• Why Semiconductors? Various semiconductors: IV, III-V, II-VI
• Solids and crystal structures
• Introduction to quantum mechanics: Energy, momentum, Uncertainty Principle, Schrödinger wave equation, potential well
• Atoms and Solids: Pauli exclusion principle
• Metal, Insulator, Semiconductor
• Conduction band, valance band, energy gap
• Electrons and holes
• Direct and indirect band
• Intrinsic, extrinsic (P and N doping)
• Distribution Functions and Fermi Energy
• Intrinsic Carrier concentration

---------------------------------------  First Exam  ---------------------------------------
• Extrinsic Carrier Concentration: Majority and Minority Charges
• Carrier Transport
• P-N Junction: equilibrium potential, space charge, current-voltage
• Heterojunction
• Metal-Semiconductor contact
• Semiconductor-Light interaction: Absorption, Spontaneous vs Stimulated Emission

---------------------------------------  Second Exam  ---------------------------------------
• Photoconductor, Photodiodes, Photovoltaic solar cells
• Light emitting diodes
• Waveguides: Snell’s law, TIR
• Semiconductor Lasers: gain, lasing condition, Fabry-Perot Lasers, L-I characteristics
• Multimode versus single mode Lasers

---------------------------------------  Final Exam  ---------------------------------------


Recommended Books:
Semiconductor Optoelectronic Devices, Author: Pallab Bhattacharya, Publisher: Prentice Hall.
Essential of photonics: Author: Alan Rogers, CRC Press

Grading:
   Attendance:  3 %
   Homework:  12 %
   First Exam:  25 %
   Second Exam:  30 %
   Final Exam:  30 %