EE 105 Introduction to Electrical Engineering

Fall, 2020

Course Syllabus

16 August, 2020

EE 105 Course Web Site: https://blackboard.usc.edu/

Instructor

Armand R. Tanguay, Jr.
Professor of Electrical Engineering–Electrophysics,
Chemical Engineering and Materials Science,
Biomedical Engineering, Ophthalmology,
and Physics and Astronomy;
Neuroscience Graduate Program

Office SSC 520 (Seaver Science Center)

Telephone 213-740-4403

E-Mail atanguay@usc.edu

Office Hours Tuesday and Thursday, 6:00 p.m. to 7:30 p.m.
OHE 230
Other times by appointment
For Fall, 2020, the schedule will be determined in consultation with the class

Class Location OHE 230 (Olin Hall of Engineering)
Class Time Tuesday and Thursday, 4:00 p.m. to 5:50 p.m.
Discussion Sections Tuesday, 8:00 p.m. to 9:00 p.m. (Tentative)
Wednesday, 8:00 p.m. to 9:00 p.m. (Tentative)

Grading Policy

Homework:	25%
Midterm Examination:	30%
Final Examination:	45%

Midterm Examination Tuesday, October 13th (Tentative)
Exact date, time, and location or format to be arranged

Final Examination Tuesday, November 17th, 4:30 to 6:30 p.m. (7:30 p.m.)
Location or format to be arranged

Graduate Teaching Fellows

Matin Barekatain
(Homework Sets, Lecture Demonstrations, Discussion Sections, Grading)
Office: VHE 419
Telephone: 323-449-8986
E-Mail: barekata@usc.edu
Office Hours: Monday
Time to be arranged
Other times by appointment

Pratyusha Das
(Homework Sets, Lecture Demonstrations, Discussion Sections, Grading)
Office: EEB 441
Telephone: 213-373-0006
E-Mail: daspraty@usc.edu
Office Hours: Tuesday, Thursday
Time to be arranged
Other times by appointment

Prerequisite or Corequisite

Math 125 Calculus I; can be waived if calculus studied elsewhere

Required Textbooks

Roman Kuc, *The Digital Information Age: An Introduction to Electrical Engineering,* Second Edition, Cengage Learning, Stamford, Connecticut, (2015).

Dick White and Roger Doering, *Electrical Engineering Uncovered,* Second Edition, Prentice Hall, Englewood Cliffs, New Jersey, (2001).

Excellent Recommended Texts

David Cyganski and John A. Orr, with Richard F. Vaz, *Information Technology: Inside and Outside,* Prentice Hall, Upper Saddle River, New Jersey, (2001).

J. David Irwin and David V. Kerns, Jr., *Introduction to Electrical Engineering,* Prentice Hall, Englewood Cliffs, New Jersey, (1995).

John G. Truxal, *The Age of Electronic Messages,* MIT Press, Cambridge, Massachusetts, (1990).

EE 105 Introduction to Electrical Engineering

EE 105 Course Outline (Topics)

1. Overview of Electrical Engineering (EE as a Discipline)
2. Information and Communication
3. Information Representations (Language)
4. Encryption and Decryption
5. Signals in the Time Domain: Analog and Digital
6. Signals in the Frequency Domain: Tones, Spectrum Analyzer
7. Signal Modulation; AM and FM Radio, TV
8. Communications Example: HDTV
9. Introduction to Computation: Computing and Computing Architectures
10. The Computer as a Communications Network
11. Key Computational Parameters: Throughput, Bandwidth, Storage Capacity
12. Main and Peripheral Device Buses; Data Storage; CPUs
13. Digital Logic
14. Digital Imaging
15. Introduction to Direct Current (DC) Linear Circuits
16. Circuit Parameters: Current, Voltage
17. Device Characteristics: Resistance, Capacitance, Inductance
18. Alternating Current (AC) Circuits
19. Semiconductor Devices: Diodes, Transistors
20. Semiconductor (VLSI Circuit) Fabrication; Cleanroom Tour

EE 105 Laboratory Experiments

Probability Simulations
(Simulations of the tossing of one or more dice in sequences)

Pre-Laboratory for Experiment 1: Free Space Optical Communications
(Introduction to laboratory instrumentation, including power supplies, signal generators, and digital storage oscilloscopes)

Experiment 1: Free Space Optical Communications
(Exploration of the design, fabrication, and operation of a free space optical communications system, consisting of a transmitter and receiver, the basis of modern fiber optics and space based communications systems)

Experiment 2: Musical Tone Synthesizer
(Construction, analysis, and operation of a simple circuit that allows for the generation of multiple musical tones, the basis for an electronic synthesizer)

Course Calendar

17 August, 2020 (Monday)	First Day of Fall Semester Classes
18 August, 2020 (Tuesday)	First EE 105 Class
4 September, 2020 (Friday)	Last Day to Register and Add Classes
4 September, 2020 (Friday)	Last Day to Drop Without a "W"
4 September, 2020 (Friday)	Last Day to Change Enrollment Option: (Pass/No Pass or Audit)
7 September, 2020 (Monday)	Labor Day (University Holiday)
2 October, 2020 (Friday)	Last Day to Drop Without a "W" Appearing on the Transcript
2 October, 2020 (Friday)	Last Day to Change Enrollment Option: (Pass/No Pass to Letter Grade)
13 October, 2020 (Tuesday)	Midterm Examination (Tentative)
6 November, 2020 (Friday)	Last Day to Drop With a "W"
13 November, 2020 (Tuesday)	Fall Semester Classes End
14 – 16 November, 2020	Stop Period (Study Days)
17 – 24 November, 2020	Final Examination Period
17 November, 2020 (Tuesday)	EE 105 Final Examination, 4:30 p.m. - 6:30 p.m. (7:30 p.m.)
25 November, 2020 – 10 January, 2021	Winter Recess