EE P 598 Syllabus, Fall 2020

Course Number and Title: EE P 598 – COVID Tech

Instructor: Alexander Mamishev

Credits: 4

Course Overview and Curriculum Content:

This course will focus on the technologies that are being developed to fight COVID Tech. Several technology areas will be represented by case studies, then followed by the topics of relevant fundamentals, and culminate in group homework projects, that will require either design or analysis of technical approaches and data.

The technology are topics will include, but not limited to: 1) design of wearable sensors (e.g. air quality, proximity, etc), 2) medical diagnostics devices (e.g. assays, PCR), 3) design of electrically assisted personal protective equipment (e.g. plasma-based filters, aerosol generators); 4) data analysis (epidemiological data, experimental data from labs). Based on case studies, the following fundamental topics will be covered: linear systems (e.g. Fourier transform methods, control, digital filters, noise suppression); sensor design (e.g. sensitivity and selectivity, noise suppression, circuit design, power supply design); high voltage engineering (safety, electrode design, measurement equipment).

Prerequisite Skills: Linear Algebra, Laplace Transforms, Differential Equations

Programming Experience: None required, knowledge of MATLAB helpful

Although there are no official prerequisites for the course, you should be comfortable with basic circuit theory and analysis technique.

Learning Goals and Objectives:
Upon completion of the course, students will be able to:

- Understand technology drivers relevant to COVID-19 battle
- Understand how public policy changes technology and vice versa – in the context of COVID-19 battle
- Apply advanced concepts of linear systems theory to real-world problems
- Apply statistical data analysis methods, including data visualization and data transformation
- Conduct structural design exercises
- Use principles of structural innovation for product design

Evaluation and Grading:
Grades will be based on homework assignments, quizzes, a midterm, and a group paper. A breakdown of the grade distribution appears below:

Class Participation:	15%
Homework:	30%
Midterm:	30%
Final Group Project:	25%

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Authors of selected reports will be given an opportunity to present their report in front of the class. Class time will be taken to critique and analyze the subject of the paper and the presentation itself. Extra credit will be assigned based on the presentations and class participation.

Grading is on the curve. There will be no Final Exam.

Lecture Logistics:
Lecture attendance is not required; however, your class participation element of the grade is likely to benefit if you attend frequently. The sequence of material will strongly depend on the results of assessments, homework, and student feedback. Lectures will be conducted online.