

VI TERM ECE

4305 - COMMUNICATION SYSTEMS VI TERM (APPLIED COURSE)

6 Hrs / Week Total Hrs : 72

MAJOR DIVISIONS

UNIT TOPIC

I RADAR AND NAVIGATIONAL AIDS

II DIGITAL COMMUNICATION

III FIBER OPTIC COMMUNICATION

IV SATELLITE COMMUNICATION

V COMPUTER COMMUNICATION SYSTEM

UNIT-I: [17 Hrs]

RADAR AND NAVIGATIONAL AIDS

Radar – frequency ranges – Radar system – Basic principles – Development of Radar frequencies and powers used in radar – Radar performance factors – Factors influencing maximum range – Target properties – Pulsed system – Basic Pulsed Radar System – Plan Position Indicator – Automatic Target detection – Radio aids to navigation – Direction finding – Radio ranges – Radio compass – Radio Telemetry – Instrument landing system – Ground controlled approach system.

TELEPHONY AND FAX

Telephone system – Electronic Exchange – Facsimile communication systems – Introduction – Facsimile sender – Cylindrical scanning – Tape Scanning - Scanning spot – Facsimile receiver – Transmission of facsimile telegraph signals .

TELEVISION

Television fundamentals - Scanning principles - Synchronization - Aspect ratio - Composite video signal - VSB Transmission - Intercarrier Sound Modulation - TV Standards - CCIR, NTSC, PAL, SECAM - Block diagram of a TV transmitter and TV Receiver.

UNIT-II: DIGITAL COMMUNICATION [12 Hrs]

Digital transmission system – Sources and signals – Processing operation in digital communication – Characteristics – Bandwidth requirement – Speed, Noise, Baud rate – Cross talk – Distortion – Digital codes – Baudot code – Error detection and correction codes – Parity check codes - error correction codes – Digital systems – Classification – Digital modulation techniques – FSK modulation / Demodulation – PSK modulation / Demodulation.

Digital Image Processing – block diagram of Image Processing system - Image Enhancement – Image Restoration – Image Data Compression – Image Analysis.

UNIT-III: FIBER OPTIC COMMUNICATION [14 Hrs]

Introduction to fiber propagation using a ray model – Material Dispersion – Attenuation In Optic Fiber – Fiber Production Methods – Cables – Step Index Fibers – Graded Index Fibers – Optical Fiber Connection Joints and Couplers – Optical Sources – LED – Semiconductor LASER for Optical Communication – Optical Detector - PIN – APD - Regeneration of Digital Signals – Optical Transmitters and Receiver – Merits of Optical Fiber Communication – Telecommunication – Local Distribution Services – Local data Transmission and telemetry – Optical Fiber Digital Communication System – Applications – Civil, Industry & Military Applications (with descriptive block diagram)

UNIT – IV SATELLITE COMMUNICATION [14 Hrs]

Satellite System - Frequency allocation for satellite services – Orbits – Kepler's Law – Apogee – Perigee – Orbit Perturbation – Active and passive Satellite – Geostationary Orbit – Earth Eclipse of Satellite – Launching Orbits – Launch Vehicles – Parabolic Reflector – Offset feed – Double Reflector Antenna

THE SPACE SEGMENT

Power Supply – Altitude Control – Station Keeping – Thermal Control - TT&C Subsystem – Transponders – Antenna Subsystem

EARTH SEGMENT

Receive Only Home TV System – Transmit – Receive Earth Station.

SATELLITE SERVICES

INSAT – INTELSAT- INMARSAT- Global Positioning System (GPS)

UNIT – V [15 hrs]

COMPUTER COMMUNICATION SYSTEM

Introduction – Types of Network – LAN , WAN - MODEMS – Integrated Service Digital Network – Internet Protocols – Types of Packet Switching – Internet – Web Browsing – EMAIL

MOBILE COMMUNICATION

Cellular Communication – Frequency allocation – Cellular phones – Cordless Phones – Video Phones - Satellite Multiple Access Techniques- TDMA- FDMA –CDMA –Video Conferencing- Wireless Local Loop (WLL)

REFERENCE BOOKS

1. Denni Roaddy, John Coolen, “Electronic Communication Systems”, Prentice - Hall of India Private Limited, New Delhi, 4th Edition, 2005.
2. Roy Blake, “Electronic Communication Systems”, Adivision of Thomson Learning, Inc, 2nd Edition.
3. Louis E.Fronzel, “Communication Electronics Principle & Applications”, Tata McGraw - Hill , 3rd Edition, 2002.

4306 - TELEVISION ENGINEERING
VI TERM (Applied Course)

7 Hrs / Week Total Hrs : 84

MAJOR DIVISIONS

UNIT TOPIC

I T.V. FUNDAMENTALS

II CAMERA AND PICTURE TUBES

III TELEVISION RECEIVERS

IV SYNC, DEFLECTION, EHT & REMOTE CONTROL

V TV TRANSMITTER AND MISCELLANEOUS TOPICS

UNIT I - T.V. FUNDAMENTALS [17 Hrs]

Simple block diagrams of TV transmission and reception - Scanning process - Sequential - Horizontal and vertical scanning - Flicker and Interlaced scanning - Need and details of synchronization, Blanking and Equalising pulses - Aspect ratio – Vertical resolution, Horizontal resolution, Video Bandwidth – Relationship among them - Composite video signal - Serrated vertical sync pulse - Positive and negative transmission - Vestigial side band transmission of video signal - Merits and demerits – Inter-carrier sound – Signal frequencies for any one channel - TV broadcast channel allocation – Different TV standards - CCIR system B in detail. Additive mixing of colors - Color perception- Chromaticity diagram - Luminance and chrominance signals - I & Q signals - their polarity - Bandwidth for color transmission – Simple block diagrams of NTSC/SECAM Encoder and Decoder.

UNIT II - CAMERA AND PICTURE TUBES [16 Hrs]

Elements and characteristics of a camera tube – Construction, working principle and characteristics of plumbicon - Silicon diode array - CCD image sensors - Comparison of vidicon, plumbicon, saticon, newvicon, chalnicon camera tubes - Camera tube deflection and focussing - Processing of camera signal – Production of Y and color difference signals from a color TV camera.

Picture tube specification - Working and characteristics of monochrome picture tube - Phosphor screen - screen burns – aluminium layer - Picture tube mountings for monochrome and color TV including yoke - Types of color picture tubes – Working principle of delta gun, precision inline, trinitron color picture tubes - Color convergence – static and dynamic - Color purity - Screen grid adjustment - Automatic degaussing - Pincushion distortion - Flat panel display- Large screen display methods – LCD projector.

UNIT III - TELEVISION RECEIVERS [17 Hrs]

Block diagram of monochrome TV receiver - functions of various blocks - RF tuner - types - Block diagram of frequency synthesized Electronic tuner – Need for AGC - block diagram of a keyed AGC system - Video IF amplifier response curve requirements – Block diagram of IC

TA 7611 – functions alone and names of IC TDA 3540, TA 7660 - Video amplifier requirements and circuit with HF and LF compensation – Coupling methods - Block diagram of sound section – Block diagram of IC CA 1190 – functions alone and names IC TDA 3190, iPC 1353 - Block diagram of PAL colour receiver - functions of various blocks - Block diagram of a digital color TV receiver.

UNIT IV - SYNC, DEFLECTION, EHT & REMOTE CONTROL (17 Hrs]

Need for sync pulse separator with block diagram - Sync separator circuit with noise gate – Need for trapezoidal voltage for deflection coils – Block diagram of horizontal output stage with EHT - HAFC block diagram with anti hunt network – Horizontal drive, width linearity controls – Typical horizontal output circuit with EHT – function of PAL chroma decoder ICTA 7699– functions and pin connections of IC TA 7680 – functions alone and IC names of TDA 8362, M51308SP.

Schematic diagrams of a remote control IR Transmitter and IR Receiver – Synthesis of remote control signals – Synchronization of receiver - Functions of remote transmitter and receiver ICs – M 50463P, M 50142P, iPC 1373HA – functions of system control ICs MN 15287, PCA 84C440P, MN 15284.

UNIT V - TV TRANSMITTER AND MISCELLANEOUS TOPICS [17 Hrs]

Block diagram of a Low level IF modulated TV transmitter - visual exciter - aural exciter - diplexer - Color compatibility - color synchronization - Color plexed composite video signal(CCVS) and weighting factor - Typical layout of TV station - PAL Color Coder – functional blocks and working of each block – output waveforms – Modern cable TV system schematic diagram - Scrambling – descrambling – block diagram of a basic descrambler – Digital CCD telecine system – Steps involved in VCD making process – Block diagram of VCD player in playback mode – Advantages of DVD over laser disc, video tape, VCD – DVD player block diagram in play mode.

TEXT BOOKS:

1. R.R. Gulati - Modern T.V Practice
2. Arvind M. Dhake - TV and Video engineering
3. Bernard Grob - Basic Television & Video systems

REFERENCE BOOKS:

1. R.P.Gulafi, “Modern TV Practice”.
2. Arvind M.Dhake, “TV and Vidio Engg”.
3. Bernald Grob, “Basic Tv & Video System”.
4. Maini.A.K, “Colour Television and Video Technology”, CBS Publishers, 2nd Edition.
5. Jim Talor, “DVD Demystified”, Tata McGraw - Hill Publishing, 2nd Edition.

4403 -A - INDUSTRIAL ELECTRONICS VI TERM (Diversified Course -III)

6 Hrs / Week Total Hrs : 72

MAJOR DIVISIONS

UNIT TOPIC

I BASICS OF THYRISTORS AND APPLICATIONS

II CONVERTERS AND INVERTORS

III ROBOTICS AND ULTRASONICS

IV PROGRAMMABLE LOGIC CONTROLLER

V NUMERICAL CONTROL OF MACHINES

UNIT 1: BASICS OF THYRISTORS AND APPLICATIONS (14 hrs)

CHARACTERISTICS OF SCR:

Turn on (characteristics and measurements) – turn off(characteristics and measurements) – voltage and current ratings – triggering circuits for SCRs – thyristors types – series and Parallel operations of SCRs.

Protection of SCRs:

Di/dt protection – dv/dt protection – gate circuit protection – over voltage and over current protection – over current protections – contactors for protection – protection by limiting junction temperatures.

Applications of SCR:

Integral cycle triggering – over voltage protection – static circuit breaker regulated supply DC and AC – emergency light using SCR – automatic battery charger circuit.

UNIT 2: CONVERTERS AND INVERTORS (Qualitative treatment only)

(14 hrs)

Converters:

Single phase semi converters R, RL and fly wheel diode – single phase converters with R, RL and fly wheel diode – input – output characteristics of bridge circuits – effect source inductance – discontinuous current operation – effect of overlap angles – line communication.

a. Self commutations

b. Forced commutations (mention of types only)

Polyphase converters with resistive load only

a. 3 Phase semi converters

b. 3 Phase full converter Dual converter.

Inverters:

Single phase inverters using thyristors with R, RL loads – output voltage control in inverter – method of obtaining sine wave output from an inverter – typical inverter circuit – three phase inverter circuit – inverter characteristics – through pass inverter – applications of inverters – DC transmission – block schematic – advantages.

UNIT 3: ROBOTICS AND ULTRASONICS (16 hrs)

Robotics:

Classification – parts of robots – uses of robots. Mechanisms of robots – position and orientation – joints and links – degree of freedom – forward kinematics – inverse kinematics – Jacobean – dynamics – trajectory – position control – force control – servo mechanism – synchronous – control transformer – receiver servo motor – drive mechanisms – hydraulic and pneumatic drives – DC electric motor drives - stepper motor – unipolar operation – 2 phase scheme – half stepping scheme – stepper motor drive circuit – open loop and closed loop control of stepper motors – comparison between DC motors and stepper motors – electronic timers – DC timer – AC timer, 555IC timer – 555IC sequence timer.

Ultrasonics:

Piezoelectric ultrasonic oscillator – applications – SONAR – flaw detector – drilling – soldering – cleaning – medical applications – saw filter – applications.

UNIT 4: PROGRAMMABLE LOGIC CONTROLLER (14 hrs)

Evaluation of PLCs – hardwire control system definition – programmable logic control system: advantages of PLCs. Block diagram of PLC system symbols used – relays and logic functions – OR, AND, Comparator, Counters review.

Programming of PLCs – different methods – ladder STL and CSF, ladder programming of simple system like traffic light controller – conveyors – list of various PLCs available

UNIT 5: NUMERICAL CONTROL OF MACHINES (14 hrs)

Basic concepts of numerical control – driving devices – hydraulic systems – data processing unit – data reading – tape reader – photoelectric type – typical reading circuit – tape formats – programming – part programming – general information – post processor elements – word addressing format with the simple programme as example – other programming systems – ADAPT/EXAPT, AUTOSPOT – characteristics of N/C system – CNC/DNC – CNC typical system block diagram – adaptive control systems – ACC-ACO.

REFERENCE BOOKS:

Power electronics: P.C. Sen.

Industrial electronics: G.K. Mithal

Numerical: Yoram koren and Joseph Ben

Robotics and image processing: P.A. Jamakiraman

Thyristors and their applications: M. Ramamoorthy

Power Electronics – circuits device and applications: Rashid

Industrial electronics and control: S.K. Bhattacharya and S.chatterjee SCR

Manual – 6th edition GE

Programmable controllers hardware software and applications

– George L. Battin

Industrial robotics: Grower & others MGH

4307 - COMMUNICATION SYSTEMS LAB
VI TERM (APPLIED COURSE)

6 Hrs / Week Total Hrs : 72

1. Construct a Transistor video amplifier and find the frequency response characteristic.
 2. Construction and testing of a sync separator.
 3. Construction and testing of a saw tooth generator for 3 different time constant.
 4. To find deflection sensitivity of TV picture tube.
 5. Study of TV receiver adjustments. Assembling and testing of Yagi antenna.
 8. Simple faults in sound section and rectification.
 11. Simple faults in video section and rectification.
 12. Simple faults in picture tube deflection section and rectification.
 13. Study of CCTV system.
 14. Study of Composite video signal from video IF IC .
 15. Observe the waveforms of FSK Transmitter and Receiver.
 16. Observe the waveforms of PSK Transmitter and Receiver.
 17. Setting up a fiber optic Analog link.
 18. Setting up a fiber optic Digital link.
 19. Losses in Optical Fiber
 20. Measurement of Numerical Aperture
 21. TDM of Signals.
 22. Manchester Coding and Decoding
 23. Analog Transmitter and Receiver.
- Scheme of Examination
S.No Topics Marks
1 Exercise 70
2 Viva – Voice 5
Total 75

4404 -A - INDUSTRIAL ELECTRONICS LAB
VI TERM (Diversified -IV)

6 Hrs / Week Total Hrs : 72

1. Construct A.C. timer circuit using transistor to operate a switching circuit after a time–delay. (Time can be specified depending on the components available). Test its performance with a standard stopwatch.
2. Construct a D.C. timer circuit-using transistor to operate a switching circuit after a timedelay. Test its performance with a standard stopwatch.
3. Construct a sequence timer using 555-timer chip.
4. Construct and test the performance of the photo relay using LDR.
5. Construct a bias controlled half rectifier using SCR. Plot the firing angle output current graph for resistive load.
6. Construct and test the performance of a bias controlled full wave rectifier using SCR for resistive load. Plot the output waveform for different firing angles.
7. Construct and test the performance of a SCR triggering circuit using UJT.
8. Construct & test the performance of a battery charger circuit using SCR.
9. Construct and test the performance of a SCR speed control circuit for universal motor.
10. Speed control of stepper motor using micro controller.
11. Construct and test SCR regulated DC power supply.
12. PSPICE Simulation of SCR circuit.
13. Construct and test TL emergy light.
14. Construct and test lamp dimmer using TRIAC.
15. Simulation of traffic light controller using PLC.
16. Construct and test temperature controller using UJT and TRIAC (using a thermistor).
17. Study of servo stabilizer.
18. Study of UPS.

SCHEME OF EXAMINATION

S.No Topics Marks

1 Exercise 70

2 Viva – Voice 5

Total 75

4308 – PROJECT WORK, ENTREPRENEURSHIP AND PERSONAL SKILLS (VI TERM Applied course)

4 Hours /Week Total Hrs : 48

I. PROJECT WORK - INCLUDING REPORT

1. PROJECT WORK

A Project is a task in a selected area engaged by an individual or group of Students with guidance of one or two faculty and / or from an Industry.

2. REPORT

The students should submit project report for evaluation. The project report should contain synopsis, description, detailed work and drawings, cost particulars, performance study report, any improvements needed, conclusion and bibliography.

II. PERSONAL SKILLS

The student is evaluated in the following areas are related to his project.

1. COMMUNICATION SKILL (PROJECT PRESENTATION)

Each student is to give a seminar in the project work. Presentation by OHP / Power point is preferred.

2. GROUP DISCUSSION

The students will be evaluated by 1. participation 2. Respecting others view 3. Accepting ones own mistakes 4. Reaction 5. Team spirit.

3. INTERVIEW / VIVA VOCE

The students will be asked to answer the questions for the interview may be the project or any other relevant subject. regarding the project in English only.

III. ENTREPRENEURSHIP

Objective type questions may be asked in the Examination for a period of 1Hour.

MAJOR DIVISIONS

UNIT 1 Entrepreneurship

UNIT 2 Business Counseling

UNIT 3 Finance

UNIT 4 Marketing

UNIT 5 Industry

UNIT 1 : ENTREPRENEURSHIP

Definitions of Entrepreneurship – Characteristics of Entrepreneurship – Traits of a entrepreneur – Types of entrepreneur – Functions of an entrepreneur – Behavioral patterns of entrepreneurs.

UNIT 2 : BUSINESS COUNSELLING

Business opportunity guidance – Project identification – Techno-economic survey – Market research – Project formulation – Project selection – Project report format – Contents of project report.

UNIT 3 : FINANCE

Sources of finance – Types of loans available – Financial Institutions – Institutions assisting entrepreneurs.

UNIT 4 : MARKETING

Marketing channels – Channel design – choice of channel – Alternative channels of distribution – Mercantile agents – Merchant middlemen – Wholesalers – Retailers.

UNIT 5 : INDUSTRY

Types of industries – Steps for starting a small industry – preparation of project report – Guidelines, procedures, and formalities for registration – Selection of type of organisation – Sole proprietorship – partnership – Joint stock company – Factors influencing the choice of an organisation.

SCHEME OF EXAMINATIONS

S.No Topics Marks

1 Exercise 70

2 Viva – Voice 5

Total 75