

# **EEE 6002: Selected Topics in Electrical and Electronic Engineering**

## **(Integrated Silicon Photonics)**

### **Course Syllabus:**

Introduction to Silicon and Silicon Nitride Platforms: Silicon-on-insulator (SOI) wafers, photonic Design Workflow, Waveguides: strip waveguides, rib waveguides, mode confinement, dispersion, bend loss; Optical I/O: edge coupling, grating coupling; Couplers and Interferometers: Y- branch, directional coupler, Mach–Zehnder interferometers; Photonic resonators: Q factor, free spectral range (FSR), coupling regimes; Photonic circuit modelling: S-parameters, compact models; Modulators: Mach–Zehnder Modulators, Ring modulators; Integrated photodetectors and Lasers: Ge PIN, detectors, heterogeneous/hybrid lasers; Manufacturability of photonic devices: yield and variability analysis; Recent Advances and Applications of Integrated Photonic Devices: Optical Transceiver, Biosensing, Photonic Computing, etc.