**6th semester**

**INDUSTRIAL ELECTRONICS**

**EC 1601**

An overview of Industrial Electronics, Thyristors – symbol, VI characteristics, two transistor analogy, on and off characteristics, series and parallel operation and industrial application, numerical

Different **COMMUTATION** techniques, numerical

Controlled rectifiers, introduction, phase control, single phase semi converters, dual converters, series converters, three phase half wave, semi converters, full wave, numerical

AC voltage controllers, principle of operation, three phase half wave controllers, bi directional, cycloconverters, numerical

Inverters – 1 and 3 phase, series, parallel and bridge operation, 120 and 180 degree operation, and the industrial application application, numerical

Chopper – Different Class of chopper, different quadrants of Chopper, Step Up and Step Down operation and Industrial use and Application, numerical

**ADVANCED SOLID STATE DEVICES**

**EC1602**

Resonance – dc converters: Analysis, design equations, control techniques and application, SMPS (forward, fly back, and push – pull configurations), current controlled PWM inverters – SPWM, advanced modulation techniques (bang – bang and space vector modulation techniques etc.)

Resonant voltage source inverters – operation, control, and design, Intelligent power Electronic Modules (IPEC), Non – drive applications of inverters; Ups, induction heating, metal cutting, active power line conditioning. Drive applications: Scalar, vector and direct torque control of ac drives, self – controlled synchronous motor drive – constant power factor and constant margin angle control. Modem application case studies of power Electronics and drive.

**ADVANCED ELECTRIC CIRCUITS**

**EC1603**

Introduction to Networks and Layered Architecture. OSI model. Data Communication Concepts. Transmission media Topology, Multiplexing. Circuit switching & packet switching Data Link Layer. Layer 2 switches and ATM , SONET/SDH. Medium acees control. CSMA CD, CDMA,TDMA, FDMA . network layer and adderss version 4 and 6. Routing Algorithms,. Transmission layer , TCPand UDP. Congestion control technique . ATM .Internetworking. Wireless Communications . Network Management and Security

**COMMUNICATION HARDWARE DESIGN**

**EC 1604**

**AMPLITUDE MDULATION AND DEMODULATION AM** , DSB –SC , SSB AND VSB SIGNAL, LOW LEVEL AM USING DIODE ,TRANSISTER , ICs , high modulator class b and c, ring modulator nd balanced modulator , generation of ssb signals, using frequency discrimination and phase dicremination , envelop and coherent detector, square law detector , costas receiver ,squaring loop.

**FREQUENCY MODULATION AND DEMODULATION**

NBFM and WBFM, Reactance modulator,Varactor modulator; Modulators using voltage controlled oscillators and function generators; Armstrong modulator, slope modulator,ratio detector, Foster-Seeley discriminator

**Receivers**

Motivation and principles of super-hetrodyne receivers,sensitivity; selectivity;selectivity and image frequency rejection; sub-system of a communication receiver;receiver evaluation and measurements**.**

**Amplifier and Mixer**

Amplifier design using admittance parameter; Broad banding techniques; mixer using diodes; Transistor, IC; Multipliers.

**PHASE LOCKED LOOPS AND FREQUENCY SYNTHESIZERS**

Linear model of PLL, Phase Detectors, Voltage controlled oscillators, Loop filters, FM demodulation using PLL;PLL application; Digital PLL; Steady state , stability and transient analysis of PLL ,demodulation using PLL, Direct frequency synthesis, PLL as a frequency synthesizer, direct Digital synthesis.

**INTRODUCTION TO ELECTRONIC SWITCHING**

Single stage, Two stage networks; Non blocking networks, networks with concentrators, switching centre’s, Store program control, Distributed SPC,CPU based exchange , switching Hierarchy and Routing

**INTRODUCTION TO TELEVISION**

Interlaced scanning , Luminance and chrominance signal, composite video signal , Television transmitters.

**Suggested Text Book & References**

Smith, Jack, “ modern Communication Circuit”, Mc Graw Hill,1986

Clarke, K.K. and Hess, D.T., “Communication Circuit: Analysis & Design”, Addison Wesley Publishing Co., 1971.

Kennedy, George, “Electronics Communication System”, 3rd Ed., Mc Graw Hill, 1984.

Gulati,R.R. “ Monochrome and Colour Television”, wiley Eastern Ltd.,1986.

Grinsec, “ Electronic Switching”, Elsevier science publishers,1983.

**MICROWAVE ENGINEERING**

**EC1605**

**Microwave tubes** – UHF and microwave frequency limitations of a convential tubes, cavity resonator, Analysis and operation of a Klystron amplifier

Two cavity Klystron amplifier, reflex Klystron oscillator, Travelling wave tube

Backward wave oscillator, Gunn Oscillator

Magnetron Oscillator, Avalenche diode Oscillator, Transferred electron Oscillator

**Microwave components** – Tees, E-plane tee, H- plane tee, Magic tee, two hole directional coupler, Isolator

Linear and rotary phase shifters, Microwave variable attenuators, Matched loads

Microwave integrated circuits – Strip line, microstrip line, , Slotted line, Microstrip antenna

Ferrite devices – property, Faraday rotation in isolators, Faraday rotation in two and four – port circullator

Scattering matrix representation and its properties

**Microwave devices –** IMPATT diode, GUNN diode, PIN diode, Tunnel diode

**COMMUNICATION SYSTEMS II**

**EC 1606**

**Baseband pulse transmission**

Matched filter,inter-symbol interference, eye pattern, Nyquist’s criterion for Distortionless Baseband binary Transmission , correlative level coding (partial response signalling ) and line coding, Adaptive Equalization, clock recover schemes

**Bandpass Digital Transmission** BPSK,00QPSK, MSK,DPSKFSK, OOK and QAM techniques ,Carrier recoveryschemes

**Performance of continuous Wave and Digital Modulation Schemes in Noise**

White noise, Narrow band noise,Noise Analysis of AM, DSB-SC and SSB using coherent detection, Noise Analysis of AM using envelope detection, Noise analysis of FM , Threshold effect in FM, pre emphasis and de-emphasis in FM. Quantization noise, Noise consideration in PCM, probability of Error, Analysis for the above digital modulation techniques

**Noise Sources and Characterizations**

Shot noise , thermal noise , Available noise power Available power again of a two port network, noise figure, noise Bandwidth, Noise Temperature , Noise Figure measurement , system noise calculation

**Information theory**

Entropy and information rate of a discrete memory less source, entropy of a Markov source, Source coding Theorem , Huffman coding, Mutual information and channel capacity , capacity with adaptive white Gaussian noise.

**Error Control Coding**

Channel coding Theorem, Linear block codes and syndrome decoding , Cyclic codes, Introduction to convolution codes and Viterbi algorithm