

### EEE.9-3.3 Quantum Electronic Devices

Course contents: \* Spontaneous and forced emission. Einstein equations. \* Function of lasers. Pumping. Three and four level systems. \* Laser spectrum. Widening mechanisms. Longitudinal models. Spectrum comb. \* Optical cavities. Design and stability criteria. \* Pulse lase technologies. Q-switching. Mode-locking. \* Transport of fast pulses through matter. \* Maxwell equations for non-linear materials. \* 2<sup>nd</sup> order non-linear processes. \* Conditions for energy and momentum conservation. \* Ideal phase matching methods. \* Partial phase matching methods.