

## EEE.8-2.6 Microwave Devices

Course contents: \* Multi-passive microwave elements and description of the operation through the Z, Y, ABCD and scattering matrices. \* Principle of operation of the rectangular directional coupler, matrix scattering, applications, broadband directional couplers. Directional microstrip couplers. \* Microwave cavity wavemeter with coupling opening in waveguide, attenuator operating principle and load implementation techniques waveguide adjustment, phase shifter. \* Techniques for design and operation of microwave antennas - horn antennas, slot antennas, parabolic reflectors. \* Ferrites and ferrite devices and properties at high frequencies: Isolation principle of operation, three-port microwave element circulator - applications. \* Magic Tee, type H and type E splitters - applications. \* Active microwave components - microwave sources - characteristics and requirements for microwave applications. Beam interaction electrons with electromagnetic wave. \* The Klystron tube, as a source of microwave frequency generation - Klystron with reflector - structure and oscillation rates - power - frequency - reflector voltage. Multi-cavity Klystron as an amplifier. \* Gunn diode - GaAs energy bands and negative resistance effect - construction of Gunn diode - maximum output power - equivalent circuit. \* TWT traveling wave tube as a broadband amplifier. \* The Magnetron tube - internal cavity structure - electron motion - field distribution. \* Impact diode, varactor diode, PIN diode. \* Noise in microwave lamps. Parametric Amplifier.