ECE 536 – SPRING 2022

Meeting Time 11:00am-12:20pm (synchronous)

Lectures Calendar (List of topics is tentative and subject to change)

January 18 Tuesday Lecture 1
Course overview, Introduction to Optoelectronics & Communication, Refresher of Maxwell's equations

January 20 Thursday Lecture 2
Semiconductor electronics – Review of pertinent concepts

January 25 Tuesday Lecture 3
Semiconductor electronics – Review of pertinent concepts

January 27 Thursday Lecture 4
Basic quantum mechanics, Quantum wells

February 1 Tuesday Lecture 5
Time-dependent perturbation theory, Fermi's Golden Rule

February 3 Thursday Lecture 6 Homework #1 due
Symmetric Optical Waveguides, Dispersion relations

February 8 Tuesday Lecture 7
Optical transitions using Fermi's Golden Rule

February 10 Thursday Lecture 8 Homework #2 due
Interband absorption and gain of bulk semiconductors and quantum wells

February 15 Tuesday Lecture 9
Quantum dots and wires, intersubband absorption

February 17 Thursday Lecture 10 Homework #3 due
Double-heterojunction semiconductor lasers

February 22 Tuesday Lecture 11
Waveguiding in material with gain or loss, Gain-guided and Index-guided Lasers

February 24 Thursday Lecture 12 Homework #4 due
Quantum-well Lasers, Scaling laws, Semiconductor optical amplifiers

March 1 Tuesday Lecture 13 (This week - Selection of final project topics)
Strain effects on band structures, Strained quantum well lasers

March 3 Thursday Lecture 14 Homework #5 due
Strained quantum dot lasers, Direct modulation of semiconductor lasers

March 8 Tuesday Lecture 15
Distributed feedback structures and lasers

March 10 Thursday Lecture 16 Homework #6 due
Vertical cavity surface emitting lasers (VCSEL's)

SPRING BREAK March 12-20

March 22 Tuesday Lecture 17
Chirped Gratings, Tunable lasers

March 24 Thursday Lecture 18
Coupled mode theory, Waveguide couplers, MMIs, AWGs

March 29 Tuesday Lecture 19
Reciprocal and non-reciprocal polarization rotators

March 31 Thursday Lecture 20 Homework #7 due
Franz-Keldysh and exciton effects

April 5 Tuesday Lecture 21
Quantum-confined Stark effect, EA modulators, EMLs, Mach-Zender modulators

April 7 Thursday Lecture 22 Homework #8 due
Photoconductors

April 12 Tuesday Lecture 23
p-n junction photodiodes, p-i-n photodiodes

April 14 Thursday Lecture 24
Avalanche photodiodes, intersubband quantum-well photodetectors

April 19 Tuesday Lecture 25 Homework #9 due
Special topics or catch up

April 21 Thursday Lecture 26
Special topics or catch up

April 26 Tuesday Lecture 27
Special topics

April 28 Thursday Lecture 28
Special topics

May 3 Tuesday Lecture 29 Last Class
Special topics/Class discussion/Wrap-up

May 5 Thursday Reading Day
May 12 Thursday 8:00-11:00am FINAL EXAM (consists of Final Project presentations)
TAKE-HOME Exam due