nd edition, Oxford University Press, 2005 Chi-Tsong Chen, **Signals and Systems**, 3rd edition, Oxford University Press, 2004
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Software	MATLAB - available in Engineering Computing Trailer (ECT) 123, Engineering Tower (ET) 201, and ET 204, and and Multipurpose Science and Technology Building (MSTB) 224 (Interactive map). Note that the labs may be not be available at all times due to reserved lab sessions and periodic maintenance. The school offers FREE MTALAB to students.
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Course Description	Introduction to Biomedical Systems and Signals. Continuous time and discrete time linear dynamical systems. Input-output description of linear systems; differential and difference equations; convolution. Laplace and Fourier transforms. Transfer function. Signal analysis in the frequency domain; Fourier

series expansion. Time-frequency analysis, filtering. Data compression and denoising.

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Prerequisites MATH 3A and MATH 3D. STATS 8 recommended. Basic understanding of differential equations, complex numbers, infinite sequences and series. Basic knowledge of linear algebra, such as systems of algebraic equations, vectors and matrices. Some knowledge of probability theory useful, but not required.

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Downstream Effect The knowledge acquired in this course will be used again in:

1. BME 140 (BME 130 prerequisite)
2. BME 170 (BME 130 prerequisite)
3. BME 180

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Grading Policy

Homework: 20%

Midterm I: 25%

Midterm II: 25%

Final 30%

Course Survey Participation: 1%

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Student Outcomes (ABET) This course relates to the following Student Outcomes (skills expected to be attained at the time of graduation): EAC 1, EAC 6

EAC 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

EAC 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

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Course Learning Outcomes Upon completing the course, students will be able to:

1. Understand the nature of common biomedical signals (EAC 1)
2. Apply the essential techniques for analyzing analog and digital biomedical signals (EAC 1)
3. Analyze linear time invariant systems (EAC 1)
4. Develop computing skills by using MATLAB for signal analysis and system modeling (EAC 6)