Shivaji University, Kolhapur

Department of Technology

FINAL YEAR B.TECH

ELECTRONICS AND COMMUNICATION TECHNOLOGY

Curriculum Structure

Semester – VII

Sr. No.	Subject Code	Subject Title	Contact hours			Credits
			L	T	P	
1	ECT 411	Audio and Video Engineering	3		-	3
2	ECT 412	Industrial and Power Electronics	3		-	3
3	ECT 413	Microwave Engineering	3		-	3
4	ECT 414	Mobile and Cellular Communication	3		-	3
5	ECT 415	Elective-I	3	1	-	4
6	ECT 416	Seminar and Project-I	-		2	4
7	ECT 417	Laboratory- I Audio and Video Engineering	-		2	1
8	ECT 418	Laboratory-II Industrial and Power Electronics	-		2	1
9	ECT 419	Laboratory-III Microwave Engineering	-		2	1
10	ECT 4110	Laboratory-IV Mobile and Cellular Communication	-		2	1
11	AC 414	Audit Course IV Professional Ethics	2		-	
		Total	17	1	10	24
Total Contact hours per week = 28						

Semester –VIII

Sr. No.	Subject Code	Subject Title	Contact hours			Credits
			L	T	P	
1	ECT 421	Broadband Communication	3	-	-	3
2	ECT 422	Satellite Communication	3	-	-	3
3	ECT 423	Antennas and Radar Engineering	3	-	-	3
4	ECT 424	ARM and Embedded system	3	-	-	3
5	ECT 425	Elective-II	3	1	-	4
6	ECT 426	Seminar and Project-II	-	-	2	4
7	ECT 427	Laboratory- I Broadband Communication	-	-	2	1
8	ECT 428	Laboratory-II Satellite Communication	-	-	2	1
9	ECT 429	Laboratory-III Antennas and Radar Engineering	-	-	2	1
10	ECT 430	Laboratory-IV ARM and Embedded system			2	1
11	AC 425	Audit Course V Constitution of India	2	-	-	-
		Total	17	1	10	24
Total Contact hours per week = 28						

LIST OF ELECTIVES

Sr. No.	**Elective-I**
1	Industrial Robotics and automation
2	Speech and audio processing
3	RF circuit design
4	Real Time Operating Systems

Sr. No.	**Elective II**	
	Core branch electives	**Open electives**
1	Fuzzy logic and applications	Internet Technology
2	High speed digital design	Soft Computing
3	Digital Image Processing	Operating Systems
4	Biomedical Instrumentation and Technology	

B. Tech. (E&CT)
Semester –VII
AUDIO AND VIDEO ENGINEERING (ECT411)

Teaching Scheme **Examination Scheme**
Lectures: 3 hours/week **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

UNIT I: Hi Fi Audio Amplifier (6Hrs)

Introduction to Amplifiers: Mono, Stereo, Public Address; Difference between stereo amplifier and Mono amplifier; Block diagram of Hi Fi amplifier and explanation; Graphic equalizer concept, circuit diagram and operation. (5 Point Circuit diagram); Dolby NR recording system; Types of speaker woofer, Midrange and Tweeter; Cross over network circuit and its function.

UNIT II: CD Player (6Hrs)

CD – material used, size; Block diagram of CD player and explanation; Principle and working of detection used in CD player; Component used for CD mechanism (i) CD pick-up assembly, (ii) gear system, (iii) drive motors, (iv) CD lens; Function of controls; Parts, function of remote control (transmitter unit) and function of receiver used in CD player; Advantages of florescent display system used in CD player.

UNIT III: TV Fundamentals (6Hrs)

Concept of Aspect ratio, image continuity, interlace scanning, scanning periods, horizontal and vertical, vertical resolution, horizontal resolution; Vestigial sideband transmission, bandwidth for Colour signal, picture tube, brightness, contrast, viewing distance luminance, hue, saturation, compatibility; Colour theory, primary colors and secondary colors, additive Colour mixing subtractive Colour mixing; Composite Video Signal, Pedestal height, Blanking pulse, Colour burst, Horizontal sync pulse details, Vertical sync pulse details, Equalizing pulses, CCIR B standards for Colour signal transmission and reception.

UNIT IV: TV Transmitters and Receiver (6Hrs)

Audio and Video signal transmission; Positive and Negative modulation; Merits and Demerits of Negative modulation; Introduction to television camera tube (a) Vidicon; (b) Plumbicon; (c) Solid State camera based on CCD; Color Picture tube (a) PIL, (b) Delta gun picture tube; Block diagram of monochrome TV transmitter; Block diagram of Colour TV transmitter; Block diagram of monochrome TV Receiver.

UNIT V: Colour TV (6Hrs)

Block Diagram and operation of color TV receiver (PAL D type); Explain –Yagi Uda Antenna; Explain block diagram of PAL-D decoder with circuit diagram of chroma signal amplifier, Burst pulse blanking, Colour killer control, Basic Circuit for Separation of U and V signals. AGC Amplifier. Colour signal matrixing, RGB drive amplifiers; EHT generation: circuit explanation for line output stage using transistor or IC in Colour TV; Comparisons between NTSC, PAL and SCAM Systems.

UNIT VI: Cable Television (6Hrs)

Working principle and specification of following components : Dish antenna, LNBC, Multiplexer,Attenuators Connectors (two ways and three ways), Amplifier and cable; MATV,

CATV and CCTV;Design concept for cable TV network; Block diagram of dB meter with working principle; Direct to Home System (DTH) Introduction and Block Diagram.

Reference :

1. Television & Radio Engineering (A.M. Dhake) Tata McGraw Hill.
2. Television Engg and Video System (R.G. Gupta) Tata McGraw Hill.
3. Audio Video Systems (R.G. Gupta) Tata McGraw Hill.
4. Modern TV Pratice (R.R. Gulati) New Age International.
5. Basic Radio and Television (S. Sharma) Tata McGraw Hill.
6. Colour Television Principles and Pratice (R.R. Gulati) New Age International.
7. Basic Television and Video System (Bernard Grob) Tata McGraw Hill.
8. Mono Chrome and Colour Television (R.R. Gulati0 New Age International.
9. Modern CD Player Servicing Manual (Manohar Lotia) BPB Publication.

INDUSTRIAL AND POWER ELECTRONICS (ECT412)

Teaching Scheme **Examination Scheme**
Lectures: 3 Hours/Week **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

UNIT I Power Devices & Driving Circuits (5Hrs.)

SCR, Construction, **V**-I Characteristics, Dynamic Characteristics during turn on, turn off, gate triggering Characteristics, rating & specifications, SCR triggering methods- R, RC, UJT triggering (using pulse Transformer), PUT, SUS, SBS triggering methods. SCR Turn off method, Class A, Class B, Class C, Class D, Class E, & Class F, dv/dt & di/dt protection circuits. Construction, working, V-I Characteristics, Driving Circuit of : Diac, Triac, GTO, MOSFET, IGBT.

UNIT-II Single & Three Phase Controlled Converter (5Hrs.)

1 Φ Half Wave Controlled Rectifier, 1 Φ Full Wave Controlled Rectifier, 3 Φ Controlled rectifier with and without freewheeling diode , 1 Φ semi converter, Full Converter & dual converter. (Derivations & Numericals expected).

UNIT III Inverters (8Hrs.)

Concept of inverter, types of inverters. Thyristorised inverters: series inverter, parallel inverter, IGBT based inverters: 1-phase half and full bridge inverter. 3-phase bridge inverter (120 and 180 mode of conduction) Voltage control of 1-phase and 3-phase inverter, harmonic reduction techniques.

UNIT-IV Choppers (6Hrs.)

Introduction to Choppers, classification, control techniques of choppers, series turn off chopper, parallel Capacitor Turn off chopper, Jones & Morgan's Chopper; step up chopper, Multi Phase chopper (Circuits based IGBT only).

UNIT-V A.C. Voltage Regulator (6Hrs.)

Switch mode AC power supplies, Resonant AC power supply, Bidirectional AC power supply, Control circuits of SMPS. Cycloconverters single and three phase.

UNIT-VI Industrial Applications (6Hrs.)

AC power flasher using Triac, light dimmer using Triac and Diac, Liquid level controller, 1 Φ preventer, burglar Alarm, Product counter, SCR driving circuit using optocoupler, battery charger, proximity detector circuit.

Text Books:

1. P.C. Sen, "Power Electronics", 1st Edition, Tata McGraw Hill.
2. M.H. Rashid, "Power Electronics", 3rd Edition, Pearson.
3. G.E. SCR Manual.

Reference Books:

1. Mohan, Undeland, Riobbins, "Power Electronics" 3rd Edition, Wiley.
2. Dubey, Doralda, Joshi,Sinha, "Thyristorised Power Controllers", 1st Edition, New Age International Edition.
3. M.D. Singh, K.B. Khanchandani, "Power Electronics", 2nd Edition, Tata- McGraw Hill.

MICROWAVE DEVICES AND CIRCUITS (ECT413)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03	

UNITI. Introduction (4 Hrs)

Microwave bands, microwave characteristics, microwave system, traditional, industrial and biomedical applications, microwave hazards.

UNIT II. Transmission line (7 Hrs)

Circuit representation of transmission line, transmission line equations, sinusoidal excitation of transmission line, impedance and its Transformation, Smith Chart and its applications, impedance matching techniques. Co-axial line, rectangular and circular wave guides, introduction to strip lines, microstrip lines and co-planar wave-guides.

UNIT III. Wave guide components (5 Hrs)

Transmission line resonators, Rectangular and circular cavity resonators, introduction of s-parameters, Hybrid junctions, Directional couplers, circulators, isolators, wave, guide terminations, Attenuators, Phase-shifter

UNIT IV. Microwave tubes and semiconductor devices (7 Hrs)

Reflex klystrons, Multi cavity klystron, Helix TWT, Coupled cavity TWT, Backward wave oscillator, magnetron, Forward wave cross field Amplifiers. Point contact diodes, Schottky barrier diodes, PIN diodes, varactor diodes, tunnel diodes, Gunn devices, IMPATT diode, parametric devices, Detectors and Mixers.

UNIT V. Hybrid and Monolithic MICs (8 Hrs)

Definition hybrid MIC, characteristics, comparison with conventional circuits, fields of application and limitations and criteria for the choice of substrate material; thin film hybrid circuits, thick film hybrid circuits, artwork, mask making, photolithography, resistor stabilization, sawing, brazing process, wire bonding. Definition monolithic MIC, substrate structure, doping by ion implantation ohmic contact, metal resistive layers, gate metal, dielectric second level metal, dielectric and air bridge vias, substrate vias, final wafer process steps.

UNIT VI. Microwave measurements (3 Hrs)

VSWR, Frequency, Power, Noise, Q Factor, Impedance, Attenuation, Dielectric Constant, antenna Gain.

Text Books:

1. Microwave engineering passive circuits - Peter A. Rizzi PHI Publication
2. Microwave Devices and circuits - Samuel Liao PHI Publication
3. Microwave Engineering - David Pozar ,John Wiley and Sons publication
4. Microwave Engineering and Applications - O.P. Gandhi Pargamon Press publication
5. Microstrip Circuit Analysis - David H. Schrader, Prentice Hall PTR, New Jersey 07458.
6. Microstrip lines and Slot lines- KC. Gupta, R. Gargand I.J. Bahl, Artech House.
7. MIIC Design: GaAs FETs and HEMTs- Peter Ladbrooke, Artech House.
8. Foundations for Microstr!p Circuit Design -T.C. Edwards, John Wiley and Sons

Reference Books:

1. Basic Microwave Techniques and laboratory manual- M.L. Sisodia, G. S. Raghuvans Wiley eastern Limited publication
2. Electromagnetic Field theory fundamentals - Guru & Hisiroglu Thomson Learning publication
3. MIC and MMIC Amplifier and Oscillator Circuit Design- Allen Sweet, Artech House.
4. Handbook of Microwave Integrated Circuits- Reinmut K Hoffman, Artech House.

MOBILE AND CELLULAR COMMUNICATION (ECT414)

Teaching Scheme **Examination Scheme**
Lectures: 3 Hours/Week **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

UNIT-I Wireless transmission (5 Hrs)

Need and Application of wireless communication. Wireless Data Technologies Market for mobile. Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Cellular concepts, hand of mechanism, Multipath Characteristics of radio waves signal fading, time dispersion, Doppler spread, coherence time, Diversty techniques.

UNIT-II Medium Access Control (3 Hrs)

Specialized MAC, SDMA, FDMA, TDMA & CDMA

UNIT-III GSM Technologies (6 Hrs)

GSM architecture, entities, call routing in GSM, PLMN Interfaces, GSM Addresses and Identifiers, Network Aspects in GSM, GSM Frequency Allocation, Authentication and Security, 3G Networks, Applications on 3G.

UNIT-IV Services over Mobile Communication (7 Hrs)

Mobile computing over SMS, Short Message Services, Value added services through SMS, GPRS and Packet Data Network, GPRS Network Architecture, GPRS Network Operations, Applications of GPRS, Limitations of GPRS.

UNIT-V Wireless Data Networking (7 Hrs)

IEEE Standards, Models Different layers, wireless LAN, Hyper LAN, Blue tooth. Performance analysis of link & transport layer protocols over wireless channels.

UNIT-VI Mobile Network and Transport Layer (8 Hrs)

Mobile IP: Goals, assumptions & requirements, IP packet delivery, Agent discovery, Registration, tunneling and en capsulation, optimization, Reverse tunneling, IP-V6, Mobile ad-hoc networks. *Transport Layer:* Tradition TCP, Classical TCP improvement, TCP over 2.5G/3G wireless networks. Performance enhancing proxies

Text Books:

1. Mobile Communications - Jochen Schiller - 2nd edition, Publication-Pearson Education.
2. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TMH

Reference Books:

1. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mulett. [Cengage Learning (India Edition)]
2. Mobile Communication – G.K. Behra, Lopamudra Das, Scitech Publication

ELECTIVE I
INDUSTRIAL ROBOTICS & AUTOMATION (ECT415)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

UNIT - I ROBOTICS AND ROBOTICS DRIVES (7 Hrs)

History, Present status and future trends in Robotics and automation, Laws of Robotics, Robot definitions, Robotics systems and robot anatomy, Specification of Robots - resolution, repeatability and accuracy of a manipulator. Robotics applications Robot drive mechanisms, hydraulic, electric, servomotor, stepper motor, pneumatic drives.

UNIT - II ROBOTICS POWER TRANSMISSION SYSTEMS (7 Hrs)

Mechanical transmission method ,Gear transmission, Belt drives, cables, Roller chains, Link , Rod systems ,Rotary-to-Rotary motion conversion, Rotary-to-Linear motion conversion, Rack and Pinion drives, Lead screws, Ball Bearing screws, End effectors - Types.

UNIT - III SENSORS (7 Hrs)

Sensor characteristics, Position sensors, Potentiometers, Encoders, Resolvers, LVDT, Velocity sensors , Tacho-generators, Encoders, Proximity sensors, Limit switches,Tactile sensors ,Touch sensors ,Force and torque sensors

UNIT - IV VISION SYSTEMS FOR ROBOTICS (7 Hrs)

Robot vision systems, Image capture cameras , vidicon and solid state, Image representation , Gray scale and colour images, image sampling and quantization , Image processing and analysis , Image data reduction , Segmentation ,Feature extraction , Object Recognition, Image capturing and communication ,JPEG, MPEGs and H.26x standards, packet video, error concealment, Image texture analysis. Motion generation.

UNIT - V PLC AND AUTOMATION (7 Hrs)

Building blocks of automation, Controllers , PLC, Role of PLC in FA ,Architecture of PLC ,Advantages , Types of PLC , Types of Programming ,Simple process control programs using Relay Ladder Logic and Boolean logic methods ,PLC arithmetic functions Flexible Manufacturing Systems concept , Automatic feeding lines, ASRS, transfer lines, automatic inspection ,Computer Integrated Manufacture , CNC, intelligent automation. Industrial networking, bus standards, HMI Systems, DCS and SCADA, Wireless controls.

TEXT AND REFERENCE BOOKS

1. Klafter, Richard D., Chmielewski, Thomas A, and Negin, Michael., "Robotics Engineering: An Integrated Approach", Prentice Hall of India, New Delhi, 1989.
2. Fu, K.S., Gomalez, R.C., and Lee C.S.G., "Robotics: Control, Sensing, Vision and Intelligence", McGraw Hill, New York, 1987.
3. Groover, Mikell P and et. al., "Industrial Robots: - Technology, Programming and Applications", McGraw Hill, New York, 1986.
4. Niku, Saeed B.,"Introduction to Robotics: Analysis, Systems, Applications" Prentice Hall of India, New Delhi, 2003.
5. Deh, S R., "Robotics Technology and Flexible Automation", Tata McGraw-Hill, New Delhi, 1994.

ELECTIVE I

REAL TIME OPERATING SYSTEMS (ECT 415)

Teaching Scheme **Examination Scheme**
Lectures: 3 hours/week **Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week **IOE: 50 marks**
Total Credits: 04

UNIT I: Introduction to real time operating systems (6 Hrs)

Brief history of operating systems, RTOS, scheduler, objects, scheduler, services, RTOS characteristics.

UNIT II: Tasks and semaphores (6 Hrs)

Tasks: Tasks states and scheduling, task operations, task structure, synchronization, communication , concurrency, deadlocks, priority inversion. Semaphores: definition, operations, use of semaphores in synchronization,

UNIT III: Message queues and kernel objects (6 Hrs)

Definition, queue states, queue content, queue storage, message queue operations, use of message queue in communication. Kernel objects: pipes, event registers, signals, condition variables

UNIT IV: Exceptions and interrupts (6 Hrs)

Exceptions and interrupts, applications, programmable interrupt controllers and external interrupts, general exceptions, processing of general exceptions, spurious interrupts

UNIT V: Timer and Timer services (6 Hrs)

Real time clocks, system clocks, programmable interval timers, timer ISR, soft timer handling facility, timing wheels.

UNIT VI: Memory management (6 Hrs)
Dynamic memory allocation, fixed size memory management, blocking v/s non blocking memory functions, hardware memory management

TEXT BOOKS

1) Rajkamal, "Embedded Systems Architecture, Programming and Design" , TATA McGraw-Hill, First reprint Oct. 2003

ELECTIVE I
SPEECH AND AUDIO PROCESSING (ECT415)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

UNIT - I Digital models for the speech signal (5 Hrs)
Process of speech production, Acoustic theory of speech production, Lossless tube models, and Digital models for speech signals.

UNIT - II Time domain models for speech processing (8 Hrs)
Time dependent processing of speech, Short time energy and average magnitude, Short time average zero crossing rate, Short time autocorrelation function, Pitch period estimation using autocorrelation function, Median smoothing.

UNIT - III Short time Fourier analysis (7 Hrs)
Linear Filtering interpretation, Filter bank summation method, Gamma tone filter, other considerations in filter bank design, speech spectrum analysis using FFT.

UNIT - IV Linear predictive coding of speech (8 Hrs)
Basic principles of linear predictive analysis, Solution of LPC equations, Prediction error signal, Frequency domain interpretation, Relation between the various speech parameters, Synthesis of speech from linear predictive parameters, Applications.

UNIT - V Audio Processing (8 Hrs)
Auditory perception and psychoacoustics - Masking, frequency and loudness perception, spatial perception, Digital Audio, Audio Coding - High quality, low-bit-rate audio coding standards, Multichannel audio - Stereo, Multichannel surround sound.

Text and References book:
1. Ben gold and N Morgan, "Speech and audio signal processing", John Wiley and sons
2. L. R. Rabiner and R. W. Schafer**,** "Digital Processing of Speech Signals," Pearson Education (Asia) Pte. Ltd., 2004.

3. D. O'Shaughnessy, "Speech Communications: Human and Machine,"Universities Press.
4. L. R. Rabiner and B. Juang,"Fundamentals of Speech Recognition," Pearson Education (Asia) Pte. Ltd., 2004.
5. Z. Li and M.S. Drew**,** "Fundamentals of Multimedia," Pearson Education (Asia)

ELECTIVE I
RF CIRCUIT DESIGN (ECT415)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

UNIT-I: RF ISSUES (7Hrs)

Importance of RF design, Electromagnetic Spectrum, RF behaviour of passive components, Chip components and Circuit Board considerations, Scattering Parameters, Smith Chart and applications.

UNIT II: RF FILTER DESIGN (5Hrs)

Filter types and parameters, Low pass filter, High pass filter, Bandpass and Bandstop filter, Insertion Loss. **Special Filter Realizations:** Butterworth type filter, Chebyshev type filters, Denormalization of standard low pass design.

UNIT III: COUPLED FILTERS: (6Hrs)

Odd and Even Mode Excitation, Bandpass Filter Design, Cascading band pass filter elements, Design examples.

UNIT IV: ACTIVE RF COMPONENTS & APPLICATIONS (6Hrs)

RF diodes, BJT, RF FETs, High electron mobility transistors; Matching and Biasing Networks – Impedance matching using discrete components, Microstripline matching networks, Amplifier class's of operation and biasing networks.

UNIT V: RF AMPLIFIER (6Hrs)

Characteristics, Amplifier power relations, Stability considerations, Constant gain circles, Constant VSWR circles, Low Noise circuits, high power and multistage amplifiers.

UNIT VI: OSCILLATORS AND MIXERS (6Hrs)

Basic Oscillator model, High frequency oscillator configuration, Balanced modulators, Basic characteristics of Mixers, Phase Locked Loops, RF directional couplers and hybrid couplers , Detector and demodulator circuits.

Text Books:

1. Reinhold Ludwig and Powel Bretchko, RF Circuit Design ,Theory and Applications, Pearson Education Asia, First Edition, 2001.
2. James Hardy, "High Frequency Circuit Design ", Resto Publishing Co., NewYork,

References:

1. Joseph. J. Carr, Secrets of RF Circuit Design , McGraw Hill Publishers, Third Edition, 2000.

2. Mathew M. Radmanesh, Radio Frequency & Microwave Electronics, Pearson Education Asia, Second Edition, 2002.
3. Ulrich L. Rohde and David P. NewKirk, RF / Microwave Circuit Design, John Wiley & Sons USA 2000.
4. Roland E. Best, Phase - Locked Loops : Design, simulation and applications, McGraw Hill Publishers 5TH edition 2003.
5. Ian Hickman, " RF HandBook ", Butter Worth Heinemann Ltd., Oxford, 1993.

Audit Course V
Professional Ethics (AC 414)

Teaching Scheme:
Lectures: 2 hrs/week **No Credits**
General Information:

UNIT 1 **3 hrs**

Engineering Ethics – Moral Issues, Ethical theories and their uses

UNIT 2 **3 hrs**

Engineering as Experimentation – Code of Ethics

UNIT 3 **3 hrs**

Engineer's Responsibility for Safety

UNIT 4 **3 hrs**

Responsibilities in Rights

UNIT 5 **3 hrs**

Global issues of engineering ethic

UNIT 6 **3 hrs**

Introduction to Entrepreneurship awareness and Development: Functions -why men become economic innovators –Various Assistance Programmes for Small Scale and large Scale Industries through agencies, like IDBI, IFC, ICICI, NSIC, SFC, SIDCO and DIC.

REFERENCE BOOKS:

1. Agarwal, A. N., "Indian Economy", Vikas Publishing House Pvt. Ltd., New Delhi.
2. Charles D.Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999.

3. Datta R. and Sundharam, "Indian Economy", K. P. M., S. Chand & Co. Ltd., New Delhi
4. Seth, M. L., "Principles of Economics", Lakshmi Narain Agarwal, Agra.

REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.

LABORATORY I
AUDIO AND VIDEO ENGINEERING (ECT417)

Teaching Scheme	Examination Scheme
Practical: 2 hour/week	**EPE: 50 marks**
Credits: 01	**Minimum passing:20**

LIST OF PRACTICALS:

(Minimum 8 Experiments based on following TV Sections)

1. Study of circuit diagram of color TV receiver
2. CCVS for different test patterns
3. RF tuner
4. Video IF & detector
5. Video Amplifier
6. Sync separators (V & H)
7. Sound IF
8. Horizontal section
9. Vertical section
10. Trouble shooting of color TV
11. DTH

LABORATORY II
INDUSTRIAL AND POWER ELECTRONICS (ECT418)

Teaching Scheme	Examination Scheme
Practical: 2 Hours/Week	**EPE: 50 Marks**
Credits: 01	**Minimum passing:20**

Practical List:

1. VI Characteristics of SCR.
2. SCR as Half wave controlled rectifier.
3. Triac as light dimmer.
4. A.C. Power Flasher.
5. SCR Triggering Circuits.
6. SCR Commutation Circuits.
7. Liquid level controller.
8. Single phase preventer.
9. AC voltage regulator.

10. SCR step down chopper.
11. Single phase semi- converter.
12. Single phase Full- converter.
13. Burglar Alarm.
14. Batch counter.

Note: Minimum ten experiments should be conducted from above mention list.

LABORATORY III
MICROWAVE DEVICES AND CIRCUITS (ECT419)

Teaching Scheme	**Examination Scheme**
Practical: 2 hour/week	**IPE: 50 marks**
Credits: 01	**Minimum passing:20**

LIST OF EXPERIMENTS:

1. Measurement of power using Bolo meters
2. Measurement of attenuation by substitution method
3. Measurement of impendence using slotted wave guide
4. Measurement of scattering parameters
5. Measurement of noise
6. Measurement of frequency using slotted wave guide.
7. Measurement of impedance using reflectometer
8. Measurement of Wavelength using reflectometer
9. Measurement of gain of horn antenna form radiation pattern

LABORATORY IV
MOBILE AND CELLULAR COMMUNICATION (ECT4110)

Teaching Scheme	**Examination Scheme**
Practical: 2 Hours/Week	**IPE: 50 Marks**
Credits: 01	**Minimum passing:20**

Practical:
Minimum eight experiments should be conducted based on above syllabus.

SEMINAR AND PROJECT-I

Teaching Scheme	**Examination Scheme**
Practical: 2 hour/week	**Minimum passing:20**
Total Credits: 04	**EOE: 50 marks**

The project work is to be carried out in two semesters of final year B. Tech. (E & CT) Part – I & Part– II. The practical batch for project will be of 15 students. The batch will be preferably divided into groups each consisting of not more than 3 students.

In semester – I, group will select a project with the approval of the guide and submit the synopsis of project in the month of August. The group is expected to complete details system design, layout etc. in semester – I, as a part of term work in the form of a joint report. In addition all students of project group will deliver the seminar on the proposed project only.

If the group of student select a project under sponsored category from industry, it is essential that they should take prior written permission & approval at the beginning of semester-I from Head of Institution through Head of Department & Concerned Guide.

B.Tech. (E&CT)
Semester –VIII

BROADBAND COMMUNICATION (ECT421)

Teaching Scheme — **Examination Scheme**
Lectures: 3 hours/week — **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

UNIT 1: Fundamentals of communications Network (4 Hrs)

Switching network, circuit switching, routing In circuit switching network, control signals in circuit switching, packet switching, comparison between packet and circuit switching, other switching techniques, X.25

UNIT 2: ISDN Architecture and Interface (7 Hrs)

Integrated digital networks, concept of ISDN, transmission structure, User-Network interface, protocol architecture, addressing, Interworking, ISDN standards.

UNIT 3: ISDN protocol and Service (7 Hrs)

ISDN physical layer: user network interface, U interface; ISDN Data link layer: LAPD, terminal adaption, data link layer; ISDN Network layer: basic call control, supplementary control; ISDN service: bearer services, tele-services, basic and supplementary service

UNIT 4: Broad band ISDN: architecture and control (4 Hrs)

Architecture, B-ISDN, standards, services, requirements, protocol interface model, physical layer, SONET

UNIT 5: Asynchronous Transfer Mode (7 Hrs)

Asynchronous transfer mode, transmission of ATM cell, ATM adaption layer, ATM traffic attributes and congestion control, flow control, error detection and control.

UNIT 6: Frame relay protocol and services (7 Hrs)

Frame mode protocol architecture, call control, LAPF, congestion in frame relay, congestion control, traffic rate management, explicit congestion avoidance, implicit congestion control.

TEXT BOOK:

1.William Stallings,"**ISDN and Broadband ISDN with Frame Relay and ATM** Prentice-Hall, IVth edition.

REFERENCE BOOKS:

1. Balaji Kumar,**" Broadcast Communications"**, McGraw Hill Publication.
2. W. Stallings, **"ISDN-An Introduction",** McGraw Hill Publishing company.
3. M. Schwartz, " **Telecommunication Network "**Addison Wesley publication.

4. M. Schwartz," **Computer Communication network – Design & Analysis"** Prentice Hall India Publication.

SATELLITE COMMUNICATION (ECT422)

Teaching Scheme **Examination Scheme**

Lectures: 3 Hours/Week **Theory: (CIE+SEE) = (50+50) =100Marks**

Credits: 03

UNIT- I Introduction to Satellite Systems (6 Hrs)

Introduction, Frequency Allocations, Satellite services, Polar Orbiting Satellites, Kepler's Laws, Orbital Elements, Orbit Perturbations, Inclined Orbits, Local Mean Solar Time and Sun-Synchronous Orbits.

UNIT- II Geostationary Satellite (4 Hrs)

Introduction, Antenna Look Angles determinations, Limits of Visibility, Earth Eclipse of Satellite, Sun Transit Outage.

UNIT- III Wave Propagation and Antennas (8 Hrs)

Introduction, Atmospheric Losses, Ionospheric Effects, Rain Attenuation, Introduction, Isotropic Radiator and Antenna Gain, Radiation Pattern, Beam Solid Angle and Directivity, Effective Aperture, Half-Wave Dipole, Aperture Antennas, Horn Antennas Parabolic Reflector, Arrays, Array Switching, Analog and digital signals used in Satellite communication. Error control coding

UNIT- IV Satellite Link Design (5 Hrs)

Introduction, transmission losses, link power budget equation, system Noise, carrier to noise ratio for uplink and downlink, combined uplink and downlink carrier to noise ratio, inter modulation noise

UNIT- V Satellite Networks (5 Hrs)

Bandwidth, Asynchronous Transfer Mode (ATM), ATM layers and Interface, ATM over Satellite, Internet, Internet Layers, The TCP Link, Enhancing TCP Over Satellite Channels, Split TCP Connections, Asymmetric Channels.

UNIT- VI DBS System (8 Hrs)

Orbital Spacing, Power Rating and Number of Transponders, Frequencies and Polarization, Transponder Capacity, Bit Rates for Digital Television, MPEG Compression Standards, Forward Error Correction (FEC), Home Receiver Outdoor Unit (ODU), Home Receiver Indoor Unit (IDU), Downlink Analysis, Uplink. *Satellite Mobile and Specialized Services:*Introduction, Satellite Mobile Services, VSATs, Radarsat, Global Positioning Satellite System (GPS), Orbcomm, Iridium.

Text Books:

1. Satellite Communications - Dennis Roddy - 3rd edition, Mc-Graw Hill Publication

Reference Books:

1. Satellite Communications systems - M. Richharia - 2nd edition Mc Millan publication

2. Introduction to Satellite Communication - Bruce R. Elbert, Third Edition , Artech house London

ANTENNA AND RADAR ENGINEERING (ECT423)

Teaching Scheme **Examination Scheme**
Lectures: 3 Hours/Week **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

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1. BASIC ANTENNA CONCEPTS. (4 Hrs)

Introduction, basic antenna parameters: radiation parameters, radiation power density, radiation intensity, directivity , beam efficiency, gain, aperture concept, effective height, polarization, input impedance, radiation efficiency

2. LINEAR WIRE AND ARRAY ANTENNAS (8 Hrs)

Infinistimal dipole with radiation field , radiation resistance , radiation distance, radiation sphere, Near field , far field directivity, small dipole, finite length dipole, half wave length dipole, folded dipole , sleeve dipole and their applications. Array of isotropic point sources , non isotropic sources, principle of pattern multiplication, linear arrays of n elements , broadside , end fire radiation pattern , directivity , beam width and null directions , planar array , circular array and their application.

3. OTHER TYPES OF ANTENNAS (6 Hrs)

Loop comparison of small loop with short dipole, radiation pattern, its parameter and their applications. V antenna, rhombic antenna, yagi-uda array. Rectangular and circular aperture, horn antenna. Plane reflector, corner reflector, parabolic reflector, and their applications,basics of microstrip antenna.

4. Introduction to Radars (4 Hrs)

Basic principle, radar range equation , radar frequencies and radar applications, minimum detectable signal, receiver noise, transmitter power, pulse repetition frequency, pulse duration, system losses, and propagation effects, A scope display.

5. CW, MTI, Pulse and Tracking Radars (8 Hrs)

CW radars, FMCW radar, MFCW radar, MTI radar, Pulse Doppler radar - principles, operation, performance, limitations and applications.

6. Navigational & Remote Sensing Radars (6 Hrs)

Airport radars, meterological radars, airborne radars, Doppler navigation, remote sensing radars, pattern synthesis, phased array

7. Landing Systems & Hyperbolic Navigation (7 Hrs)

Instrument landing systems, ground controlled approach, radio altimeter, microwave landing system, loran - A, measurement delay, loran-C, DECCA.

TEXT AND REFERENCE BOOKS.

1. Antennas-John D.Kraus
2. Electromagnetics-Jordon Balmain
3. Introduction to Radar System - M. I. Skoh1ik ,Mc-Graw Hill publication
4. Radar Systems and Radio Aids to Navigation - A. K. Sen & A. B. Bhattacharya Khanna

publication.
5. Robert Gagliardi, Communication satellites, CBS Publisher &amp
6. Timothy Pratt, Charles Bostian and Jeremy Allnutt, **" SatelliteCommunications",** Wiley publications, IInd Edition, 2003.
7. Dennis Roddy, **"Satellite Communications"**, McGraw Hill, IInd Edition, 1996

ARM AND EMBEDDED SYSTEMS (ECT424)

Teaching Scheme **Examination Scheme**
Lectures: 3 Hours/Week **Theory: (CIE+SEE) = (50+50) =100Marks**
Credits: 03

UNIT-I-INTRODUCTION TO ARM ARCHITECTURE (6 Hrs)
ARM7TDMI architecture, registers, interrupts, exception process, status registers processor modes, memory, memory mapped I/O, endianness,

UNIT - II ARM INSTRUCTION SET (8 Hrs)
ARM instruction set: Data processing instruction, Load, store, Branch, interrupt instruction, program status register instruction, loading constants, conditional execution.

UNIT - III THE THUMB INSTRUCTION SET (8 Hrs)

Entering thumb state, Thumb instruction set: Thumb register usage, ARM Thumb Interworking, branch instructions, Data processing, single register load-store, multiple register load-stores, stack instructions, software interrupt instruction.

UNIT - IV INTERRUPTS (4 Hrs)
Interrupts and exception handling schemes

UNIT – V MEMORY MANAGEMENT UNIT (4 Hrs)
Memory architecture, Memory access sequence, translation process, access permissions, domains, Aborts

UNIT-VI EMBEDDED SYSTEMS (6 Hrs)
Introduction, CISC and RISC architectures, features of 16/32 bit microcontrollers, device drivers, Interrupt servicing mechanisms, programming concepts in embedded c and c++, Prototype development phases, software design and implementation , Hardware software co design, Case study: Adaptive cruise control system in car.

TEXT BOOKS

1. Sloss, Symes, Wright,"ARM system developers guide"Morgan Kaufman,Elsevier, publication
2. Raj Kamal, "Embedded Systems: Architecture, Programming and Design", TMH, 2003.
3. Wolf, Wayne, "Computers as Components: Principles of Embedded Computing System Design, Morgan Kaufman Publishers, 2001.

REFERENCE BOOKS

1. Vahid, Frank and Givargi, Tony, "Embedded System Design: A Unified Hardware/Software Introduction", John Wiley & Sons, New York, 2000.
2. Deshmukh, Ajay V., "Microcontroller Theory and Applications", Tata McGraw-Hill.

ELECTIVE II
FUZZY LOGIC AND APPLICATION (ECT425)

Teaching Scheme	Examination Scheme
Lectures: 3 hours/week	Theory: (CIE+SEE) = (50+50) =100Marks
Tutorial: 1 hour/week	IOE: 50 marks
Total Credits: 04	

UNIT 1: Introduction to Fuzzy Logic (2 Hrs)

Origin of Fuzzy Set Theory, Historical developments Fuzzy Logic, Benefits, Limitations of Fuzzy Logic, Application potentials and application domains of Fuzzy Logic

UNIT 2: Fuzzy Set Theory (6 Hrs)

Fuzzy Set: discrete and continuous domains, Crisp Set versus Fuzzy Set, Concept of membership function and its features, Types of Fuzzy Sets, Characteristic properties of Fuzzy Set, Methods of assigning membership grade values, Hedges, Labels, Fundamental operations (Union, Intersection, Complement, Containment)

UNIT 3: Fuzzy Relation and Implications (10 Hrs)

Classical (Crisp) and Fuzzy Relations, Fundamental operations (Union, Intersection, Complement, Containment), Properties of Fuzzy Relation, Fuzzy Proposition, Formation of Fuzzy Rules, Compound rules, Aggregation of Fuzzy rules, Fuzzy (Approximate) Reasoning, Types of Fuzzy Reasoning, Mamadani and TSK methods of Fuzzy Reasoning, Fuzzy Inference System (FIS), Types of FIS: Mamadani and Sugeno type, Comparison, Fuzzy Implication: Generalized Modus Ponens and Tolens, Types of Implications, Conversion of Fuzzy Rules into Fuzzy Relation by Zadeh and Mamadani type implications, Compositional Rule of inference.

UNIT 4: FKBC Design Parameters (8 Hrs)

The FKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzzification procedure, choice of defuzzification procedure, comparison and evaluation of defuzzification methods.

UNIT 5: Nonlinear Fuzzy Control (4 Hrs)

The Control Problem, The FKBC as a Non-Linear Transfer Element, Types of FKBC such as PID-like FKBC, Sliding Mode FKBC, Sugeno FKBC.

UNIT 6: Adaptive Fuzzy Control (6 Hrs)

Design & Performance Evaluation, Approaches to Design such as membership function tuning using gradient descent, membership function tuning using performance criteria, the self-organizing controller, model based controller.

Text books:

1. Fuzzy logic with engineering applications By T J Ross, Wiley publications
2. An introduction to fuzzy control. By D Driankov, H Hellendoorn, M Reinfrank

Reference books:

1. Introduction to fuzzy sets, fuzzy logic and fuzzy control system By Guanron Chan, Trung Pham
2. Fuzzy sets and fuzzy logic: Theory and application By Klin and Yaun

ELECTIVE II
HIGH SPEED DIGITAL DESIGN (ECT425)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

Unit 1 Introduction to High Speed Digital Design (7 Hrs)

Frequency, time and distance, Capacitance and Inductance Effects, High speed properties of logical gates, Speed and power modeling of wires, Geometry and Electrical properties of wires, Electrical model of wires, transmission lines, lossless LC transmission lines, lossy RLC transmission lines – Special transmission lines

Unit 2 Power Distribution and Noise: **(8 Hrs)**

Power supply network Local power regulation IR drops Area bonding On chip bypass capacitors Symbiotic bypass capacitors Power supply isolation –Noise sources in digital system Power supply Noise – Cross talk Inter symbol interference.

Unit 3 Signaling convention and Circuits: **(8 Hrs)**

Signaling modes for transmission lines signaling over lumped transmission media Signaling over RC interconnects driving lossy LC lines simultaneous bidirectional Signaling terminators transmitter and receiver circuits.

Unit 4 Timing Convention and Synchronization: **(8 Hrs)**

Timing fundamentals Timing properties of clocked storage elements signals and events open loop Timing , level sensitive clocking pipeline Timing closed loop Timing –clock Distribution Synchronization failure and meta stability PLL and DLL based lock aligners.

Unit 5 Ultra fast VLSI Circuits and Systems: **(5 Hrs)**

GaAs crystal structure, Technology development, Device modeling and performance estimation, Thermal design, Electromagnetic compatibility.

TEXT BOOKS

1. “Digital System Engineering”, William S.Dally & John W. Paulton, Cambridge University Press,1998.
2. “High Speed Digital Circuits”, Masakazu Shoji.,Addison Wesley Publishing Company, 1996

REFERENCES

1. “Digital Integrated Circuits: A design Perspective”, Jan M.Rabaey et al;2nd Edition 2. “Basic VLSI Design”, Douglas A.Pucknell & Kamran Eshraghian, Prentice Hall,1994.

3. "Design for Test for Digital ICs & Embedded core Systems", Alfred L Crouch; Prentice Hall.
4. "High Speed Digital DesignA Hand book of Black Magic", Howard Johnson & Martin Graham, Prentice Hall PTR,1993.

DIGITAL IMAGE PROCESSING (ECT425)

Teaching Scheme — **Examination Scheme**
Lectures: 3 hours/week — **Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week — **IOE: 50 marks**
Total Credits: 04

UNIT - I DIGITAL IMAGE FUNDAMENTALS (8 Hrs)

Introduction, Image perception , light , luminance , brightness and contrast , Fundamental steps in digital image processing, pixels, image processing components , visibility function , monochrome vision models ,color representation ,color matching and reproduction ,color vision model Image sampling and quantization ,Two dimensional sampling theory ,reconstruction of images from its samples , Multi rate aliasing ,sampling theorem. Practical limits in sampling reconstruction. Image quantization, visual quantization, image sensing and acquisition, Image sampling and quantization.

UNIT - 2 IMAGE TRANSFORMS (5 Hrs)

Image transforms, two dimensional orthogonal and unitary transforms, properties of unitary transforms, one dimensional DFT, cosine, sine, Hadamad and Haar transforms.

UNIT – 3 IMAGE ENHANCEMENT AND RESTORATION (7 Hrs)

Image enhancement, Point operations ,contrast stretching , clipping and thresholding , digital negative intensity level slicing , bit extraction. Histogram modeling ,histogram equalisation ,modification. Spatial operations ,sharpening and smoothing techniques. Magnification and interpolation. Transform operations. Color image enhancement. Image Restoration , degradation model, Unconstrained and Constrained restoration, Inverse filtering - removal of blur caused by uniform linear motion, Wiener filtering.

UNIT - 4 IMAGE COMPRESSION (6 Hrs)

Image Compression, Fundamentals, Image compression models, Elements of Information Theory, Error free Compression, Lossy Compression, DCT and Wavelet based compression, Image compression standards , JPEG 2000, MPEG 4.

UNIT- 5 MORPHOLOGICAL IMAGE PROCESSING (6 Hrs)

Dilation and erosion**,** opening and closing, hit or miss transformation, morphological algorithms, extensions to grey scale images.

UNIT 6 IMAGE SEGMENTATION (4 Hrs)

Discontinuities detection, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds, use of motion in segmentation.

TEXT BOOKS

1. Gonzalez, Rafel C. and Woods, Richard E., "Digital Image Processing", Second Edition, Prentice Hall, 2006.

2. Jain, Anil K., "Fundamentals of Digital Image Processing", Prentice Hall of India, New Delhi.

REFERENCE BOOKS

1. Rosenfield, Azriel and Kak, Avinash C., "Digital Picture Processing", Academic Press Inc, New York, 1982.
2. Salomon, David., "Data Compression: The Complete Reference", Second Edition, Springer Verlag, New York, 2001.
3. Pratt, William K., "Digital Image Processing", John Wiley & Sons, New York, 2003.

ELECTIVE II
BIOMEDICAL INSTRUMENTATION & TECHNOLOGY (ECT425)

Teaching Scheme — **Examination Scheme**
Lectures: 3 hours/week — **Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week — **IOE: 50 marks**
Total Credits:04

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1. **Bioelectronics signal:** **(6 Hrs)**

Origins of Bioelectric signals, Electrocardiogram (ECG), Electromyogram (EMG). Recording Electrodes: Silver-silver Electrodes, Electrodes for ECG, EEG and EMG. Physiological Transducers: Pressure Transducers, Temperature sensors, Pulse sensors.

2. **Recording and monitoring instruments**: **(6 hrs)**

Biomedical Recorders: Block diagrams of electrocardiogram phonocardiograph, Electroencephalograph, Electromyography. Monitoring system, block diagram of patient monitor, measurement of heart rate, blood pressure measurement, and temperature measurement respiration rate. Basic Arrhythmia Monitoring system: Block diagram, Foetal Monitoring System: Methods of monitoring Foetal Heart Rate, Abdomen Foetal Electrocardiogram and Foetal Phonocardiogram. Biomedical Telemetry: Introduction, block diagram and description of single channel/multi channel telemetry systems.

3. Audio meters: **(4 hrs)**

Mechanism of hearting, measurement of sound, basic audiometer,pure tone audiometer, sped audiometer.

4. Image systems: **(6 hrs)**

Introduction, Basic principle and block diagram of x-ray machine,x-ray computed topography (C.T. Scanner) and Nuclear Magnetic resonance (NMR) Topography, Ultrasonic Imaging System: Introduction, medical ultrasound, block diagram of pulse echo-system, A-Scan, M-mode, B-scanner and real time ultrasound imaging systems.

5. Biomedical equipments: **(6 hrs)**

Therapeutic: Type of cardiac Pacemakers. Cardiac Defibrillator,Kidney Machine. Physiotheraphy: Short-wave Diathermy, Microwave Diathermy, Ultrasound Therapy unit.

6 X- ray machine **(6 hrs)**

Basic X-Ray components and circuits, types of X-ray machines e.g. general purpose, dental image intensifier system, table shooting and maintenance of X- Ray machine

7. Patient safety: **(2 Hrs)**

Electric shock hazard, leakage currents, Test Instruments for checking safety parameters of Biomedical Equipments.

TEXT AND REFERENCE BOOKS:

1. Handbook of Biomedical Instrumentation by R.S.Khandpur.

2. Biomedical Instruments: Theory and Design by Walter Welko- Witiz and Sid Doutsch
3. John. G. Webster,**" Medical Instrumentation"** John Wiley publication.
4. Goddes & Baker,**" Principles of Applied Biomedical Instrumentation"** John Wiley publication.
5. Carr & Brown," **Biomedical Instrumentation & Measurement"** Pearson Education
6. Cromwell, " **Biomedical Instrument"** Prentice Hall of India, New Delhi
7. R.S. Khandpur, " **Hand book of Medical instruments**" TMH, New Delhi
8. Sanjay Guha ,**"Medical Electronics and Instrumentation"** University press Publication
9. Edward J. Bukstein," **Introduction to Biomedical electronics"**sane and Co. Inc.USA

OPEN ELECTIVE
INTERNET TECHNOLOGY (ECT 425)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

UNIT I: Computer networks and internet principles

Computer network and internet, application layer protocols HTTP, FTP e mail, DNS socket programming, TCP/UDP web servers web page design using HTML and XML

UNIT II: Multimedia networking

Streaming stored audio and video , internet telephony ,RTP scheduling and policing mechanisms, integrated services , RSVP differentiated services, network management, internet network management framework.

UNIT III: Network security

E mail security privacy, S/MIME IP security overview, architecture ,authentication, header and payload, combining security associations, key management, web security, SSL and transport layer security, SET systems security intruders, firewall designs, viruses

UNIT IV: Mobile internet

Mobile network layer, mobile IP dynamic host configuration protocol, ad hoc networks, mobile transport layer, implications on TCP on mobility , indirect TCP snooping ,TCP mobile TCP transmission , selective retransmission, transaction oriented TCP support for mobility file system, WAP protocols, WML , WML script ,wireless telephony applications.

TEXT BOOKS

1) Kurose J.F. , Ross K.W., "Computer networking: A top down approach , featuring the internet , Addison Wisley
2) Stallings W., "Cryptography and network security principles and practice", Pearson Education,
3) Schiller J., "Mobile communications" Addison Wisley
4) Singhal, " The Wireless application protocol", Pearson education Asia

OPEN ELECTIVE
SOFT COMPUTING(ECT 425)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

UNIT I :Artificial Intelligent systems

Neural Networks, Fuzzy Logic and Evolutionary Programming concepts. Artificial Neural Networks ,Biological neural networks ,Model of an artificial neuron, Comparison between biological neuron and artificial neuron,Basic models of artificial neural network ,Learning methods ,Activation function and terminologies of ANN, Mc Culloch Pitts Neuron ,Linear Separability , Hebb network , Perceptron Networks , Adaline, Madaline.

UNIT II Back propagation Networks : Architecture

Multi layer perceptron ,Back propagation learning – Input layer, Hidden Layer , Output Layer computations, Calculation of error, Training of ANN, Back propagation Algorithm, Momentum and Learning rate, Selection of various parameters in BP networks- Radial Basis Function Networks, Variations in standard BP algorithms , Decremental iteration procedure, Adaptive BP, GA, based BP, Quick prop training, Augmented BP networks, Sequential learning Approach for single hidden layer Neural networks.

UNIT III Fuzzy sets and crisp sets

Fuzzy sets ,Fuzzy set operations, Fuzzy relations, Membership functions , Features of the membership functions, Fuzzification, Methods of membership value assignments, Defuzzification, Defuzzification methods, Fuzzy Rule Base and approximate reasoning, Truth values and tables in fuzzy logic, Fuzzy propositions, Formation of rules, Decomposition of rules, Aggregation of fuzzy rules- Fuzzy Inference Systems, Construction and Working Principle of FIS- Methods of FIS- Mamdani FIS and Sugeno FIS Fuzzy , Logic Control Systems- Architecture and Operation of FLC System, FLC System Models, Application of FLC Systems.

UNIT IV Genetic Algorithms

Basic Concepts, Creation of off springs, Working Principle, Encoding, Fitness function Reproduction, Roulette, Wheel Selection, Boltzmann Selection, Tournament selection,
Rank Selection, Steady, State Selection, Elitism, Generation gap and steady state replacement

Inheritance operators, Cross Over, Inversion and deletion, Mutation Operator, Bit wise operators, Generational Cycle, Convergence of Genetic Algorithm, Differences and Similarities between GA and other traditional methods, Applications.

TEXT BOOKS

1) S. N. Sivanandam, S. N. Deepa, "Principles of Soft Computing" , Wiley India Pvt. Ltd
2) R.Rajasekharan and G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms- Synthesis and Applications", Prentice Hall of India
3) S. Haykins, Neural Networks , "A Comprehensive Foundation" , Prentice Hall 2002

ELECTIVE II
OPERETING SYSTEMS (ECT425)

Teaching Scheme	**Examination Scheme**
Lectures: 3 hours/week	**Theory: (CIE+SEE) = (50+50) =100Marks**
Tutorial: 1 hour/week	**IOE: 50 marks**
Total Credits: 04	

Unit 1. Introduction: Idea of an operating system , Different types of Operating Systems, System Calls. (2)

Unit 2. Process and Process Scheduling: Process Concept, Process Scheduling, Operation on process, Cooperating process, Threads, Inter-process Communication Basic concept, Scheduling Criteria, Scheduling Algorithms, Multiple processor scheduling, Real time scheduling. (4)

Unit 3 Inter-process Synchronization: Background, Classical problems of synchronization, Critical Region, The critical section problem, Synchronization Hardware Monitors, Semaphores. (5)

Unit 4 Deadlocks: System modes, Deadlock characterization, Methods for handling deadlocks Deadlock prevention, Deadlock avoidance, Deadlock detection Recovery from deadlock, combined approach to dead lock. (6)

Unit 5 Memory management: Background, Logical Versus Physical Address space, Swapping Contiguous Allocation, Virtual Memory: Background, Demand paging, Page replacement, Page replacement algorithms, Allocation of frames, Thrashing. (5)

Unit 6 I/O system: Overview, I/O hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O request to hardware operation. Case Study: Memory, Process, File, Disk, Device Management in UNIX, MS-DOS, Windows, Linux. (4)

Text Books:

1.Operating System concepts – 5th Edition – Silberschatz Galvin (John Wiley).
2.Understanding Operating System – Ann McHoes & Ida M. Flynn, (Thomson) 5th Edition (Refer Chapters 13,14,15,16 from the book for Chapter 8: Case Study)

Reference Books:

1.Operating system with case studies in Unix, Netware and Windows NT – Achyut S. Godbole (TMGH).
2.Operating systems: concepts and design - Milan Milenkovic (TMGH).

Audit Course VI

CONSTITUTION OF INDIA (AC425)

Teaching Scheme:
Lectures: 2hrs/week **No Credits**
Evaluation Scheme - Marks: 50 **Minimum Passing Marks: 20**

UNIT 1 **(4 hrs)**
Preamble to the constitution of India. Fundamental rights under Part – III – details of Exercise of rights, Limitations & Important cases.

UNIT 2 **(3 hrs)**
Relevance of Directive principles of State Policy under Part – IV. Fundamental duties & their significance.

UNIT 3 **(3 hrs)**
Union Executive – President, Prime Minister, Parliament & the Supreme Court of India.

UNIT 4 **(3 hrs)**
State executive – Governors, Chief Minister, State Legislator and High Courts.

UNIT 5 **(4 hrs)**
Constitutional Provisions for Scheduled Castes & Tribes, Women & Children & Backward classes. Emergency Provisions.

UNIT 6 **(3 hrs)**
Electoral process, Amendment procedure, 42nd, 44th, 74th, 76th, 86th and 91st Constitutional amendments.

Text Book:

1. Durga Das Basu: "Introduction to the Constitution of India"(Students Edn.) Prentice – Hall EEE, 19th/20th Edn., 2001.
2. R.C.Agarwal, "Indian Political System", (1997) S.Chand and Company, New Delhi.
Maciver and Page, "Society: An Introduction Analysis", Mac Milan India Ltd., New Delhi.
3. K.L.Sharma, "Social Stratification in India: Issues and Themes",(1997), Jawaharlal Nehru University, New Delhi.

Reference Book:

1. An Introduction to Constitution of India" by M.V.Pylee, Vikas Publishing, 2002.
   Sharma, Brij Kishore, "Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, "(1998) Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers Pvt. Ltd.
4. Yogendra Singh, "(1997) Social Stratification and Charge in India ", Manohar, New Delhi.

LABORATORY I

BROADBAND COMMUNICATION (ECT427)

Teaching Scheme	**Examination Scheme**
Practical: 2 hour/week	**IPE: 50 marks**
Credits: 01	**Minimum passing:20**

Practical:
Minimum eight experiments should be conducted based on above syllabus.

LABORATORY II
SATELLITE COMMUNICATION (ECT428)

Teaching Scheme	**Examination Scheme**
Practical: 2 Hours/Week	**EOE: 50 Marks**
Credits: 01	**Minimum passing:20**

Practical:
Minimum eight experiments should be conducted based on above syllabus.

LABORATORY III
ANTENNA AND RADAR ENGINEERING (ECT429)

Teaching Scheme	**Examination Scheme**
Practical: 2 Hours/Week	**EPE: 50 Marks**
Credits: 01	**Minimum passing:20**

Practical:
Minimum eight experiments should be conducted based on above syllabus.

LABORATORY IV
ARM AND EMBEDDED SYSTEMS (ECT4210)

Teaching Scheme	**Examination Scheme**
Tutorial: 1 Hours/Week	**IOE: 50 Marks**
Credits: 01	**Minimum passing:20**

Practical:
Minimum eight experiments should be conducted based on above syllabus.

SEMINAR AND PROJECT-II (ECT426)

Teaching Scheme	**Examination Scheme**
Practical: 2 hour/week	**Minimum passing:20**
Total Credits: 04	**EOE: 50 marks**

The Project group in semester-I will continue. The project work in Semester- II and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.) The project work along with project report should be submitted as part of term work in Semester- II on or before the last day of the semester -II.

Equivalence of Final Year B.Tech (Electronics and communication Technology) Semester VII and VIII

The above detailed syllabus is a revised version of the Final Year BTech (Electronics and communication Technology) course being conducted by the Shivaji University at the Department of Technology. This syllabus is to be implemented from June 2014.

The Equivalence for the subjects of Electronics and communication Technology at Final Year (B.Tech) Semester VII and VIII pre-revised course and revised course (Credit System) is as follows.

Final Year B. Tech Semester VII (Electronics and communication Technology)

	Final Year B.Tech (Electronics and communication Technology) Semester VII **Pre-revised syllabus**	**Final Year BTech (Electronics and communication Technology) Semester VII** **Revised syllabus** **(Credit System)**	**Remark**
1.	Audio and Video Engineering	Audio and Video Engineering	----------
2.	Industrial and Power electronics	Industrial and Power electronics	----------
3.	Microwave devices and circuits	Microwave devices and circuits	----------
4.	Multiprocessor System on Chip	----------	Cancelled
5.	----------	Mobile and cellular communication	**Newly added**
6.	Elective I	Elective I	----------

7.	Seminar and Project-I	Seminar and Project-I	----------
8.	----------	Professional ethics	**Newly added audit course**

Final Year B. Tech Semester VIII (Electronics and communication Technology)

	Final Year B.Tech (Electronics and communication Technology) Semester VIII **Pre-revised syllabus**	**Final Year BTech (Electronics and communication Technology) Semester VIII** **Revised syllabus** **(Credit System)**	**Remark**
1.	Broadband communication	Broadband communication	----------
2.	Antenna and Radar Engineering	Antenna and Radar Engineering	----------
3.	----------	Satellite communication	**Newly added**
4.	Mobile and satellite Communication	----------	Cancelled
5.	Elective II	Elective II/ Open electives	Open electives added
6.	----------	Arm and Embedded Systems	**Newly added**
7.	Seminar and Project II	Seminar and Project II	----------
8.	----------	Constitution of India	**Newly added audit course**