MANONMANIAM SUNDARANAR UNIVERSITY,TIRUNELVELI-12,TAMILNADU

B.Sc .Electronics and Communication (2017-2018 onwards)

Sl.No	Category of Subjects	Contact Hrs/week	Credits
	SEMESTER I		
1.	Language-Tamil/Other	6	4
2.	Language-English	6	4
3.	Core-Basic Electronic Devices	5	4
4.	Major Practical I-Basic Electronic Devices Lab	4	2
5.	Allied I-Basic Electronics	3	3
6.	Allied Practical I-Basic Electronics Lab	4	2
7.	Common-Environmental studies	2	2
	Subtotal	**30**	**21**
	SEMESTER II		
8.	Language-Tamil/Other	6	4
9.	Language-English	6	4
10.	Core-Digital Electronics	5	4
11.	Major Practical II-Digital Electronics Lab	4	2
12.	Allied II-Introduction to Digital Electronics	3	3
13.	Allied Practical II-Digital Electronic Circuits Lab	4	2
14.	Common-Value Based Education	2	2
	Subtotal	**30**	**21**
	SEMESTER III		
15.	Core-Electronic Circuits	4	4
16.	Core-Measurement and Circuit Theory	5	4
17.	Major Practical III-Circuits Lab	4	2
18.	Major Practical IV Measurements Lab	4	2
19.	Allied III-Electronic Communication system	3	3
20.	Allied Practical III-Communication Lab I	4	2
21.	Skill Based Core-Cellular Phone System	4	4
22.	Non- Major Elective 1.Applied Electric circuits (Select any one) 2.Bio Medical Elecronics	2	2
23.	Common-Yoga	2	2
	Subtotal	**32**	**25**

SEMESTER IV			
24.	Core-Linear Integrated Circuits	4	4
25.	Core-Telecommunication Systems	5	4
26.	Major Practical V-Linear Integrated Circuits Lab	4	2
27.	Major Practical VI- Electronic Circuits Lab	4	2
28.	Allied IV-Advanced Communication System	3	3
29.	Allied Practical IV-Communication Lab II	4	2
30.	Skill Based- Audio Video Systems	4	4
31.	Non- Major Elective 1.Industrial Controls (Select any one) 2.Power Converters	2	2
32.	Extension Activitiy –NCC,NSS,YRC,YWF,PE-	0	1
33.	Common-Computers for Digital Era	2	2
	Subtotal	**32**	**26**
SEMESTER V			
34.	Core-Microprocessor and Microcontroller	4	4
35.	Core-Communication System	4	4
36.	Core-Mathematics for Electronics	4	4
37.	Core-Computer Hardware Servicing and Networking	4	4
38.	Major Practical VII- Microprocessors and Microcontrollers Lab	4	2
39.	Major Elective 1. VLSI Technology (Select any one) 2. Digital Communication	4	4
40.	Skill Based Common- Personality Development/Effective Communication/Youth Leadership	2	2
41.	Mini Project	4	6
		30	**30**
SEMESTER VI			
42.	Core-Antennas	4	4
43.	Core-Optical Fiber Communication	4	4
44.	Core-Advanced Communications	4	4
45.	Core-Mobile Communication	4	4
	Major Practical VIII-Communication and System Design lab	4	2
	Major Elective 1.Printed Circuit Boards (Select any one) 2.Embedded System	4	4
	Major Project	6	7
	Subtotal	**30**	**29**
	Total		**152**

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI
B.Sc ELECTRONICS&COMMUNICATION (CBCS)

(2017-2018 onwards)

I SEMESTER

I Semester-Core subject: 1

BASIC ELECTRONIC DEVICES

LTPC
3 2 0 4

Preamble: To equip the students with basic components in electronics and to understand the principles of operation of fundamental electronic devices. Prerequisite needed is background of the basic science at school level.Students on completion of this course will have good knowledge about the basic devices, its operation, Characteristics in detail.

UNIT I

TYPES OF RESISTOR

Types of resistor – color code –Construction of various types of resistors (carbon composition.carbon film, wire-wound etc.) – power ratings- Capacitors (ceramic, mica polystrene,electrolytic etc.) – fixed and variable capacitors – Inductors,types.

(12L)

UNIT II

ATOMIC STRUCTURE

Atomic structure Bohr atom model – energy levels -energy bands –important energy band in solids- classification of solids and energy bands – forbidden Energy gap – intrinsic and extrinsic semiconductors P type and N type semiconductors– majority and minority carriers

(13L)

UNIT III

PN JUNCTION

PN junction- Biasing a PN junction – forward and reverse biasing – PN junction diode: Characteristics -static and dynamic resistance - Diode Rectifiers: Half wave and Full wave rectifier – Bridge rectifier – clippers and clampers - Zener diode –Characteristics-voltage regulation using zener diode.

(12L)

UNIT IV

BIPOLAR TRANSISTOR

Bipolar transistor – UJT – Common Base, Common Emitter & Common Collector configurations and their characteristics – load line – operating point – cut off and saturation regions – transistor biasing methods -Transistor as switch,Amplifier– SCR.

(11L)

UNIT V

FET

FET Constructional features-working Principle, features and characteristics – JFET and MOSFET and their characteristics – enhancement and depletion type – LED, LDR and photodiode.

(12L)

(Total:60L)

TEXT BOOK:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand & Co

I Semester-Core Practical

BASIC ELECTRONIC DEVICES LAB

LTPC
0 0 4 2

1. Characteristics of PN Junction diode
2. Characteristics of Zener diode
3. Transistor Characteristics – Common base
4. Transistor Characteristics – Common emitter
5. Transistor Characteristics – Common collector
6. Measurement of stability factor of self biasing method
7. Measurement of stability factor of fixed biasing method
8. FET Characteristics
9. Photoconductivity of LDR
10. Characteristics of Photo diode
11. Characteristics of SCR
12. Characteristics of Photo transistor.

I Semester-Allied Theory

Allied Electronics and Communication for other major students

BASIC ELECTRONICS

LTPC
3 0 0 3

Preamble: To acquire the knowledge about passive components and various electronic devices and their characteristics.prerequisite for this course is basic science.On completion students will have thorough knowledge of basic semiconductor devices.

UNIT I

SEMICONDUCTOR BASICS

Introduction to semiconductor materials, intrinsic & extrinsic semiconductors. P type semiconductor,N type semiconductor p-n junction diode

(9L)

UNIT II

DIODE CIRCUITS

clipper circuits, clamping circuits. Half wave rectifier, Center tapped and bridge full wave rectifiers, DC power supply: Block diagram of a power supply, Zener diode as voltage regulator.

(9L)

UNIT III

THE BJT

Basic transistor action, Transistor configurations: Common Base (CB), Common Emitter (CE) and Common Collector (CC) configuration, I-V characteristics. UJT: construction, working and applications.

(9L)

UNIT IV

FEEDBACK AMPLIFIERS

Concept of feedback, negative and positive feedback, Positive feedback: Barkhausen criteria for oscillations, Study of phase shift oscillator, Colpitts oscillator and Crystal oscillator.

(9L)

UNIT V

JUNCTION FIELD EFFECT TRANSISTOR (JFET)

Construction of JFET, current-voltage output characteristics. Metal Oxide Field Effect Transistor (MOSFET): Basic Construction of MOSFET and working, I-V characteristics, enhancement and depletion modes.

(9L)

(Total:45L)

TEXT BOOK:

Basic and Applied Electronics-T.K Bandyopadhyay, Books and Allied Pvt Ltd (2002)

BOOKS FOR REFERENCE:

1. V.K.Mehta, "Principles of Electronics", S.Chand & Co
2. B.L.Theraja, "Basic solid state Electronics", S.Chand &Co
3. R. L. Boylestad, L. Nashelsky, Electronic Devices and Circuit Theory, Pearson Education (2006).
4. N Bhargava, D C Kulshreshtha and S C Gupta, Basic Electronics and linear circuits, Tata McGraw-Hill (2007)
5. J. Millman and C. Halkias, Integrated Electronics, Tata McGraw Hill (2001).
6. David A. Bell, Electronic Devices & Circuits, Oxford University Press, Fifth edition
7. Mottershed, Electronic Devices, PHI Publication, 1st Edition.

I semester Allied Practical

Allied Electronics and Communication Practical for other major students

BASIC ELECTRONICS LAB

LTPC
0 0 4 2

1. Characteristics of PN diode
2. Characteristics of Zener diode
3. Transistor Characteristics – Common base
4. Transistor Characteristics – Common emitter
5. Transistor Characteristics – Common collector
6. Measurement of stability factor of self biasing method
7. Measurement of stability factor of fixed biasing method
8. FET Characteristics
9. Photoconductivity of LDR
10. Characteristics of Photo diode
11. Characteristics of SCR
12. Characteristics of Photo transistor

II SEMESTER

II Semester-Core subject: 1

DIGITAL ELECTRONICS

LTPC
3 2 0 4

Preamble: The design of the subject is to impart the knowledge about code conversion, Boolean algebra, logic gates, combinational and sequential logic, and converters. Prerequisite for this course is Basic arithematic.Upon Completion of the course, the student will be able to Convert one Number system to another number system, Construct truth tables for logic gates, Simplify Boolean expression.

UNIT I

NUMBER SYSTEM AND CODES

Decimal, Binary, Octal and Hexadecimal number systems, base conversions. Representation of signed and unsigned numbers, BCD code. Binary, octal and hexadecimal-,BCD-Excess3,graycode-Alphanumeric codes.

(12L)

UNIT II

DIGITAL LOGIC FAMILIES

Fan-in, Fan out, Noise Margin, Power Dissipation, Figure of merit, Speed power product, comparison of TTL and CMOS families. Truth Tables of OR, AND, NOT, NOR, NAND, EXOR, Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem. Karnaugh Maps: Two variable K-Map

(12L)

UNIT III

ARITHMETIC CIRCUITS

Binary Addition. Half and Full Adder. Half and Full Subtractor, Binary Adder/Subtractor. Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters - Magnitude Comparator.

(12L)

UNIT IV

LATCHES

Latches, Flip-flops - SR, JK, D, T, and Master-Slave -Edge triggering – Level Triggering Asynchronous Ripple or serial counter – Asynchronous Up/Down counter - Synchronous counters – Synchronous Up/Down counters – Programmable counters – Modulo–n counter, Registers – shift registers - Universal shift registers – Shift register counters – Ring counter – Shift counters - Sequence generators.

(12L)

UNIT V

MEMORY DEVICES

Memory Devices Classification of memories – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell –Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) .

(12L)

(Total:60L)

BOOKS FOR STUDY:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

II Semester-Core Practical

DIGITAL ELECTRONICS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Designing of all the logic gates using NOR gate IC
4. Verification of Demorgan's theorems
5. Construction of gates using discrete components
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

II Semester-Allied Theory 2

Allied Electronics and Communication for other major students

INTRODUCTION TO DIGITAL ELECTRONICS

LTPC
3 0 0 3

Preamble: The objective of the paper is to facilitate the student with the knowledge of Digital Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture. Prerequisite is knowledge of basic mathematics. Upon completion of the course student is expected to develop an understanding of simple digital systems and develop the logic behind the organization of various computer components.

UNIT I

NUMBER SYSTEM AND CODES

Decimal, Binary, Octal and Hexadecimal number systems, base conversions. BCD code. Binary, octal and hexadecimal arithmetic.

(9L)

UNIT II

DIGITAL LOGIC FAMILIES

Comparison of TTL and CMOS families. Truth Tables of OR, AND, NOT, NOR, NAND, EXOR,gates , Universal Gates, Basic postulates and fundamental theorems of Boolean algebra. Demorgan's Theorem.

(9L)

UNIT III

ARITHMETIC CIRCUITS

Binary Addition. Half and Full Adder. Half and Full Subtractor, Multiplexers, De-multiplexers, Decoders, Encoders. Parity checker – parity generators – code converters

(9L)

UNIT IV

LATCHES AND FLIP FLOPS

S-R Flip flop, J-K Flip flop, T and D type Flip flops,Counters (synchronous and asynchronous, ring and modulo- n counter Registers – shift registers Sequence generators.

(9L)

UNIT V

Memory Devices Classification of memories – ROM PROM – EPROM – EEPROM – EAPROM, RAM – Static RAM Cell- Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell –Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA)

(9L)

(Total:45L)

BOOKS FOR REFERENCE:

1. Digital Principles & Applications – Albert Paul Malvino & Leach
2. Digital Fundamentals – Thomas L. Floyd – Prentice Hall
3. Digital Electronics-an introduction to Theory and Practice - William H.Gothmann Prentice Hall
4. Digital Practice using Integrated Circuits – R. P. Jain and Anand
5. Fundamentals of Digital Circuits, Anand Kumar, 2nd Edn, 2009, PHI Learning Pvt. Ltd.
6. Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
7. Digital Systems: Principles & Applications, R.J.Tocci, N.S.Widmer, 2001, PHI Learning.
8. Digital Principles, R. L. Tokheim, Schaum's Outline Series, Tata McGraw- Hill (1994)

II semester Allied Practical

Allied Practical for other major students

DIGITAL ELECTRONIC CIRCUITS LAB

LTPC
0 0 4 2

1. Study of AND, OR, NOT, NAND, NOR and XOR gates using IC
2. Designing of all the logic gates using NAND gate IC
3. Designing of all the logic gates using NOR gate IC
4. Verification of Demorgan's theorems
5. Construction of gates using discrete components
6. Code conversion
7. Half adder and Full adder
8. Half subtractor and Full subtractor
9. Multiplexer and De-Multiplexer
10. Encoder and Decoder
11. Study of Flip flops
12. Shift register
13. Ripple counter

SEMESTER III

III Semester-Core subject: 1

ELECTRONIC CIRCUITS

LTPC
4 0 0 4

Preamble: This subject describe the classification and operation of amplifiers, oscillators, rectifiers and filter circuits and enable the students to become an electronic technician and circuit designer Prerequisite is Background knowledge of basic electronics. Upon completion of the course, the student should be able to design and troubleshoot the amplifiers,Oscillators, power supply and filters

UNIT I

RECTIFIERS & REGULATORS Half wave, Full waves and bridge rectifiers – Calculation of RMS value – Average value – Ripple factor – Efficiency – Transformer utility factor – Peak inverse voltage – Inductor filter – Capacitor filter – LC filter – filter. Voltage doubler– Voltage regulator – Zener diode shunt regulator – Transistor shunt and series regulator – Overload protection – Construction of DC power supply

(12L)

UNIT II

SMALL SIGNAL AMPLIFIERS CE, CB, CC amplifiers – Calculation of I/P resistance, O/P resistance – Current gain - Voltage gain – power gain – single stage transistor amplifier – DC and AC load line – RC coupled amplifier – RC coupled amplifier – gain frequency response – bandwidth – transformer coupled amplifier – impedance matching – FET amplifier.

(12L)

UNIT III

POWER AMPLIFIERS Operation and graphical representation of Class A, Class B, Class C and Class AB amplifiers – Maximum collector efficiency of class A power amplifier – Collector dissipation curve – Harmonic distortion – Class B push pull amplifier – Crossover distortion – Complementary symmetry push pull amplifier

(12L)

UNIT IV

FEEDBACK AMPLIFIERS Basic concepts of feedback – Positive feedback – Negative feedback – Effects of negative feedback on gain, bandwidth and distortion – Noise – Voltage series feedback - Voltage shunt feedback – Current series feedback – Current shunt feedback

(12L)

UNIT V

OSCILLATORS AND MULTIVIBRATORS Barkhausen criterion – Hartley Oscillator – Colpitts oscillator – Phase shift oscillator – Weinbridge oscillators –Peizo electric crystal and it effects – Crystal oscillator. Astable multivibrator – Monostable multivibrator – Bistable multivibrator – Schmitt trigger.

(12L)

(Total:60L)

TEXT BOOKS

1. S.K. Sahdev, "Electronic Principles", Dhanpat Rai & Co (P) Ltd, 2nd Edition, 1998
2. B.L.Theraja, "Basic Electronics",S.Chand Company Ltd.2000
3. BernardGrob "Basic Electronics"-Tata McGraw-Hill Publishing Company Limited,9th Edition.

III Semester-Core subject: 2

MEASUREMENTS AND CIRCUIT THEORY

LTPC
4 1 0 4

Preamble: The objective of this paper is to introduce the basic concepts related to the operation Measuring Instruments. To apply circuit theorems to simplify and to find solutions to electrical circuits. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems. Prerequisites of this paper is Background knowledge of basic electricity and science.Upon completion of the subject, the student should be able to understand various instruments and their working,and will have basic problem solving skills through organizing available information and applying circuit laws.

UNIT I

BASIC MEASUREMENT INSTRUMENTS:

DC measurement: dc voltmeter, ammeter. Digital type voltmeter, ammeter and ohmmeter, digital multimeter, AC measurement, voltmeter, ammeter. Digital frequency meter: elements of frequency meter, universal counter and its different modes, measurement errors and extending the frequency range. Digital LCR-Q meter, digital wattmeter.

(12L)

UNIT II

ELECTRONIC DISPLAYS

The Cathode Ray Oscilloscope (CRO): Block diagram of a General Purpose Oscilloscope and its basic operation, electrostatic focusing and deflection, screen for CRT and graticules, CRT connections, CRO probes. Types of CRO's: dual trace ocilloscope, digital storage oscilloscope. Wave Analyzers: Operation of frequency selective wave analyzers and heterodyne wave analyzers and their application. Spectrum analyzer

(12L)

UNIT III

NETWORK LAWS

Ohms Law-power Energy-resistors in series,parallel- Kirchoff's Laws and their applications – Branch and loop currents- mesh and node analysis-problems.

(12L)

UNIT IV

AC CIRCUITS

Fundamental ideas of AC circuits - impedance of RL, RC, RLC circuits-Resonance in AC circuits- series and parallel-Problems.

(12L)

UNIT V

THEOREMS

Network graph of a network- concept of tree- branches and chords dual networks- Network theorems: Superposition, Thevenin, Norton, Maximum Power transfer Theorem-Problems

(12L)

(Total:60L)

BOOKS FOR STUDY:

1. C.S.Rangan "Instrumentation Devices and Systems" Tata McGraw Hill, 1998.
2. Copper "Electronic Instrumentation and Measurement Techniques" PHI
3. A.J. Bouwels "Digital Instrumentation", McGraw Hill, 1986
4. C.Barney "Intelligent Instrumentation" Prentice Hall of India, 1985
5. Oliver and Cage "Electronic Measurements and Instrumentation" McGraw HILL,1975
6. Deobelin "Measurements Systems" McGraw HILL, 1990
7. Electronic circuits – Edminister (Schaum outline series – TMH)
8. Circuits and networks, Analysis and synthesis – A.Sudakar & S.P. Shyammohan (TMH).
9. Networks, analysis and synthesis – Umesh sinha.
10. Electronic circuits Theory – Dr.M.Arumugam & Dr.N.Prem Kumaran (Khanna Publishers)

III Semester-Core Practical 1

CIRCUITS LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. To familiarize with basic electronic components (R, C, L, diodes, transistors), digital Multimeter, Function Generator and Oscilloscope.
2. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.
3. Verification of Ohm's Law
4. Measurement of Amplitude, Frequency & Phase difference using Oscilloscope.
5. Verification of Kirchoff's laws.
6. Verification of Thevenin's theorem
7. Verification of Norton's theorem.
8. Verification of Superposition Theorem.
9. Verification of Reciprocity Theorem.
10. Verification of Millmans theorem.
11. Verification of Maximum Power Transfer Theorem.
12. Transient Response
13. Series resonance.
14. Parallel Resonance.

III Semester-Core Practical 2

MEASUREMENTS LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. Wheatstone bridge
2. Kelvin double bridge
3. Maxwell bridge
4. Hay bridge
5. Schering bridge
6. LVDT
7. Displacement meter
8. Transducer Applications and Measurement
9. Extension of range of PMMC meter
10. Current Measurement using sensors
11. Measurement of displacement,rotary displacement using magnetic pickup.
12. Measurement of load using strain gauge based load cell.
13. Measurement of flow rate by anemometer
14. Measurement of temperature by RTD.
15. Measurement of temperature by thermocouple

III Semester-Allied Theory

Allied Electronics and Communication for other major students

ELECTRONIC COMMUNICATION SYSTEMS

LTPC
3 0 0 3

Preamble: The objective of this paper is to impart the basic concepts of communication systems, transmitter and receiver. To understand analog modulation and demodulation techniques. To analyze the adverse effect of noise on signals.Prerequisite for this paper is basic physics and electronics.On completion of course student will apply engineering mathematical concepts in various communication techniques. Identify the required system for a better communication technique. Analyze and interpret data considering the limitations of various modulation techniques. Employ appropriate modulators and demodulators for transmitters and receivers Predict and mathematically design an appropriate modulation technique.

UNIT I

PROPAGATION OF RADIO WAVES

Introduction to EM waves – Reflection and refraction of radio waves at the surface of the earth – Ground wave propagation-Sky wave propagation – Space wave propagation – Structure of the Atmosphere – Critical frequency - Skip distance – Maximum Usable frequency (MUF) – Virtual height.

(9L)

UNIT II

AM GENERATION & TRANSMISSION

Need for modulation – Amplitude modulation – Frequency Spectrum of the AM Wave - Modulation Index – Power relations in the AM Wave – AM generation – AM Transmitter. - Forms of Amplitude Modulation – Evolution of SSB – Balanced Modulator – Methods of SSB Generation – Vestigial side band Transmission.

(9L)

UNIT III

FM GENERATION & TRANSMISSION

Frequency Modulation - Frequency Spectrum of the FM Wave – Modulation Index – Effect of Noise – Adjacent & Co-Channel Interference – Wide Band & Narrow Band FM-FM Generation – Direct and Indirect methods - FM Transmitter – Pre-Emphasis.

(9L)

UNIT IV

AM & FM RECEPTION

AM Receiver – TRF Receiver – Super Heterodyne Receiver – Image Frequency Rejection – Frequency Changing & Tracking – Choice of IF – AM Detection – AGC – SSB Detection. FM Receiver – Amplitude Limiter – De-Emphasis – FM Detection – Balanced Slope Detector – Phase Discriminator – Ratio Detector.

(9L)

UNIT V

PULSE MODULATION

PAM Modulation & Detection – PWM Modulation & Detection - PPM Modulation & Detection - Sampling Theorem – Quantization & Quantization Error – PCM Modulation & Detection - Companding – ASK – FSK – BPSK – QPSK – DPSK .

(9L)

(Total:45L)

BOOKS FOR STUDY:

1. Electronic communication systems- Kennedy-TMH – IV edition
2. Electronic communication systems - Roddy & Collen – PHI – IV edition
3. Electronic communications – Sanjeev Gupta – Khanna publications .
4. Principles of communication engineering – Anokh Singh – S.Chand.

Allied Electronics and Communication Practical for other major Students

COMMUNICATION LABORATORY-I

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. Amplitude Modulation(AM) and Demodulation
2. Frequency Modulation and Demodulation
3. Amplitude Shift Keying (ASK) modulation and Demodulation
4. Frequency Shift Keying (FSK)
5. Phase Locked Loop (PLL) and Frequency Multiplier
6. Voltage Controlled Oscillator (VCO)
7. Time Division Multiplexing using (TDM)
8. Binary Phase Shift Keying (BPSK)
9. Pulse Width Modulation (PWM)
10. Directional characteristics of micro phone and loud speakers.
11. Measurement of Connector and Bending Losses in optical fibres.
12. Numerical Aperture Determination for optical Fibers

CELLULAR PHONE SYSTEMS

LTPC
4 0 0 4

Preamble: The objective of this paper is to impart the concepts of cellular communication systems, Study about different types of cell phones,Messaging and different mobile standards and services. Prerequisite for this paper is basic physics,electronics andcommunication.On completion of course student will learn concepts in Cellular communication. Identify the standard system for a better communication technique from various stages of evolution. Analyze the limitations of various mobile standards. Employ appropriate solutions for various issues of mobile system and network.

UNIT I

THE CELLULAR SYSTEM

The cellular concept - interference Vs capacity, cell splitting, sectorisation. The cellular system-mobile location, in call handover and power control in cell planning. TACS standard. The cellular network - Base stations, MSC, services.

(12L)

UNIT II

INTRODUCTION TO MOBILE DEVICES

Device overview - Input mechanisms - keypad input, pen-based input and voice input. Mobile phone classifications - web enabled phones - Low end smart phones - palm sized PDA - High end smart phones.

(12L)

UNIT III

CELLULAR TECHNOLOGY

Introduction - RF issues - Digital modulation - Power control - Frequency hoping. Signal processing - Digital speech coding - Channel coding and decoding. Software - Radio system software, network management software.

(12L)

UNIT IV

MESSAGING AND SECURITY

Mobile messaging – SMS, EMS,MMS, instant messaging. Message value chain – Wireless carrier, mobile message oriented middlewere (MOM). Security threats – spoofing, sniffing, tampering, theft.

(12L)

UNIT V

MOBILE STANDARDS

WPAN standards - IrDA, Bluetooth, 1G, 2G standards, 2.5G applications. 3G devices and applications. Network protocols - TDMA (2G), GSM (2G), CDMA one (2G), PDC 2(G), GPRS (2.5G), CDMA 2000 1x (2.5G), EDGE (3G), CDMA 2000 1xEV (3G), WCMA (G).

(12L)

(Total:60L)

TEXT BOOKS:

1. Martyn Mallick, Mobile and Wireless Design Essentials, Wiley Publishing, Inc, New Delhi. 2006.
2. R.C.V.Macario, Personal and Mobile Radio Systems, IEE Telecommunications series 25.

III Semester-: Non Major Elective

Non Major Elective for other major students

(Select any one course 1 or 2)

1. APPLIED ELECTRIC CIRCUITS

LTPC
2 0 0 2

Preamble: The objective of this paper is to introduce the basic concepts related to the operation of electrical circuit components.To understand basic electronic components and their effects in DC and aAC circuits. To apply circuit theorems to simplify and to find solutions to electrical circuits. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems. Prerequisites of this paper is Background knowledge of basic electricity and science.Upon completion of the subject, the student should be able to understand passive components and their working,and will have basic problem solving skills through organizing available information and applying circuit laws..

UNIT I

CIRCUIT COMPONENTS

Resistors, Capacitors & Inductors in Series and Parallel - Factors governing the Resistance of a Resistor, Capacitor & Inductor - Colour Coding of Resistors - Energy Stored in a Capacitor - Energy Stored in an Inductor .

(6L)

UNIT-II

CIRCUIT LAWS

Ohms Law - Kirchoff's Voltage Law - Kirchoff's Current Law - Current Division - Voltage Division - Star Connection - Delta Connection - Series Circuits - Parallel Circuits - Series & Parallel Circuits - Open Circuit - Short Circuit - Simple Problems.

(6L)

UNIT III

THEOREMS

Super Position Theorem – Thevenin's Theorem – Norton's Theorem – Millman's Theorem Maximum Power Transfer Theorem

(6L)

UNIT IV

AC CIRCUIT BASICS

Sinusoidal and Non Sinusoidal Waveforms – Peak Value – Peak to Peak Value – Average Value – RMS Value – Period and Frequency Measurement - Power Factor - Real Power – Reactive Power

(6L)

UNIT V

RESONANCE :

Capacitive Reactance – Inductive Reactance – Impedance – RL and RC in Series and Parallel – RLC in Series and Parallel – Series Resonance - Parallel Resonance

(6L)

(Total:30L)

TEXT BOOKS :

1. Circuits And Networks : Analysis And Synthesis - Sudhakar & Shyam Mohan - TMH - IV Edition
2. Basic Electronics – Bernard Grob – Mcgraw Hill.

2. BIO MEDICAL ELECTRONICS

LTPC
2 0 0 2

Preamble: To equip the students to understand various bio-potentials and Transducers, various systems and measuring instruments related to human body andworking principles of medical instruments. Prerequisite is knowledge of instrumentation and anatomy. On successful completion of the course the students should have understood the concept of bio-potential; concept of medical instruments its maintenance and develop the troubleshooting skills of medical instruments.

UNIT I

HUMAN PHYSIOLOGY

Introduction to Human Physiology – Micro Electrodes – Skin Surface Electrodes – Needle Electrodes – Reference Electrodes.

(6L)

UNIT II

METERS & RECORDERS :

Digital Thermometer–Sphygmo Manometer-Electronic Sthethoscope-ECG – EEG - EMG .

(6L)

UNIT III

TEST EQUIPMENT

Cardiac Stress Test Equipment – Cardio Tocography - Electro Oculography - Electro Retinography - Poly Somnography - Spirometer - Blood Flow Meter - Vascular Doppler – Audiometer

(6L)

UNIT IV

OPERATION THEATRE EQUIPMENTS :

Boyles Apparatus - Upper Endoscope - Lower Endoscope - ENT Endoscope - Laparoscope

(6L)

UNIT V

DIATHERMY

Diathermy - Surgical Diathermy- Micro Wave Diathermy – Multiparameter Patient Monitor.

(6L)

(Total:30L)

REFERENCE BOOKS:

1. Biomedical Instrumentation & Measurements – Ananda Natarajan – PHI
2. Biomedical Instrumentation and Measurements - Leslie Cromwell, Fred Weibell, Erich A.Pfeiffer - PHI - 2nd Edition.
3. Bio-Medical Instrumentaion - Dr.M.Arumugam – Anuradha Agencies - 2nd Edition
4. Handbook of Biomedical Instrumentation - R.S.Khandpur – TMH.
5. Medical Instrumention, Application and Design – John G.Webster - WEL - 3rd Edition

SEMESTER IV

IV Semester-Core subject: 1

LINEAR INTEGRATED CIRCUITS

LTPC
4 0 0 4

Preamble: To equip the students with detailed knowledge of IC fabrication .OP-AMP to learn the basics of differential Amplifiers,Characteristics of OPAMP, filters, wave form generators, comparators, multivibrators and various OP AMP applications. Prerequisites needed are the background of the basic electronics. By the end of the programme, students should have a thorough knowledge about all the electrical and electronic characteristic of analog integrated circuit devices present.

UNIT I

IC FABRICATION TECHNOLOGY

Fundamentals of Monolithic IC technology – Basic planar process – Wafer preparation – Epitaxial growth – Oxidation – Photolithography – Diffusion of impurities – Isolation techniques – Metallization – Monolithic transistors –Integrated resistors – Integrated capacitors- integrated Inductors- Thin and Thick film technology

(12L)

UNIT II

BASIC OPERATIONAL AMPLIFIER

Concept of differential amplifiers, block diagram of an operational amplifier (IC 741),
Op-Amp parameters: input offset voltage, input offset current, input bias current, differential input resistance, input capacitance, offset voltage adjustment range, input voltage range, common mode rejection ratio, slew rate, supply voltage rejection ratio.

(12L)

UNIT III

ADDER

Adder-subtractor-Integrator-differentiator – V to I and I to V converter. Oscillator: Principles-types-frequency stability phase shift oscillator-wein bridge oscillator- square wave generator –triangular wave generator

(12L)

UNIT IV

COMPARATORS

Comparator-Schmitt trigger-clipper and clamper-peak detector-zero crossing detectors- IC-555 function block diagram-mono stable operation –astable operation –applications

. **(12L)**

UNIT V

SIGNAL CONDITIONING CIRCUITS:

Sample and hold systems, Active filters: First order low pass and high pass butterworth filter, Second order filters, Band pass filter, Band reject filter, All pass filter, Logarithmic and exponential amplifiers.

(12L)

(Total:60L)

BOOKS FOR STUDY:

1. Linear Integrated Circuits- D.Roychoudry & Shail Jain (New age publications 1999).
2. Operational amplifiers and linear integrated circuits-F.Couglin & Drison (4^{th} edition prentice hall of India, 1992).
3. Operational amplifiers and linear integrated circuits- Denton J.Dailey, McGraw Hill 1989.
4. Operational amplifiers and linear integrated circuits-Ramakant A.Gayakwad 3^{rd} edition PHI.
5. Second Edn. Operational amplifiers and Linear Ics-David A. Bell.

IV Semester-Core subject: 2

TELECOMMUNICATION SYSTEMS

LTPC
4 1 0 4

Preamble: To equip the students with basic knowledge of telephones, Parts of telephone and their signalling, Working, Switching of telephones, Traffic handling, Transmission media .Working and Transmission in FAX machines.Mobile networks and basic knowledge of mobile communication Prerequisites needed are the background of the basic electronics. By the end of the programme, students should have a thorough knowledge about all the Telecommunication devices such as Telephones,Its working ,switching ,FAX machines and their working .Cellular phones,Cellular communication and various Technologies they use.

UNIT I

EVOLUTION OF TELE-COMMUNICATION

Basic Switching System, Simple Tele-phone Communication, Telephone Transmitter, Telephone receiver, Telephone's bell & dialer pulsing mechanism, subscriber's telephone sets, Dialing types, signaling tones. Brief Introduction to Electromagnetic Exchanges.

(12L)

UNIT II

ELECTRONIC SWITCHING

Space Division Switching Stored Programme Control – Centralized SPC, Distributed SPC, Software Architecture, Application Software – Enhanced Services, Multi Stage Switching Networks**.**

(12L)

UNIT III

TIME DIVISION SWITCHING

Time Division space switching, Time Division Time Switching, Time multiplexed space switching, and Time multiplexed Time Switching, Combination Switching

(12L)

UNIT IV

TRAFFIC ENGINEERING

Grade of Service and Blocking Probability - Telephone Networks, Subscriber Loops, Switching Hierarchy and Routing, Signaling Techniques, In Channel, Common Channel. Transmission media.

(12L)

UNIT V

FAX SYSTEM

Basic facsimile system, facsimile applications working of FAX machines, recording media, FAX reproduction technique. Mobile radiocommunication : Introduction, cellular structures & planning, Frequency allocation, propagation Problems, Base station antennas, Mobile unit antenna Type of mobile systems, Handoffs, Analog cellular Radio Digital Cellular radio, Digital Narrow band TDMA, CDMA technology.

(12L)

(Total:60L)

BOOKS FOR STUDY:

1. Digital Telemetry by John C Bellamy.
2. Telecommunication Switching System and Network by Tyagrajan
3. Telecommunication system Engg. by Roger L.Freeman.
4. Wireless Mobile Communication by Rappaport

IV Semester-Core Practical 1

LINEAR INTEGRATED CIRCUITS LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. Inverting and Non Inverting Amplifier.
2. Integrator and Differentiator.
3. Instrumentation Amplifier.
4. High pass, Low pass filters.
5. Band pass filter.
6. Astable multivibrator using OP-AMP.
7. Monostable multivibrator using OP-AMP.
8. Phase shift oscillator using OP-AMP.
9. Wien Bridge oscillator using OP-AMP.
10. Digital to Analog Converter.
11. Analog to Digital Converter.
12. Astable Multivibrator using IC555.
13. Monostable Multivibrator using IC555.
14. Schmitt Trigger and Comparator using OP-AMP.
15. Design of light switch using LDR and Relay.

IV Semester-Core Practical 2

ELECTRONIC CIRCUITS LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. Half wave rectifier
2. Full wave rectifier
3. Construction of power supply using C filter and zener diode as regulator
4. Construction of variable power supply using IC723
5. Construction of variable power supply using LM317
6. Characteristics of Class A Power Amplifier
7. Characteristics of Class B Power Amplifier
8. Design a Single Stage CE amplifier.
9. Design of Two stage RC coupled Amplifier.
10. Darlington pair Amplifier.
11. Clipping circuits.
12. Clamping circuits.
13. Hartley Oscillator.
14. Colpitt's Oscillator.
15. Astable Multivibrator using BJT.

IV Semester-Allied Theory 2

Allied Electronics and Communication for other major students

ADVANCED COMMUNICATION SYSTEM

LTPC
3 0 0 3

Preamble: The objective of this paper is to impart the basic concepts of Digital communication systems, Fiber Optic systems to understand cellular communication and Satellite communication techniques. To Learn about various wireless networks.Prerequisite for this paper is basic physics and electronics.On completion of course student will apply concepts in various communication techniques. Identify the required system for a better communication technique.

UNIT I

DIGITAL COMMUNICATION

Basic Elements Of Digital Communication System – Block Diagram-Characteristics Of Data Transmission Circuits - Bandwidth Requirement – Speed - Baud Rate - Noise -Crosstalk – Distortion. Digital Codes: ASCII Code – EBCDIC Code - Error Detection Codes – Parity Check Codes – Redundant Codes - Error Correction Codes – Retransmission- Forward Error Correcting Code – Hamming Code

(9L)

UNIT II.

OPTICAL FIBER COMMUNICATION

Introduction-need for OFC. Block diagram of OFC system. Fiber optic cables, light propagation through fiber-step index fiber, graded index fiber, Snell's law, numerical aperture (derivation). Types of optical fiber cables, light sources-requirements, LEDs and semiconductor laser diodes. Photo detectors -PN, PIN and avalanche photodiodes. Losses in optical fibers -Rayleigh scattering, absorption, leaky modes, bending, joint junction losses. Advantages and disadvantages of OFC over metallic cables.

(9L)

UNIT III

CELLULAR COMMUNICATION

Concept of cellular mobile communication – cell and cell splitting, frequency bands used in cellular communication, absolute RF channel numbers (ARFCN), frequency reuse, roaming and hand off, authentication of the SIM card of the subscribers, IMEI number, concept of data encryption, architecture (block diagram) of cellular mobile communication network, CDMA technology, CDMA overview, simplified block diagram of cellular phone handset, Comparative study of GSM and CDMA, 2G, 3G and 4G concepts.

(9L)

UNIT IV

SATELLITE COMMUNICATION

Introduction, need, satellite orbits, advantages and disadvantages of geostationary satellites. Satellite visibility, satellite system – space segment, block diagrams of satellite sub systems, up link, down link, cross link, transponders (C- Band), effect of solar eclipse, path loss, ground station, simplified block diagram of earth station. Satellite access – TDMA, FDMA, CDMA concepts, comparison of TDMA and FDMA, Satellite antenna (parabolic dish antenna).

(9L)

UNIT V

WIRELESS NETWORKS

Wireless LAN's Major components of local area network- Primary characteristics of Ethernet-mobile IP, OSI model, wireless LAN requirements-concept of Bluetooth, WiFi and WiMAX.

(9L)

(Total:45L)

BOOKS FOR STUDY:

1. Advanced Electronic Communication Systems-Wayne Tomasi, PHI 6th edition.
2. Telecommunication Systems –P.H Smale, Wheeler Publication 2nd edition.
3. Optical Fiber Communications-Gerd Kaiser, McGraw-hill 2nd edition.
4. Satellite Communications- Roddy, McGraw-hill 4th edition.
1. Electronic Communication systems, Kennedy & Davis, IVth edition-TATA McGraw Hill.

REFERENCE BOOKS:

1. Electronic Communication systems, Fundamentals through Advanced, Wayne Tomasi - 5th edition.

Allied Electronics and Communication Practical for other major Students

COMMUNICATION LABORATORY- II

LTPC
0 0 4 2

All experiments have to be carried out compulsorily

1. Voltage to frequency converter.
2. Study of AGC (Automatic Gain Control).
3. Study of mixer circuit.
4. Study of IF amplifier.
5. Analog signal sampling and reconstruction
6. Voltage to frequency converter
7. PSK, DPSK and QPSK Modulation and Demodulation
8. PCM modulation and demodulation
9. Delta / Adaptive Delta Modulation and Demodulation
10. PPM / PAM modulation and demodulation
11. Low high power splitter using MATLAB.
12. Band pass and band stop filter using MATLAB.

IV Semester-Skill based

AUDIO VIDEO SYSTEMS

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various Audio Video devices used in everyday life and to understand the principles of operation of the devices, its care and Maintenance and troubleshooting. Prerequisite needed is background of the basic science and knowledge of working.Students on completion of this course will have good knowledge about the basic working of Microphones, Amplifiers, Videodisc players, Television etc its operation, maintenance and troubleshooting in detail.

UNIT I

MICROPHONES

Characteristics and Requisites - Types Comparison Special Microphones – Precautions. Loudspeakers: Characteristics – Types–Comparison – Line Source Speakers – Baffles and Enclosures – Woofers & Tweeters – Crossover Networks – Consequence of Mismatch.

(12L)

UNIT II

AUDIO AMPLIFIERS

Types - Characteristics – Amplifier Circuits – PMPO - Controls in Audio Amplifiers – Special Types of Tone Controls. Public Address Systems**:** Need and Use – Block Diagram - Requirements of a PA system - Installation Planning for Various Occasions.

(12L)

UNIT III

STEREOPHONY

Meaning – Stereophony in Human System of Hearing – Differences between Stereophony and Monophony – Ideal Stereo System – Practical Stereo System – Quadraphonic and Surround Sound Systems – Stereo Recording on Tape and Reproduction – Tape Cartridge and Cassette Tape – Hi-fi Stereo Reproducing System Stereo Controls.

(12L)

UNIT IV

TROUBLESHOOTING IN AUDIO & VIDEO EQUIPMENTS

Maintenance Policy - Maintenance Aids for Fault Diagnosis – Servicing and Maintenance Procedure – Shielding and Grounding - Fault Location – Faulty Component Identification – Common Faults – Intermittent Faults - Troubleshooting: Power supply – Public Address System – Stereo Amplifier – VCR – DVD Players.

(12L)

UNIT V

COLOUR TV RECEIVER ALIGNMENT AND SERVICING:

TV Test Charts – Colour TV Receiver Alignment & Servicing – Modern Colour TV Receivers – Preliminary Trouble Shooting – Safety Precautions.

(12L)

(Total:60L)

TEXTBOOKS

1. 1. Audio & Video Systems – R G Gupta - TMH – II Edition.
2. Colour Television Theory and Practice - S.P. Bali, Tata Mc Graw Hill Publishing Co. Ltd.

REFERENCE BOOKS

1. Audio and Video systems - R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.
2. Monochrome and Colour Television - R. Gulati. New Age Interbational (P) Ltd. New Delhi.
3. Electronic Instruments and systems, Principles, Maintenance and Troubleshooting R.G. Gupta Tata Mc Graw Hill Publishing Co.Ltd.

IV Semester-: Non Major Elective

Non Major Elective for other major students

(Select any one course 1 or 2)

1. INDUSTRIAL CONTROLS

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge in Industrial devices which has now become a part of every industry.The syllabus aims at a comprehensive coverage of basics of Motors,Starters,Control system,Drives,Switches,sensors and protective relays.Prerequisite is knowledge in Electricity, and electronics science.Upon completion of the course student will be well versed with Motors and their control.

UNIT I

MOTOR CONTROLS

Starting and speed control of DC Motors-Starting and speed control of AC motors-Automatic regulation system

(6L)

UNIT II

CONTROL SYSTEM

Elements of automatic control system-Rotary amplifiers-Magnetic amplifiers-Thyristor control of DC and AC motor Inverters-Cycloconvertors

(6L)

UNIT III

PHASE CONTROL

Phase control of DC shunt motor-Reversible speed control of DC motor using dual converter-Chopper control of DC series motor-Slip control-Frequency control- constant speed DC drive

(6L)

UNIT IV

PILOT DEVICES

Pilot devices and accessories-push button controllers& master switches-rotary selector switches-rotary control switches-over travel and limit switches-Float switches-Pressure switches and regulators-Thermostats or temperature switches-Speed governors

(6L)

UNIT V

RELAYS

Plugging switches-contactors-Electromagnetic relays-Protective relays-Voltage relay-Electromagnetic time relay-control and automation relays-Polarized electromagnetic relay-Construction and operation of electromagnetic relay

(6L)

(Total:30L)

TEXTBOOK

Utilization of Electric Power and Electric Traction-G.C Garg- Khanna Publishers

2. POWER CONVERTORS

LTPC
2 0 0 2

Preamble: To equip the students with basic knowledge of Industrial power convertors which has now become a part of every industry.The syllabus aims at a comprehensive coverage of basics of Inverters, basics of them and their operation.Series inverters, Parallel inverters, Converters etc.Prerequisite is knowledge in Electricity, and electronics science.Upon completion of the course student will be well versed with all types of inverters and their working, Converters and their working.

UNIT I

DC – AC PWM INVERTERS

DC – AC PWM inverters: Introduction – Principle of operation – performance parameters – Single phase bridge inverters

(6L)

UNIT II

THREE PHASE INVERTERS

Three phase inverters – Voltage control of single phase inverters – Voltage control of three phase inverters – Current source inverters.

(6L)

UNIT III

RESONANT PULSE INVERTERS

Resonant pulse Inverters: Introduction – Series resonant inverters – Parallel resonant inverters – Zero current Switching resonant converter

(6L)

UNIT IV

ZVS RESONANT CONVERTER

Zero voltage switching resonant converter – Two quadrant ZVS resonant converter – resonant DC link inverter

(6L)

UNIT V

CONTROLLED CONVERTER

Principle of phase controlled converter operation – Single phase full converter – Single phase dual converter

(6L)
(Total:30L)

TEXT BOOK

Power electronics – Circuits, devices & Applications – Rashid M.H.

SEMESTER V

V Semester-Core subject: 1

MICROPROCESSORS AND MICROCONTROLLERS

LTPC
4 0 0 4

Preamble: To equip the students to understand architecture and assembly language programming of microprocessor and microcontroller, to understand the concept of interrupts and interfacing with various peripherals and to realize the features of a microcontroller and its timer applications.Prerequisite is knowledge of digital electronics.Upon completion of course student will be able to apply the basic concepts of digital fundamentals to Microprocessor based personal computer system.Able to program microprocessor applications using assembly language programming. Able to illustrate how the different peripherals (8255, 8279, 8253, 8237, 8251) are interfaced with Microprocessor.Able to Program,design, develop and interface complete microcontroller based systems to peripheral devices using 8051 microcontroller.Able to illustrate how the different peripherals are interfaced with microcontroller.

UNIT I

ARCHITECTURE OF 8085

Architecture of 8085 -Instruction set – Data Transfer, Arithmetic, Logical, Branching and I/O Instruction, Instruction types- various Addressing Modes. Different 8 bit & 16 bit processors Z80, MC 6800 & INTEL 8086, Timing sequence- Instruction cycle- Machine cycle- Halt wait state-. ALP- Mnemonic - simple Assembly language program flow chart stack and subroutines- Interrupts.

(12L)

UNIT II

PERIPHERAL DEVICE

Peripheral device – Programmable peripheral Interface (8255 A) - Programmable Interrupt controller (8259 A) - USART- Serial Communication Interface. Programmable DMA Controller (8257), Interfacing –Analog to Digital Converter- Digital to Analog Converter- Traffic Light Controller- Stepper Motor – Key Board & Display Interface.

(12L)

UNIT III

INTEL 8051 MICROCONTROLLER

Intel 8051 microcontroller – Block Diagram, pin out – oscillator and clock – Program Counter and Data pointer, A and B registers, flags and program status word – Internal RAM – the Stack and Stack pointer –special functions registers – Internal ROM – I/O Pins, ports and circuits – External memory. Counters, Timers and Addressing Modes Timer counter interrupts – Timing – Timer – Modes of operation – Counting – Addressing.

(12L)

UNIT IV

INSTRUCTIONS

Data exchanges – Logical operations – Byte level operation – Bit level logical operations – Rotate and swap operations – Arithmetic operations – Jump and call instructions – Jump and call program range – Jumps – Calls and subroutines – Interrupts and return.

(12L)

UNIT V

PROGRAMMING

Assembly Language programming for 8051 Micro controller family – Programs 8–Bit addition – 8–Bit subtraction – 8-Bit Multiplication – 8-Bit Division - Greatest and smallest number in an array – ascending and Descending – Delay –Routines – Calculation of Time delay – Block data transfer. Interfacing Keyboard –Scanning programs for small keyboards – Interfacing LED, LCD Display – Pulse measurement and pulse width measurement – A/D and D/A Interfacing.

(12L)

(Total:60L)

REFERENCE BOOKS

1. Microprocessor and Interfacing: Programming and Hard ware, Douglas V.Hall,Mc GrawHill, New York (1988)
2. Microprocessor Architecture Programming and applications with 8085/ 8080A. S.Ramesh Goankar, Wiley Eastern Limited(1986)
3. Digital systems & Microprocessor Douglas V.Hall, Mcgraw Hill.
4. Microprocessor- Srinath, PHI Ltd.
5. 8051 Micro controller Architecture, Kennath J. Ayala, Programming and Applications, Penram International Publishing
6. Microprocessor Principles and Applications – 2nd Edition, Gilmore – Tata McGraw Hill.

V Semester-Core subject: 2

COMMUNICATION SYSTEM

LTPC
4 0 0 4

Preamble: The objective of this paper is to impart the basic concepts of communication systems, transmitter and receiver. To understand analog modulation and demodulation techniques. To analyze the adverse effect of noise on signals learn basics of telephone systeems.Prerequisite for this paper is basic physics and electronics.On completion of course student will apply engineering concepts in various communication techniques. Identify the required system for a better communication technique. Analyze and interpret data considering the limitations of various modulation techniques. Employ appropriate modulators and demodulators for transmitters and receivers Predict and design an appropriate modulation technique in communication systems.

UNIT I

INTRODUCTION

Communication systems – Modulation - need for modulation- bandwidth- Amplitude modulation - theory- mathematical representation- frequency spectrum - USB & LSB- power relation- Frequency modulation - theory- mathematical representation- frequency spectrum- Phase modulation- comparison of AM- FM- PM.

(12L)

UNIT II

RADIO TRANSMITTERS

AM transmitter - block diagram - Solid state modulators - circuit explanation- FM transmitter - reactance modulator- varactor diode modulator- Amstrong modulator.

(12L)

UNIT III

RADIO RECEIVERS

Tuned radio frequency receiver- superheterodyne receiver - block schematic- selectivity- sensitivity- importance of IF - image frequency rejection - AM receivers - schematic explanation - RF amplifiers - circuit explanation - Mixer circuits - IF amplifiers - circuit explanation- simple diode detector - Automatic gain control circuit - simple and delayed AGC - FM receivers - block schematic explanation - amplitude limiting - FM demodulators: slope detectors- phase discriminator- ratio detectors.

(12L)

UNIT IV

SIDE BAND COMMUNICATION

Single side band transmission - suppression of carrier - balanced modulator - filtering of unwanted sideband - SSB receivers - block schematic explanation - pilot carrier receiver - suppressed carrier receiver - Vestigial side band transmission - transmitter and receiver responses - advantages of VSB in television.

(12L)

UNIT V

TELEPHONE SYSTEMS

Telephone subscribers loop circuit - subscriber's line interface circuit - Pulse and tone signaling - Frequency assignments - Electronic telephone - block schematic of a telephone set- block schematic of single line analog SLIC board - two wire repeaters - Electronic private automatic branching exchange - basic block schematic- Power line communication: block schematic explanation- Facsimile - FAX transmitter and receiver.

(12L)
(Total:60L)

BOOKS FOR STUDY:

1. Electronic communication Systems: Wayne Tomasi- Pearson Edn.
2. Electronic communication: Roody and Coolen- PHI.
3. Electronic Communication systems: George Kennedy- Mc Graw Hill.
4. Electronic and radio engineering: A P Mathur.
5. Telephony and Carrier current engineering: P N Das.
6. Modern communication Systems: Couch- PHI.

V Semester-Core subject: 3

MATHEMATICS FOR ELECTRONICS

LTPC
4 0 0 4

Preamble: To equip the students to identify and classify the numerical problem to be solved choose the most appropriate numerical method for its solution based on characteristics of the problem to understand the characteristics of the method to correctly interpret the results and to understand the basic methods, algorithms and programming techniques to solve mathematical problems.Prerequisite is high school mathematics.Upon completion of this course students will be well versed in solving Homogeneous difference equations,Interpolation.Find solution of variousequation using various methods.

UNIT I

Finite differences-difference table operator E, Δ, D-Relations between these operators-Difference equations- Linear difference equation Homogeneous linear difference equation with constant coefficients

(12L)

UNIT II

Interpolation using finite differences-Newton Gregory formula for forward interpolation-Divided differences-properties-Newtons formula for unequal intervals-Lagranges formula-Relation between ordinary differences and divided differences

(12L)

UNIT III

Solutions of algebraic and Transcedental equation iterative method, Bisection method, Newton raphson method. Solution of simultaneous Linear equations-Gauss method-Gauss Jordan method –Iteration method-Gauss Seidel method

(12L)

UNIT IV

Theory of equation-relation between roots and coefficients-Transformation of equation

(12L)

UNIT V

Reciprocal equation –approximate solution of equation-Newton's method and Horner's method

(12L)

(Total:60L)

BOOKS FOR STUDY:

1. Mathematics For Electronics-K.C Pillai
2. Numerical analysis-Armugam and Isaac
3. Numerical analysis-Gupta and Kapoor
4. Theory ofequation-Armugam and Isaac
5. Algebra-Manikavasagam pillai

Semester-Core subject: 4

COMPUTER HARDWARE SERVICING AND NETWORKING

LTPC
4 0 0 4

Preamble: The objective of this paper is to impart the basic concepts of Maintaining and servicing the computers, laptops and peripherals are essential requirements of the computer students. The clear understanding of computer network devices and protocols are also taught in this subject.Prerequisite is basic electronics and digital electronics.On completion of the course the students can Identify the major components of CPU.Understand the principle of operations of all the interfacing boards, interfacing devices. Know the use of diagnostic Software.Trouble shoot the problems in Laptop. Understand the different layers of OSI and their functions. Compare different LAN protocols. Identify the protocols used in TCP /IP and compare with OSI model. Use of IP addressing and TCP/ IP protocols briefly.

UNIT I

MOTHERBOARD COMPONENTS AND MEMORY

Introduction: Hardware, Software and Firmware Mother Board, IO and memory expansion slots, SMPS, Drives, front panel and rear panel connectors. Processors: Architecture and block diagram of multicore Processor, Features of new processor (Definition only)-chipsets (Concepts only) Bus Standards: Overview and features of PCI, AGP, and PCMCIA Primary Memory: Introduction-Main Memory, Cache memory – DDR2, DDR3 and Direct RDRAM. Secondary Storage: Hard Disk – Construction – Working Principle Specification of IDE, Ultra ATA, Serial ATA; HDD Partition - Formatting. Removable Storage: CD-R, CD-RW, And DVD –ROM and DVD –RW: construction and reading & writing operations; Blue-ray – Introduction –Disc Parameters.

(12L)

UNIT II

I/O DEVICES AND INTERFACE

Keyboard: Signals – operation of membrane and mechanical keyboards–troubleshooting; wireless Keyboard. Mouse: types, connectors, operation of Optical mouse and Troubleshooting. Printers: Introduction – Types of printers- Dot Matrix, Inkjet, Laser, MFP (Multi Function Printer) and Thermal printer – Operation, Construction and Features-Troubleshooting I/O Ports: Serial, Parallel, USB, Game Port and HDMI. Displays: Principles of LED, LCD and TFT Displays. Graphic Cards: VGA and SVGA card. Modem: Working principle. Power Supply: Servo Stabilizers, online and offline UPS – working principles; SMPS: Principles of Operation and block diagram of ATX Power supply, Connector Specifications.

(12L)

UNIT III

MAINTENANCE AND TROUBLE SHOOTING

Bios-setup: Standard CMOS setup, Advanced BIOS setup, Power management, advanced chipset features, PC Bios communication – upgrading BIOS, Flash BIOS -setup. POST: Definition – IPL hardware – POST Test sequence – beep codes Diagnostic Software and Viruses: Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic softwares. Laptop: Types of laptop –block diagram – working principles– configuring laptops and power settings -SMD components, ESD and precautions. Laptop components: Adapter – types, Battery – types, Laptop Mother Board - block diagram, Laptop Keyboard and Touchpad. Installation and Troubleshooting: Formatting, Partitioning and Installation of Operating system – Trouble Shooting Laptop Hardware problems-Preventive maintenance techniques for laptops and computers.

(12L)

UNITIV

COMPUTER NETWORK DEVICES AND OSI LAYERS

Data Communication: Components of a data communication. Data flow: simplex – half duplex – full duplex; Topologies: Star, Bus, Ring, and Mesh, Hybrid – Advantages and Disadvantages of each topology. Networks: Definition -Types of Networks: LAN – MAN – WAN – CAN – HAN – Internet –Intranet –Extranet, Client-Server, Peer To Peer Networks. Network devices: Features and concepts of Switches – Routers (Wired and Wireless) – Gateways. Network Models: Protocol definition - standards - OSI Model – layered architecture – functions of all layers.

(12L)

UNIT V

802. X AND TCP/IP PROTOCOLS

Overview of TCP / IP: TCP/IP – Transport Layers Protocol – connection oriented and connectionless Services – Sockets - TCP & UDP. 802. X Protocols: Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) – Token ring (802.5) – Ethernet – type of Ethernet (Fast Ethernet, gigabit Ethernet) – Comparison between 802.3, 802.4 and 802.5 Network Layers Protocol: IP –Interior Gateway Protocols (IGMP, ICMP, ARP, RARP Concept only). IP Addressing: Dotted Decimal Notation –Subnetting & Supernetting. Application Layer Protocols: FTP– Telnet – SMTP– HTTP – DNS -pop

(12L)

(Total: 60L)

TEXT BOOKS:

1. IBM PC and CLONES, B.Govindrajalu, Tata McGrawhill Publishers, IBM PC and CLONES
2. Computer Installation and Servicing, D.Balasubramanian, Tata McGraw Hill
3. The complete PC upgrade and Maintenance, Mark Minasi, BPB Publication, The complete PC upgrade and Maintenance
4. Troubleshooting, Maintaining and Repairing PCs, Stephen J Bigelow, Tata MCGraw Hill Publication
6. Upgrading and repairing laptops, Scott Mueller, QUE Publication,
7. Data Communication and networking, Behrouz A.Forouzan, Tata Mc-Graw Hill, New Delhi,
8. Data and Computer Communications, William Stallings, Prentice-Hall of India, Eighth Edition
9. Computer Networks, Andrew S.Tanenbaum, Prentice-Hall of India, New Delhi,

REFERENCE BOOKS:

1. Computer Networks, Achyut Godbole, Tata Mc-Graw Hill -New Delhi
2. Principles of Wireless Networks– A unified Approach, Kaveh Pahlavan and Prashant Krishnamurty, Pearson Education, 2002

V Semester-Core Practical

MICROPROCESSOR AND MICROCONTROLLER LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A. Microprocessor Lab

1. Program for 8 Bit Addition and Subtraction
2. Program for16 Bit Addition and subtraction
3. Program for 8 Bit Multiplication and division
4. Program for 16Bit Multiplication and Division
5. Program for Square and Square root of a number
6. Program for Sorting and Searching
7. Program for Smallest and Largest number in an array.
8. Program for Reversing a String
9. Program for Fibonacci series.
10. Program for Factorial of a number
11. Program for B.C.D to Binary, Binary to B.C.D, A S C I I to Binary,
12. Binary to ASCI I Conversion
13. Six letter word display.
14. Rolling display
15. Interfacing seven segment display to display any character.
16. Program to display Time(Hours and Minutes)
17. Program for 1's complement and 2's complement of 8 bit and 16 bit data
18. Interfacing Traffic light controller
19. Interfacing Stepper motor control
20. Interfacing Matrix Keyboard
21. Interfacing A.D.C
22. Interfacing D.A.C
23. Study of 8255 chip and generation of
    1. Square wave
    2. Triangular wave
    3. Saw Tooth wave

B. Microcontroller 8051 Lab

1. Addition – 8 bit, 16 bit.
2. Subtraction – 8 bit, 16 bit.
3. Multiplication 8 bit
4. Division 8 bit
5. Array addition (multibyte)
6. Logical Operations – AND, OR, NOT
7. Decimal to ASCII and ASCII to Decimal.
8. Decimal to Hexa and Hexa to Decimal.
9. Ascending Order.
10. Descending Order
11. up/down Counter
12. Block data transfer
13. Interfacing with LCD.
14. Interfacing with Matrix Keypad.
15. Square wave generator
16. Interfacing with ADC.
17. Interfacing with DAC.
18. Digital Clock.
19. Interfacing with Stepper Motor.

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V Semester-: Major Elective

(Select any one course 1 or 2)

1. VERY LARGE SCALE INTEGRATION

LTPC
4 0 0 4

Preamble: The objective of this paper is to study about the MOS Transistor and its characteristics. To get familiarized with stick diagrams and Layout design. To understand the CMOS logic design styles, latches and registers. The students will learn MOSFET, CMOS, and IC Fabrication Process Prerequisite for this paper is basic physics and electronics.On completion of course student will. Gain knowledge on MOS Transistor structure and its characteristics. Gain knowledge on design rules and layout. Understand CMOS circuit design using the various logic styles.

UNIT I

INTRODUCTION TO MOSFET

Structure of MOSFET: Enhancement mode MOSFET-Depletion Mode MOSFET – MOS Transistor Theory: Figure of merit-MOS Device design equations-equivalent circuits of MOSFETS- Basic structure of CMOS-Solved examples

(12L)

UNIT II

BASIC MOS & CMOS AND BIPOLAR LOGIC CIRCUITS

Pass Transistor (or) Transmission gate- Inverters: The nMOS Inverter-MOSFET as a resistance-determination of pull-up to pull-down ratio for an n-MOS inverter by another n-MOS inverter-pull-up to pull-down ratio for an n-MOS inverter driven through one or more pass transistors-Different forms of pull-up-BICMOS Inverter – Tristate Inverter –Differential Inverter-Bipolar logic circuits- DTL- ECL-Integrated injection logic

(12L)

UNIT III

VLSI FABRICATION PROCESS

Crystal growth and wafer preparation-epitaxy-oxidation-diffusion: Constant source diffusion-limited source diffusion-Parameters affect diffusion-Diffusion Systems- Diffusion Furnace - Ion Implementation- lithography-Dielectric and polysilicon Film Deposition-Etching – Metallization-Yield and reliability

(12L)

UNIT IV

FABRICATION OF TYPICAL IC COMPONENTS

Monolithic resistors-Monolithic capacitors-Monolithic diodes-Monolithic Transistors-An overview of MOSFET technology-CMOS Technology-Solved Examples

(12L)

UNIT V

APPLICATION OF CMOS

An Increment/Decrement circuit-Shift Registers: Left/Right Register- Serial Parallel registers-Comparators for a two bit number- Two Phase non- Overlapping clock generator

(12L)

(Total: 60L)

TEXT BOOK:

1. Dilip K. Roy, Principles of VLSI, Galgotia Publication Limited, 2005

REFERENCE BOOKS:

1. Neil H. E. Weste, Principles of CMOS VLSI Design, Addison-Wesley Publishing Company, 1993
2. Introduction to VLSI Systems Carver Mead Lynn Conway BS Publication, 2003

2. DIGITAL COMMUNICATION

LTPC
4 0 0 4

Preamble: The objective of this paper is to study about the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals. To learn various base band transmission schemes.To understand various coding and spread spectrum techniques. Prerequisite for this paper is basic physics and communication electronics.On completion of course student will understand various base band transmission schemes. Analyze the spectral characteristics of band pass signalling schemes. Acquire knowledge on error control coding and spread spectrum techniques

UNIT I

SAMPLING PROCESS

Sampling process –PAM- other forms of pulse modulation –Bandwidth –Noise trade off – Quantization – PCM- Noise considerations in PCM Systems-TDM- Digital multiplexers-Virtues, Limitation and modification of PCM-Delta modulation –Linear prediction – differential pulse code modulation – Adaptive Delta Modulation.

(12L)

UNIT II

MATCHED FILTER

Matched Filter- Error Rate due to noise –Intersymbol Interference- Nyquist's criterion for Distortionless Base band Binary Transmission- Correlative level coding –Baseb and M-ary PAM transmission –Adaptive Equalization –Eye patterns

(12L)

UNIT III

PASS BAND TRANSMISSION MODEL

Introduction – Pass band Transmission model- Generation, Detection, Signal space diagram, bit error probability and Power spectra of BPSK, QPSK, FSK and MSK schemes – Differential phase shift keying – Comparison of Digital modulation systems using a single carrier – Carrier and symbol synchronization.

(12L)

UNIT IV

DISCRETE MEMORYLESS CHANNELS

Discrete memoryless channels – Linear block codes - Cyclic codes - Convolutional codes – Maximum likelihood decoding of convolutional codes-Viterbi Algorithm, Trellis coded Modulation, Turbo codes.

(12L)

UNIT V

PSEUDO- NOISE SEQUENCES

Pseudo- noise sequences –a notion of spread spectrum – Direct sequence spread spectrum with coherent binary phase shift keying – Signal space Dimensionality and processing gain – Probability of error – Frequency –hop spread spectrum –Maximum length and Gold codes.

(12L)

(Total: 60L)

TEXT BOOK

1. Simon Haykins, "Communication Systems" John Wiley, 4th Edition, 2001

BOOKS FOR REFERENCE

1. Sam K.Shanmugam "Analog & Digital Communication" John Wiley.
2. John G.Proakis, "Digital Communication" McGraw Hill 3rd Edition, 1995
3. Taub & Schilling, "Principles of Digital Communication "Tata McGraw-Hill" 28th reprint, 2003

V Semester Mini project

LTPC
0 0 4 6

Course Objectives

- To develop skills to formulate a technical project.
- To give guidance on the various tasks of the project and standard procedures.
- To teach use of new tools, algorithms and techniques required to carry out the projects.
- To give guidance on the various procedures for validation of the product and analyse the cost effectiveness.
- To provide guidelines to prepare technical report of the project.

Course Outcomes

1. Formulate a real world problem, identify the requirement and develop the design solutions.
2. Identify technical ideas, strategies and methodologies.
3. Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
4. Perform test and validate through conformance of the developed prototype and analysis the cost effectiveness.
5. Explain the acquired knowledge through preparation of report and oral presentations

Mini Project shall be a group activity with a maximum of 5 students in a group.
Students are adviced to select topics of their own interest in hardware and develop their hardware skills by designing a circuit of their own.Periodical assesment may be done to evaluate their skills.

VI SEMESTER

VI Semester-Core subject: 1

ANTENNAS

LTPC
4 0 0 4

Preamble: The purpose of this course is to enable the students to the basics of antennas and various types of antenna arrays and its radiation patterns. To impart the knowledge of field distribution characteristics of various types of antennas.The main objective of this subject is to help students to identify the different latest antennas available for specific communication. Prerequisite is Knowledge of electronics and communication.On completion of coursethe students will be able to understand the antenna basic parameters. Estimate the array factor for uniform and non-uniform arrays. Apply the fundamental concepts to obtain field distributions of broad band antennas. Examine the field characteristics of special type antennas .Categorize the radio wave propagation regions.Design and analyze various types of antennas using simulation tools

UNIT 1

ANTENNA BASICS

Introduction, basic Antenna parameters, patterns, beam area, radiation intensity, beam efficiency, diversity and gain, antenna apertures, effective height, bandwidth, radiation, efficiency, antenna temperature and antenna filed zones.

(12L)

UNIT II

POINT SOURCES AND ARRAYS

Introduction, point sources, power patterns, power theorem, radiation intensity, filed patterns, phase patterns. Array of two isotropic point sources, non-isotropic but similar point sources, principles of pattern multiplication, examples of pattern synthesis by pattern multiplication, non-isotropic point sources, broad side array with non unipolar amplitude distribution, broad side versus end fire array, direction of maxima fire arrays of n isotropic point sources of equal amplitude and spacing.

(12L)

UNIT III

ELECTRIC DIPOLES AND THIN LINEAR ANTENNAS

Introduction, short electric dipole, fields of a short dipole, radiation resistance of short dipole, radiation resistances of lambda/2 Antenna, thin linear antenna, micro strip arrays, low side lobe arrays, long wire antenna, folded dipole antennas.

(12L)

UNIT IV

LOOP, SLOT, PATCH AND HORN ANTENNA

Introduction, small loop, comparison of far fields of small loop and short dipole, loop antenna general case, far field patterns of circular loop, radiation resistance, directivity, slot antenna, Balinet's principle and complementary antennas, impedance of complementary and slot antennas, patch antennas, horn antennas, rectangular horn antennas.

(12L)

UNIT V

ANTENNA TYPES

Helical Antenna, Yagi-Uda array, corner reflectors, parabolic reflectors, log periodic antenna, lens antenna, antenna for special applications – sleeve antenna, turnstile antenna, omni directional antennas, antennas for satellite antennas for ground penetrating radars, embedded antennas, ultra wide band antennas, plasma antenna.

(12L)

(Total: 60L)

TEXT BOOK

1. John D.Krauss, Antennas, III (SEI) edition, McGraw-Hill International edition, 2006
2. Harish and Sachidananda: Antennas and Wave Propagation Oxford Press2007

BOOKS FOR REFERENCE

1. C A Balanis, Antenna Theory Analysis and Design 2nd ED, John Wiley, 1997
2. Sineon R Saunders, Antennas and Propagation for Wireless Communication Systems, John Wiley, 2003.
3. G SN Raju: Antennas and wave propagation, Pearson Education 2005

VI Semester-Core subject: 2

OPTICAL FIBRE COMMUNICATION

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in various optical fiber modes, configurations and various signal degradation factors associated with optical fiber and to study about various optical sources and optical detectors and their use in the optical communication system.Prerequisite is knowledge in electronics.On competion of the course students will learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. Understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. Learn the various optical source materials, LED structures, quantum efficiency, and laser diodes. Learn the fiber optical receivers such as PIN, APD diodes, noise performance in photo detector, receiver operation and configuration.Understand the fiber optical network components, variety of networking aspects, Measure various parameters in fibre networks.

UNIT I

BASIC PRINCIPLES OF OPTICS

Recollection of basic principles of optics: ray theory- reflections at boundary- critical angle-total internal reflection - Optical wave guides - Propagation in fibre- expression for acceptance angle-acceptance cone – numerical aperture- V number - Index profile-effect of index profile on propagation.

(12L)

UNIT II

FIBRE

SI fibre and GI fibre - Brief description of modes in SI fibre and GI fibre- Pulse dispersion and Band Width limitation- Mode coupling – Attenuation in single mode and multimode fibres- Optic fibre cables- characteristics of cables- Optic fibre couplers: types of coupling – fibre to fibre joints- splicing techniques- optical fibre connectors.

(12L)

UNIT III

OPTICAL SOURCES

Optical sources- LEDs, LASER diodes- operating characteristics- photo-detectors-principles of photo detection – PIN diode – APD – operating principles – photo-multiplier tubes- source to fibre power launching – lensing schemes- modulation circuits.

(12L)

UNIT IV

BASIC OPTICAL COMMUNICATION SYSTEMS

Basic optical communication systems- point-to-point link- rise time budget- protection techniques- WDM – transceiver requirements-TDM- optical amplifiers- SOAs – EDFAs- optical receivers- Introduction to optical fibre networks.

(12L)

UNIT V

MEASUREMENTS

OTDR - Measurements- numerical aperture- dispersion measurements- refractive index profile measurements- band width measurements- fibre attenuation measurements- cutoff wave length measurements- applications of fibre optic systems- future developments.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Fibre optic communication technology: Djafer K Mynbaev, Pearson Education.
2. Electronic communication: Dennis Roddy & John coolen, PHI.
3. Optic fibre communication: John M senior, PHI.
4. Telecommunication principle circuits Systems and experiments: S.Ramabhadran, Khanna.
5. Optical communication system: John Gower, PHI
6. Fibre optics in telecommunication: Sharma, Mc Graw Hill
7. Optical fibre and fibre optic communication: Subir Kumar Sarkar, S Chand & co. Ltd
8. Optical communication: M Mukund Rao, Universities press.
9. Fiber Optic Communication: Palais, Pearson Education.

VI Semester-Core subject: 3

ADVANCED COMMUNICATIONS

LTPC
4 0 0 4

Preamble: To equip the students with basic knowledge in the basic principles, concepts and types of communication systems. To understand the various design issues in communication system. To gain knowledge about various communication channel.Prerequisite is basic knowledge in analog communication or physics.On competion of this course students will acquire the Knowledge and reproduce the importance of various communication forms Understand the procedures for various technique sused in satellite communication, Cellular communication, and various other wireless communication techniques. Develop the ability to compare and contrast the strengths and weaknesses of various communication methods.Learn about spread spectrum and various secure communications.

UNIT I

SATELLITE COMMUNICATION

Satellite Communication - Satellite orbits – Geo synchronous orbit –orbital velocity – Round trip time delay - Antenna look angles - Satellite classifications - spacing - frequency allocation- System parameters analysis - link equations- Link Budget - Spacecraft subsystem (block schematic). Tracking and telecommand - Earth stations – Antenna systems – receiver subsystems (block) - functioning LNA – LNB - down converter - channel filters - demodulators- INTELSAT/INMARSAT –Overview of INSAT.

(12L)

UNIT II

TYPES OF SATELLITE COMMUNICATION SYSTEM

Types of satellite communication system-FSS, DSS-Direct broadcasting and community broadcast - Multiple Access Techniques– Introduction- FDM-FM-FDMA, PSK-TDMA, SSMA, CDMA - Switching techniques – circuit – message - packet switching- Packet satellite network-domestic satellite system.

(12L)

UNIT III

THE CELLULAR CONCEPT

The cellular concept – Introduction - Frequency reuse –channel assignment – Hand off strategies – prioritizing handoff –practical handoff – Co-channel interface and system capacity – channel planning – adjacent channel interference –Cell splitting – sectoring – repeaters – micro-cell concept- Blue tooth technology- Fundamentals and Applications.

(12L)

UNIT IV

WIRELESS COMMUNICATION

Wireless communication system-paging-cordless & cellular system –comparison-Second generation cellular networks-third generation cellular networks - Global System for Mobile – services and features – Architecture – Radio subsystem – channel types – frame structure - Global positioning Systems - basic concepts- system block - positioning – Applications.

(12L)

UNIT V

SPREAD SPECTRUM TECHNIQUES

Spread spectrum Techniques and remote sensing- Pseudo noise sequences –time hopping-frequency Hopping – Robustness – Fast and Slow hopping – Hybrid & Chirp spread spectrum- Synchronization – acquisition – Tracking - Concepts of Jamming -Analysis of DS/SS – Analysis of avoidance-generation of signals-detection –Applications.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. Electronic communication system fundamentals: Wayne Tomasi, Pearson Education.
2. Wireless communication principles and practice: T S Rappaport, Pearson Education.
3. Satellite communication: Gagliardi.
4. Digital Communication Fundamentals and Applications: B Sklar, Pearson Education.
5. Digital communication: Simon Haykin, John Wiley&Sons.
6. Space communication System: Filipowasky, McGrawHill.

VI Semester-Core subject: 4

MOBILE COMMUNICATION

LTPC
4 0 0 4

Preamble: To equip the students to understand the basic foundation in mobile communication and understand cellular design concepts and apply those in wireless communication.To design a 2G and 3G wireless communication system to meet desired needs within realistic constraints. Pre-Requisite is knowledge in Digital Communication.On completion Student will be able to understand the concepts and techniques of mobile radio communication fundamentals like reflection, diffraction, scattering and fading. Know various multiple access techniques and fundamentals of equalization in wireless communication. Understand cellular design concepts and apply them in wireless communication.Design GSM and CDMA and its components in mobile and wireless communication.Design a 2G and 3G wireless communication systems to meet desired needs within realistic constraints

UNIT I

CELLULAR MOBILE SYSTEM

Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

(12L)

UNIT II

CO-CHANNEL INTERFERENCE

Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

(12L)

UNIT III

ANTENNAS

Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channelassignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

(12L)

UNIT IV

2 G AND 3 G NETWORKS

Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

(12L)

UNIT V

INTELLIGENT CELL CONCEPT

Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous TransferMode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

(12L)

(Total: 60L)

BOOKS FOR STUDY:

1. W.C.Y. Lee,"Mobile Cellular Telecommunications",2nd Edition,TataMcGrawHill, 2006.
2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.
3. Theodore. S. Rapport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.
4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.
5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.

6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

VI Semester-Core Practical

COMMUNICATION AND SYSTEM DESIGN LAB

LTPC
0 0 4 2

All experiments have to be carried out compulsorily from A and B

A.Communication Lab

1. Amplitude modulation and Demodulation.
2. Frequency Modulation and Demodulation
3. Pulse Modulation – PAM / PWM / PPM
4. Pulse Code Modulation
5. Delta Modulation, Adaptive Delta Modulation.
6. Digital Modulation & Demodulation – ASK, PSK, QPSK, FSK
7. Designing, Assembling and Testing of Pre-Emphasis / De-emphasis Circuits.
8. PLL and Frequency Synthesizer
9. Line Coding
10. Error Control Coding using MATLAB.
11. Sampling & Time Division Multiplexing.
12. Frequency Division Multiplexing

B. Electronics Design Lab Practical

Students must use dotted boards or Group boards and interconnect the joints by soldering.

Soldering Practice

1. Design and construction of fixed voltage power supply
2. Design and construction of Dual power supply
2. Design and construction of switching power supply
3. Design and construction of 1.5 to 12 V power supply using multi tap transformer.
4. Design and construction of Burglar alarm using L.D.R
5. Design and construction of Temperature switch using Thermistor
6. Design and construction of Light sensitive switch using Photo diode
7. Design and construction of Audio amplifier using LM 380
8. Design and construction of Timer circuit
9. Design and construction of Decade counter/ seven segment decoder
10. Design and construction of Logic probe

VI Semester-: Major Elective

(Select any one course 1 or 2)

1. PRINTED CIRCUIT BOARDS

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about Printed Circuit boards To study the basics of Printed circuit boards, To know the layout planning and design, To know the design considerations for special circuitsFLEXIBLE CIRCUITS Quality control and Recycling chemicals.Prerequisite is knowledge of electronic components.On completion of course student will be having good knowledge on PCB designing ,manufacturing , its characteristics,Various types,Application.Drawing schematics and preparing PCB's and testing.

UNIT I

EVOLUTION OF PCBS

Basics Connectivity in electronic equipment - evolution in PCBs – components of a PCB – classification of PCBs – manufacturing of basic PCBs – challenges in modern PCB design and manufacture

(12L)

UNIT II

LAYOUT PLANNING

Layout Planning and Design Reading drawings and diagrams – general PCB design consideration – mechanical design consideration – electrical design consideration – component placement rules – fabrication and assembly consideration – environmental factors – layout design – layout design checklist – documentation

(12L)

UNIT III

MULTILAYER AND FLEXIBLE PCBS

Multilayer and Flexible PCBs Multi-layers – Interconnect techniques – materials for multilayer boards – design features – fabrication process- Flexible PCBs – construction of flexible PCBs – design consideration in flexible circuits – manufacture of flexible circuits –

rigid flex PCBs – terminations – advantages of flexible circuits – application of flexible circuits

(12L)

UNIT IV

DESIGN RULES

Schematics and Netlist, Design Rules Schematic Entry – Schematic Standards – Schematic Design Check List – Schematic Styles – Sheets and Connectors Design rules for analog circuits – Design rules for digital circuits – Design rules for HF circuits – EMI/EMC

(12L)

UNIT V

QUALITY ASPECTS AND ENVIRONMENTAL CONCERNS

Quality Aspects and Environmental Concerns Testing for quality control – quality control methods –testing of PCBs – Reliability testing – Acceptability of PCBs – Recycling of PCBs – Environmental Standards – Safety Precautions – Lead free Soldering

(12L)

(Total: 60L)

TEXT BOOKS:

1. R S Khandpur - Printed Circuit Boards: Design, Fabrication, Assembly and Testing – McGraw Hill, India – 2005
2. Christopher T. Robertson - Printed Circuit Board Designer's Reference: Basics – Prentice International, U.S. – 2004

2. EMBEDDED SYSTEM

LTPC
4 0 0 4

Preamble: To equip the students with fundamental knowledge about the basic concepts of Embedded System. To acquire Knowledge in Real time Embedded system, programming languages and tools. To explore the potential areas utilizing embedded processors in real time systems.Prerequisite is knowledge of microprocessor and microcontroller.On completion of course student will acquire knowledge about the basic functions of embedded systems. Understand the basic structure and concepts of embedded systems. Acquire designing skills in Hardware and software tools of embedded firmware. Understand the applications of embedded systems. Develop good programming skills to develop embedded projects. Apply the acquired knowledge to develop embedded related projects.

UNIT I

INTRODUCTION

Differences between the Desktop PC and typical Embedded System - Applications of Embedded System – Microprocessor Vs Microcontroller Analysis. Embedded Design Life Cycle: Product Specification, Hardware/Software Partitioning, Iteration and Implementation, Detailed Hardware and Software Design, Hardware Software Integration, Product Testing and Release, Maintenance and Upgrading Existing products.

(12L)

UNIT II

HARDWARE MODULES AND INTERFACING TECHNIQUES

Memory Mapping – Signal Description – Port Integration Module – Serial Communication Interface: SCI, SPI, I2C, CAN, Analog to Digital Converter, Pulse Width Modulator – Enhanced Capture Timer – Periodic Interrupt Timer. Interfacing Concepts: Hardware Initialization, Display Interfacing, Keyboard Interfacing, and Concept of Touch Screen. ADC Interfacing, Serial Communication Interface: RS232, IIC. Real Time Clock (RTC) Intefacing- EEPROM Interfacing-Stepper Motor and DC Motor Interfacing Techniques.

(12L)

UNIT III

SOFTWARE DEVELOPMENT TOOLS

Cross-Compilers, Cross-Assemblers, Linker/Locator, Debugger and Simulator - Introduction to Code Warrior Integrated Development Environment (IDE) – Embedded C Programming using IDE: I/O Port Programming, EEPROM Programming, Timer Programming,

Programming ADC, Programming PWM Module, Serial Port Programming and Interrupts Programming.

(12L)

UNIT IV

INTEGRATION OF HARDWARE AND SOFTWARE MODULES

Host and Target Machines. Getting Embedded Software into Target System: In-Circuit Emulators. Debug Kernels: BDM and JTAG.

(12L)

UNIT V

REAL TIME OPERATING SYSTEMS

Tasks and Task States, Tasks and Data, Semaphores and Shared Data, Message Queues, Mailboxes and Pipes, Timer functions, Events, Memory Management, Interrupt Routines in RTOS Environment. Design of Underground Tank Monitoring System using MUCOS RTOS.

(12L)
(Total: 60L)

TEXT BOOKS:

1. Arnold Berger, "Embedded System Design: An Introduction to Processes, Tools, and Techniques" CMP Books, 2006.
2. Han–Way Huang, "The HCS12/9S12: An Introduction to Hardware and Software Interfacing", Delmar publishers, New Delhi, 2009.

REFERENCE BOOKS:

1. David E Simon, "An Embedded Software Primer", Pearson Education Asia, New Delhi, 2009.
2. Douglas V Hall, "Microprocessors and Interfacing: Programming and Hardware", Tata McGraw-Hill Edition, New Delhi, 2005.
3. Rajkamal, "Embedded Systems: Architecture, Programming and Design", Tata McGraw-Hill, New Delhi, 2008

VI Semester Major Project

PROJECT WORK

LTPC
0 0 6 7

The objective of the project work is to motivate the students for doing research and to inculcate in them the self confidence to work independently. Each student should do an individual project and they can freely choose their own topic of experimental nature. The project should be of investigative type not a hobby project one.

Students are encouraged to take the project work as a challenge so that their project will boost up their industrial career.

Periodic Seminars should be conducted to assess the students. The students should present the progress of the project to their respective guides and get the required assistance from them

At the completion of the project .The student will submit Project Report in the form of Dissertation which will be examined by the examiners.

The examination shall consist of i) evaluation of the dissertation and ii) comprehensive viva-voce