EE 105 Introduction to Electrical Engineering

Fall, 2021

Course Syllabus

4 October, 2021

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, 2021, 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 to 5:50 p.m.
Discussion Sessions  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  Saturday, October 23rd (Tentative)
Exact date, time, and location or format to be arranged

Final Examination  Thursday, December 9th, 4:30 to 6:30 p.m.
Location or format to be arranged
EE 105 Introduction to Electrical Engineering

Graduate Teaching Fellow

Matin Barekatain
(Homework Sets, Lecture Demonstrations, Discussion Sections, Grading)
Office: VHE 418
Telephone: 323-449-8986
E-Mail: barekata@usc.edu
Office Hours: Mondays
5:00 p.m. to 7:00 p.m.
Other times by appointment

Undergraduate Teaching Fellows

Alexander (Xander) Morgan
(Homework Sets, Lecture Content)
E-Mail: xmorgan@usc.edu
Office Hours: Saturdays
12:00 p.m. to 2:00 p.m.
Other times by appointment

Jocelyn Liu
(Homework Sets, Lecture Content)
E-Mail: liujocel@usc.edu
Office Hours: Sundays
12:00 p.m. to 2:00 p.m.
Other times by appointment

Prerequisite or Corequisite

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

Required Textbooks


Excellent Recommended Texts


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
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>23 August, 2021 (Monday)</td>
<td>First Day of Fall Semester Classes</td>
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<tr>
<td>24 August, 2021 (Tuesday)</td>
<td>First EE 105 Class</td>
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<tr>
<td>6 September, 2021 (Monday)</td>
<td>Labor Day (University Holiday)</td>
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<tr>
<td>10 September, 2021 (Friday)</td>
<td>Last Day to Register and Add Classes</td>
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<td>10 September, 2021 (Friday)</td>
<td>Last Day to Drop Without a “W”</td>
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<tr>
<td>10 September, 2021 (Friday)</td>
<td>Last Day to Change Enrollment Option:</td>
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<td>(Pass/No Pass or Audit)</td>
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<tr>
<td>8 October, 2021 (Friday)</td>
<td>Last Day to Drop Without a “W”</td>
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<tr>
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<td>Appearing on the Transcript</td>
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<tr>
<td>8 October, 2021 (Friday)</td>
<td>Last Day to Change Enrollment Option:</td>
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<td>(Pass/No Pass to Letter Grade)</td>
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<td>14 October – 15 October, 2021</td>
<td>Fall Recess</td>
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<tr>
<td>23 October, 2021 (Saturday)</td>
<td>Midterm Examination (Tentative)</td>
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<tr>
<td>12 November, 2021 (Friday)</td>
<td>Last Day to Drop With a “W”</td>
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<td>24 – 28 November, 2021</td>
<td>Thanksgiving Break</td>
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<tr>
<td>3 December, 2021 (Friday)</td>
<td>Fall Semester Classes End</td>
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<td>4 – 7 December, 2021</td>
<td>Stop Period (Study Days)</td>
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<td>8 – 15 December, 2021</td>
<td>Final Examination Period</td>
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<td>9 December, 2021 (Tuesday)</td>
<td>EE 105 Final Examination,</td>
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<td>11:00 a.m. - 1:00 p.m. (2:00 p.m.)</td>
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<td>16 December, 2021 – 9 January, 2022</td>
<td>Winter Recess</td>
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