

### EEE.8-3.6 Nanoelectronic Devices

Course contents: \* Introduction to quantum mechanics. Photoelectric effect. Hydrogen spectrum. De Broglie equation. Discrete spectrums. Electrochemical potential in metals. \* Energy levels in low dimensionality systems. Quantum wells. Molecular bonds. Tunneling. Energy levels in solids. \* Bottom up approach study in nanoelectronic systems. Molecular electronics. I-V and G-V characteristics. \* Carrier movement in nano MOS transistors. Ballistic conductivity. Carbon nanotube transistors. Nano-wires. \* Memory devices with nanoparticles. Hot electrons and carrier transport models through thin insulators. \* C-V characteristics in MOS and nano-memories. \* Coulomb blockage. Quantum points. Bandgap widening. Optical properties. Single electron transistors. Coulomb diamonds. \* Metallic nanoparticles. Single molecule sensors. Photovoltaic elements. \* Electronic, optical properties and transport phenomena in nanodevices. \* Characterization of nanodevices. \* Introduction to quantum computing.