

UNIVERSITY OF SOUTHERN CALIFORNIA
School of Engineering
Department of Electrical and Computer Engineering

E.S. Kim

EE 499, Fall 2020

Fundamentals of Wearable Technology

4 Units -- TuTh 5:00 - 6:20
F 2:00 – 2:50

Instructor: Prof. Eun Sok Kim
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Office Hours: TuTh 4:00 - 4:50

Textbook: "Wearable Sensors," © 2014 Elsevier

References: "Wearable and Implantable Medical Devices," © 2020 Elsevier.
"Wearable Technology in Medicine and Health Care," © 2018 Elsevier
"Wearable Electronic Sensors for Safe and Healthy Living," © 2015 Springer

***Helpful (Not Mandatory) Prerequisite:** EE348 and EE370L

Course Description and Objectives:

This course teaches fundamentals of wearable technology with focus on the following topics:

- (1) sensing, signal processing, RF communication and power management
- (2) wearable algorithms and wireless body area networks.

Tentative Course Contents:

Week	Topic	Reading Assignment
1	Introduction to Wearable Technology	Ch. 1.1 of Wearable Sensors
2 – 6	Sensors and Wearable Applications; MEMS Pressure Sensor, MEMS Accelerometer, MEMS Gyroscope, Magnetometer, IR Sensor, MEMS Focal Plane Array, Radar Sensor, ECG, EEG, EMG, EOG, Heart Rate Monitoring, Pulse Oximetry, Inertial Measurement	Ch. 2.2 of Wearable Sensors, pp. 107 – 133 of Wearable Electronics Sensors, Ch. 1 of Wearable and Implantable Medical Devices
7 - 10	Wearable Algorithms, Signal Processing, Microcontroller Units (MCUs), Wireless Transceivers, Low Noise Amplifiers, Power Amplifiers, Analog Digital Converters, Analog and Digital Filters, Batteries	Chs. 4.1 and 5.1 of Wearable Sensors
11 and 12	Wearable Technology for Healthcare: Glucose Sensing, Blood Pressure Sensing, Electrocardiogram, Biomedical Diagnostic Devices Based on Smartphone, etc.	Ch. 2.3 of Wearable Sensors, Chs. 11 and 12 of Wearable Technology in Medicine and Health Care
13 and 14	Wireless Body Area Networks (WBANs): Indoor localization, Packet Radio Systems, Data Fusion, Secure Data Aggregation.	Ch. 6.4 of Wearable Sensors, Ch. 4 of Wearable and Implantable Medical Devices

Grading: Homework: 20%, Term Papers: 40%, and Final Exam: 40%.

*Updated on July 23, 2020.