DEPARTMENT OF ELECTRONIC SCIENCE

Course Structure under CBCS Pattern for the students admitted from 2015-16 onwards

Sem.	Course	Paper Title	Paper Code	Instruct Hours	No. of Credits	Total credits
I	LC I	Tamil – I		6	3	20
	ELC I	English – I		6	3	
	CC I	Principles of Electricity And Magnetism	15EL101	5	5	
	CC II	Major Practical I	15ELP102	2	2	
	AC I	Allied theory I -Mathematics I		9	5	
	SBC I	Computer Hardware And Its Networking	15SEL101	2	2	
II	LC II	Tamil – II		6	3	20
	ELC II	English – II		6	3	
	CC III	Electronic Devices And Applications	15EL203	5	5	
	CC IV	Major Practical II	15ELP204	2	2	
	AC II	Allied theory II – Mathematics II		9	5	
	SBC II	Electrical Wiring	15SEL202	2	2	
III	LC III	Tamil - III		6	3	20
	ELC III	English - III		6	3	
	CC-V	Operational Amplifiers And Linear Integrated Circuits	15EL305	4	4	
	CC - VI	Major Practical - III	15ELP306	3	2	
	AC III	Allied Theory III– Computer programming in C		7	4	
	AC IV	Allied Practical IV -C Programming		2	1	
	SBC III	Electronic Testing, Fault Diagnosis And Solar Photovoltaics	15SEL303	2	2	
IV	LC IV	Tamil - IV	15LT404	6	3	20
	ELC IV	English - IV	15LE404	6	3	
	CC-VII	Digital Electronics	15EL407	4	4	
	CC - VIII	Major Practical - IV	15ELP408	3	3	
	AC- V	Allied Theory V - Object Oriented Programming With C++		7	4	
	AC VI	Allied Practical VI – C++ Programming Lab		2	1	
	NMEC I	Basic electronics	15NMEL401	2	2	
V	CC - IX	Microprocessor And Its Application	15EL509	4	4	30
	CC - X	Modern Communication Electronics	15EL510	5	5	
	CC -XI	Electronic Instrumentation And Programmable Logic Controllers	15EL511	5	5	

	CC - XII	Major Practical-V	15ELP512	6	6	
	EC I	Microcontroller And Its Application	15ELE501	3	5	
	EC II	Nanotechnology	15ELE502	2	3	
	NMEC II	Computer Electronics	15NMEL502	2	2	
	EA I	Gender studies	11EA501	1	1	
	SSD I	Soft Skills Development	11SSD501	2	2	
VI	CC – XIII/ LSC- I	Domestic Home Appliances	15ELSC613	5	5	
	CC - XIV	Industrial And Power Electronics	15EL614	5	5	
	CC - XV	PCB Design, Fabrication, Assembly And Testing	15EL615	5	5	
	CC - XVI	Major Practical VI	15ELP616	6	5	
	EC III	VLSI ,VHDL Tools and Embedded Systems	15ELE603	5	5	
	VBC	Value Education	11VBC601	2	2	
	EVS	Environmental Studies	11ES601	2	2	
	EA II	External Activity		-	1	1
				Total		140

Max. Marks for each course: CIA: 25 + ESE: 75 = 100 Practical: CIA: 40 + ESE: 60 = 100

1. Extra Disciplinary Courses offered by the Department of Electronics Science:
   1. Basic Electronics 2. Computer Electronics

2. Extra Disciplinary Courses offered by the Department of Computer Science to our Department:
   1. WebTechnology 2. Multimedia And Its applications.

Core Course I - Principles of Electricity And Magnetism
CODE: 15EL101
(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

Electrical Measurements: Definitions of potential difference, Electric current – Resistance - Laws of resistance - Resistance, Resistivity and conductivity - Resistor Colour codes - Types of resistors - Resistance in series and in parallel - Types of condensers - Condensers in series and in parallel.

UNIT II:

Measurement of AC: - Average value - RMS value - peak value - Peak to peak value - Form factor - Crest factor - LCR series and parallel resonance circuits - Quality factor.

Measuring Instruments: Moving coil galvanometers - Ballistic galvanometer - Current sensitiveness of moving coil galvanometers - Construction of voltmeter - Ammeter - Calibration of voltmeter and Ammeter.

UNIT III:

Growth and Decay of current in a circuit containing R and L - Charging and discharging of condenser through a resistance - Charging and discharging of a condenser through L and R.

Thermo Electricity: See beck effect – Peltier effect - Thomson effect – Measurement of Thermo e.m.f using direct deflection method – Practical applications of thermo electricity.

UNIT IV:

Electro Magnetic Induction: Faraday's laws of Electromagnetic induction - Lenz's law - Fleming's right hand rule - Self-induction - Mutual induction - Ohm's law - Maximum power transfer theorem - Kirchoff's current law - Kirchoff's voltage law - Voltage source - Current Source - Thevenin's theorem - Norton's theorem.

UNIT V:

Applications of Electro Magnetic Induction: Eddy currents and its uses – AC generator or dynamo - Poly phase circuits - Distribution of three phase AC system - Star and Delta - Rotating magnetic field - Principles of induction motor - Types of transformers - Transformers on no load - Transformers on load - Power losses in a transformer - Applications.

Text Books:

1) Electricity & Magnetism - Brijlal and N.Subramanian (Unit I, II, III, IV, V)
2) Basic Electronics- B.L.Theraja (Unit IV)

References:

1) Electricity and Magnetism – R.Murugesan – PHI
2) Electronic devices and circuits-S.salivahanan, N.suresh Kumar and A.vallavaraj

Core Course II – MAJOR PRACTICAL - I

CODE:15ELP102

(For the candidates admitted to the course from June 2015 onwards)

CHOOSE ANY EIGHT EXPERIMENTS

1. Verification of Ohm's Law.
2. Verification of Maximum power transfer theorem.
3. Verification of Kirchoff's voltage law.
4. Verification of Kirchoff's current law.
5. Verification of Thevenin's theorem.
6. Verification of Norton's theorem.
7. Transient Response of RC Circuits of DC Excitation.
8. Calibration of Voltmeter using Potentiometer.
9. Calibration of Ammeter using Potentiometer.
10. Determination of Thermo-EMF Direct deflection method.
11. Determination of Current sensitiveness of Moving coil Galvanometer.
12. Series resonance circuit – Determination of Inductance.
13. Parallel resonance circuit – Determination of Inductance.
14. Study of Filters
15. Construction of Voltage source and current source

SBC I: Computer Hardware and its Networking CODE: 15SEL101
(For the candidates admitted to the course from June 2015)

UNIT I:

Basic Computer System:

Introduction- Block diagram of computer-Main system unit: Types of Main system unit-Inside the Main system unit- Motherboard components-Types of Computer Virus.

UNIT II:

Memory Concepts:

Primary memory - Secondary memory-Flash memory-memory Speed improvement-Cache memory-HDD -Track and Sector-Format of Disk-Pen drive-Flash memory-Memory card, Touchpad, monitor, Shadow mask, LCD monitor

UNIT III:

I/O Devices:

Keyboard: Keyboard organization-Switches All types-Mouse: Types of Mouse-Printers-Printing Mechanism –Modem & it's working-Digital camera.

UNIT IV:

Basics of Computer Networks:

Introduction-advantage of network-Structure of communication network-dataflow and physical structure- Network topologies: Topology &design goals-hierarchical-bus-star-ring mesh topology.

UNIT V:

Networking:

Types of Network- LAN-WAN-MAN-Setting up of a Network- Preparation for Network installation-Internet Concept of Internet Applications of Internet.

Text Books:

1. Computer Hardware Course.
   Manohar Lotia, Pradeep Nair & Payal Lotia (BPB Publications). (Unit I, II, III, V)
2. Computer Networks Modern -Protocols, standards and interfaces. (II Edition)
   Uyless Black (PHI Publications). (Unit IV)

References:

1. Computer Networks Andrew S. Tanen Baum. Third edition PHI publications

Core Course III – Electronic Devices and Applications CODE:15EL203

(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

Semiconductors: Semiconductors - properties - Bonds in semiconductors - Commonly used semiconductors - Energy band description of semiconductors - Effect of temperature - Hole current - Intrinsic and Extrinsic semiconductors - n type and p type semiconductors - charge on n-type and p-type semiconductors - Majority and Minority carriers.

PN Junction Diode: - Construction - properties of p-n junction – applying voltage across p-n junction - forward bias - Reverse bias - current flow in a forward biased p-n junction - volt-ampere characteristics - diode parameters – Half wave, Full wave and Bridge Rectifiers Ripple factor.

UNIT II:

Voltage multiplier circuits: - zener diode - Equivalent circuit of zener diode - zener diode as voltage regulator - IC voltage regulator -voltage Doubler - Tripler - Quadrupler.

Transistors: Transistor terminals - construction of transistors - working of transistors - Transistor as an amplifier - Transistors connections - CB, CE, CC configurations - characteristics of CB, CE configurations - Load line analysis - operating point

UNIT III:

Transistor Biasing: Transistors as an amplifier in CE configuration - Faithful amplification Transistor biasing - stabilization - stability factor - Methods of transistor biasing :- Base resistor bias - collector to base bias - voltage divider bias.

Classification of Amplifiers: RC coupled, transformer coupled, Direct coupled amplifiers - Push-pull amplifiers - complementary symmetry amplifiers –Parameters:-Phase reversal - Gain and Band width of an amplifier- h- parameters (Introduction only).

UNIT IV:

Feed Back In Amplifiers: Feed back - General theory of feed back – negative feed back – reasons for negative feed back – types of negative feed back in transistor circuits: Voltage series – current series feed back circuits.

Oscillators: Effect of positive feed back – requirement for oscillations – phase shift oscillator - Hartley oscillator - Colpitt's oscillator - Astable Multivibrator – Differentiator – Integrator – Clipper – Clamper circuits using passive components.

UNIT V:

Field Effect Transistors: FET construction - working principles of FET - Difference between FET and Bipolar transistor - Output characteristics of FET - Advantages of FET - parameters of FET - FET as an amplifier - FET Biasing - FET applications - MOSFET construction - working principle - Enhancement mode - Depletion mode.

Text Books:

1. Principles of Electronics - V.K. Metha- 9th edition (Unit I,II,III,IV.V)
2. Electronic Devices and Circuits – Allen Mottershed –PHI (Unit IV)

References:

1. Electronic Principles - Albert Paul Malvino – TMH Publishers.
2. Textbook of Electrical Technology Volume IV - B.L.Theraja.

Core Course IV – MAJOR PRACTICAL – II CODE:15ELP204

(For the candidates admitted to the course from June 2015 onwards)

CHOOSE ANY EIGHT EXPERIMENTS

1. Characteristics of PN junction diode.
2. Characteristics of Zener diode.
3. Characteristics of Light Emitting Diode (LED).
4. Characteristics of Transistor in CE Configuration.
5. Characteristics of Transistor in CB Configuration.
6. Characteristics of Field Effect Transistors (FET).
7. Construction of Half wave rectifiers.
8. Construction of Full Wave rectifiers.
9. Conversion of Galvanometer into a Voltmeter and an Ammeter.
10. Study of Basic gates using Discrete Components.
11. Measurement of Impedance and power factor of RL Circuits.
12. Temperature co- efficient of semiconductor diode.
13. Construction of Voltage Doubler
14. Construction of Voltage Quadrupler
15. Construction of Voltage Tripler

SBC-II: Electrical wiring **CODE:15SEL202**

(For the candidates admitted to the course from June 2015 onwards)

UNIT- I:

Power stations:

Thermal power station: advantages-disadvantages- modern coal fed plant - Hydroelectric power stations: advantages- disadvantages- factors for the location – classifications:- Diesel power station –Nuclear power station.

Substations:

Introduction – classification:- Service, Service voltage, Mounting– comparison of outdoor & indoor substations – design of substation.

UNIT – II

Transmission and distribution of electrical energy:

Introduction – definitions – AC and DC system of supply – distribution of electrical energy – overhead lines – types of conductors – line supports – arrangement of conductors – lightening arresters and its types – earthing of overhead lines – service lines – tariffs.

UNIT – III

House wiring systems:

Introduction –single phase wiring system – looping in system – wiring of a building – tree system – ring system – lamp circuits: simple circuits – series parallel circuits – fluorescent tube lightening – thermal starter – glow starter – instant start circuit of fluorescent tube.

UNIT – IV

Underground cables:

Cable insulation – underground cables – general information – types of three phase cable – extra high tension cable – cable laying & grading – measurement of insulation resistance of cable – cable jointing – multicore cable jointing.

UNIT- V:

Electrical earthing & shock:

Neutral wire – necessity of grounding – neutral VS earth wire - electric shock – cure of shock – artificial respiration. Measurement of earth resistance: 2 point method – 3 point method – fall of potential method – direct measurement of earth resistance – insulation resistance of complete installation to earth – Testing: insulation resistance between conductors –polarity of single pole switches –earth continuity path.

Text Book:

1. Electrical wiring, estimating and costing - S.L.Uppal – khanna publishers.

References

1. House wiring – Arora – R.B. publications.
2. Basic electrical electronics and computer engineering – R.Muthusubramanian, S.Salivahanan &K.A.Muralidharan.

Core Course V - OPERATIONAL AMPLIFIERS AND LINEAR INTEGRATED CIRCUITS (instruction hours 4) **CODE: 15EL305**

(For the candidates admitted to the course from June 2015 onwards)

UNIT I

Introduction of Op-amp - Pin configuration and details of IC 741 - Block diagram - Equivalent circuit- Symbol-Ideal Op-amp and Characteristics – Ideal Voltage Transfer curve-Open loop configurations (inverting, Non-inverting, differential Configuration)

Differential amplifier:- Introduction-Dual input balanced output (DC, AC Analysis) – single input balanced output (DC, AC Analysis) - Differential amplifier with swamping resistors - Constant current bias - Current Mirror - Level Translators.

UNIT II

Op-amp with negative feedback:-Introduction-Feedback Configuration- Voltage Series: Voltage gain, Input resistance, Output resistance and Bandwidth with feedback –Voltage Follower.

Practical Op-Amp parameters:- Input offset Voltage - Input bias current - Input offset current - Total output offset voltage - Thermal drift - Error voltage - Noise - CMRR- slew rate.

UNIT III

DC and AC amplifiers - The peaking amplifier – summing, scaling and averaging amplifiers (inverting, Non-inverting, differential Configuration) – Instrumentation Amplifier-Voltage to Current converter (floating load, grounded load) - Low Voltage DC Voltmeter - Low voltage AC Voltmeter-diode match finder-zener diode tester-LED tester-Current to voltage converter - Resistance to voltage conversion-capacitance to voltage conversion.

UNIT IV

Integrator - Differentiator - Active filters-First order low pass, high pass, band pass and band reject filters (Butterworth) - Oscillators - Phase shift oscillator –Wien Bridge Oscillator-Square wave generator - Triangular wave Generator - Saw-tooth generator -Voltage Controlled Oscillator.

Comparator - Schmitt trigger - Voltage limiter - D/A converter (Binary weighted, Ladder)-A/D converter (Simultaneous method, Counter method, Continuous method, Dual Slope, Successive Approximation) - Clipper and Clampers - Peak detector –Sample and Hold Circuit

UNIT V

IC555 Timer:- introduction - Operating modes - Terminals of 555(~~Seven~~ Eight terminals) - Free running operation (Astable) – Applications-Tone Burst Oscillator -Frequency Shifter- One shot operation (Monostable) - Applications- Water level fill control – Touch Switch-frequency divider – missing pulse detector-Phase Locked Loops -Applications:- (Frequency Multiplier, FSK)-Voltage regulators:- Fixed type-Adjustable-

Text Book:

1. OP-amps and Linear IC's - Ramakant A. Gayakwad – Prentice Hall of India Pvt.Ltd, 3th Edition Rs. 195
2. Digital Principles and Applications by Albert Paul. Malvino Donald. P. Leach fourth edition,Tata MG-Graw Hill Publication 1991 Rs.195
3. OP-amps and Linear IC's -Robert F. Coughlin Frederick F. Driscoll – Prentice Hall of India Pvt Ltd., Eastern economy Edition -6th edition Rs. 225

Reference Book:

1. Linear Integrated Circuits (2nd edition) – D.Roy Choudry, Shail B.Jain - New age International publishers.

Unit I- Book 1 (P. No. 64-66,70-73,109 -113,2-12,16-19,24-25,28-34,42-44) & Book 3 (4)
Unit II-Book 1 (P. No. 118-130, 157-185,197-202,225-230)
Unit III-Book 1 (P. No. 237-241, 244-261,264-273, manual of op-amp)
Unit IV-Book 1 (P. No. 275-283,290-296,301-303,308-315,318-323,326-336,343-345,347-349,351-354,370-375,379-387,389-392) & Book 2 (442-460)
Unit V-Book 3 (362-384) & Book 1(P. No. 430-446,455-464)

Core Course VI – PRACTICAL – III **CODE:15ELP306**

(For the candidates admitted to the course from June 2015 onwards)

CHOOSE ANY TWELVE EXPERIMENTS **Instruction hours 3**

1. Construction of Power Supply using Bridge Rectifier
2. Construction of Zener Regulated Power Supply.
3. Construction of TTL Regulated Power Supply.
4. Construction of Adjustable Regulated Power Supply Using LM 317.
5. Op-amp basic operations (Inverting, Non-inverting, Buffer & Scale Changer, ~~Adder-Subtractor~~)
6. Construction of Emitter Follower - Frequency Response.
7. Characteristics of Photo Diode.
8. ~~Construction of~~ Hartley Oscillator.
9. Characteristics of UJT.
10. Astable Multivibrator using transistors
11. Monostable Multivibrator using Transistors
12. UJT Relaxation Oscillator.
13. Tuned collector Oscillator.
14. Op-amp Astable Multivibrator.
15. Colpitt's oscillator -determination of L.
16. Astable Multivibrator using 555 timer.
17. Monostable Multivibrator using 555 timer.
18. Schmitt triggers using 555 timer

SBC III–ELECTRONIC TESTING, FAULT DIAGNOSIS AND SOLAR PHOTOVOLTAICS CODE NO: 15SEL303 (instruction hours 2)

(For the candidates admitted to the course from June 2015)

UNIT I:

Electronic Components:

Introduction- Resistors –Types-Fixed Resistors:- carbon composition-carbon film-Variable Resistors:– Potentiometer-Rheostat-Trimmer-Tolerance-Color coding of resistors-Capacitors and Types- Fixed Capacitors- Electrolytic Capacitors- Ceramic Capacitors-Disc capacitors- Variable Capacitors

UNIT II:

Testing circuits of Electronic Components:

Testing circuits for resistors, capacitors, inductors and active components viz., Diode, Transistors, SCR, Op-Amp, and Timer 555.

UNIT III:

Fault Finding on Digital Logic Circuits:

Fault finding tools - logic probe - logic pulser – CRO - Locating short circuits using current sensing probe and micro voltmeter techniques

UNIT IV:

Solar Cell Fundamentals:

Introduction -World energy requirement- Need for sustainable energy sources-Sustainable sun's energy-Current status of renewable energy sources-Place of Photovoltaics in energy supply-World production of solar PV modules and cost

UNIT V:

Solar Photovoltaic Applications

Solar radiation- The sun and the earth-The sun earth movement- Angle of sunrays on solar collector-Sun tracking-Estimating solar radiation empirically-Measurement of solar radiation

Text Book:

1. Basic Electrical and Electronics Engineering- R.Muthusubramanian, S.Salivahanan. Tata Mc graw hill Publications II Edition
2. Electronic testing & fault diagnosis – George C.Love day, Wheeler Pub.
3. Solar Photovoltaics- Fundamentals, Technologies and Applications Second Edition Chetan Singh Solanki PHI Publisher Rs.495.

Reference Book:

1.OP-amps and Linear IC's -Robert F. Coughlin Frederick F. Driscoll – Prentice Hall of India Pvt Ltd., Eastern economy Edition -6th edition Rs. 225

Unit I- Book 1 (P. No 273-275,277-284,286,287,292,293)
Unit II, III –Book 2 (P. No 58-65),(88-91,175)
Unit IV, V-Book 3 (P. No 3-21,293-321)

Core Course VII - DIGITAL ELECTRONICS CODE:15EL407
(instruction hours 4)
(For the candidates admitted to the course from June 2015 onwards)

UNIT I

Number system & Codes

Number system:- Binary to Decimal- Decimal to Binary-Octal to Decimal - Decimal to Octal-Octal to Binary-Binary to Octal-Hexa-decimal to binary- Decimal to Hexa Decimal Conversions

Weighted Code:- BCD addition and Subtraction Non-weighted code:- Excess-3 Code-Gray Code- Binary to gray code converter - Error detecting codes- Error Correcting code- Alphanumeric code

UNIT II

Unsigned Numbers:-Binary arithmetic (addition and subtraction) - Signed Numbers:- One's and two's Complements representation- Arithmetic Operation Addition and Subtraction (Four Cases)

Logic Gates:

AND, OR, NOT, EX-OR, EX-NOR, gates operations and truth tables - Universal Building blocks - logic families: RTL-DTL-TTL - ECL - CMOS gates.

UNIT III

Boolean algebra – laws (Complement, Commutative, Associative, Distributive) –Reduction Of Boolean Algebra and logic diagram- De-Morgan's theorem - Standard SOP forms:- Karnaugh map - Two, Three, and four variable simplifications. Pair, Quad, Octet, Overlapping, Rolling and Don't care conditions-Standard POS forms and Simplifications

UNIT IV

Combinational Logic System:

Parity checker – Half adder - Full adder - Half subtractor - Full Subtractor - Encoder (IC 74147) - Decoder (1 x 16 and IC 7445)- Seven-segment decoder - Digital Comparator - Multiplexer (16 x 1 and IC 74150) – Demultiplexer(1 x 16 and IC 74154) .

Sequential Logic System:

Flip-flop - R-S Flip flop - clocked R-S flip flop – D Flip Flop- Edge triggered D, J-K flip flop - JK Master Slave flip flop-Schmit trigger

UNIT V

Shift register:– Types:-SISO – SIPO –PISO-PIPO-Operations.

Counters:– Synchronous counter – 4 bit Up counter-4 bit down counter-Design of 3 bit Up-Down counter using J-K flip flop- Ring counter-Johnson counter
Asynchronous counter-two bit up/down counter positive and negative edge triggered flip-flops- IC 7490 decade counter.

Text Book:

1.Digital principles and applications – Albert Paul Malvino and Donald P-Leach - 4th Editions – TMH Rs.195
2. Fundamentals of Digital circuits by A.Anand kumar PHI Publications EEE edition Rs.295
3.Digital Electronics - An introduction to theory and practice EEE 2nd edition - 1998 W.H.Gothmann - prentice hall of India New Delhi 110 001 Rs.110.

Reference Book:

1. Modern Digital Electronics - R.P.Jain - TMH Edition
Unit I- Book 1 (123-138) & Book 3 (52-65)
Unit II- Book 1(156-175) & Book 2 (89-100) & Book 3(117-123)
Unit III-Book 2 (P.No 121-126,135-140) & Book 1(P.No 48-70)
Unit IV-Book 2 (P:No 233-240) & Book 1(P. No 78-80, 85-99,102-104,256-273)
Unit V-Book 2 (P. No 372-381,391-394,407-420,438-441)

Core Course VIII – PRACTICAL – IV CODE:15ELP408
(For the candidates admitted to the course from June 2015 onwards)

CHOOSE ANY TWELVE EXPERIMENTS (instruction hours 3)

1. Study of Logic gates using TTL ICs (AND,OR,NOT,NAND,NOR,EX-OR).
2. Verification of DeMorgan's Theorem ($\overline{A+B} = \overline{A}.\overline{B}$), ($\overline{A.B} = \overline{A}+\overline{B}$)
3. Verification of Boolean Expressions.
4. Universal building blocks – NAND and NOR.
5. Half Adder and Full Adder (Using ICs).
6. Half Subtractor and Full Subtractor (Using ICs).
7. Waveform generation using IC 7400(Astable Multivibrator and Schmitt trigger).
8. Counter Design using IC 7490 (Mod-2, 3, 4, 5, 6, 8, 9,10).
9. Shift Register (Serial In Serial Out (SISO), Serial In Parallel Out (SIPO)).
10. Encoder using Diodes.
11. Decoder using Diodes.
12. Multiplexer using basic gates (4 x 1).
13. Demultiplexer using basic gates (1 x 4).
14. Construction of Flip-flops using gates (R-S, J-K, D, T).
15. Ring counters using Flip-flops.
16. D/A converter- Binary weighted method-using op-amp.
17. D/A converter- Ladder method using op-amp.
18. Op-amp Arithmetic operations (Adder, Subtractor, Comparator & Adder-Subtractor)

EDC-I: BASIC ELECTRONICS **CODE:15NMEL401**

(For the candidates admitted to the course from June 2015)

(instruction hours 2)

UNIT-I:

Resistors: Fixed Resistors: Carbon composition-Carbon film- Variable Resistors: Potentiometer-Carbon potentiometer-Wire wound potentiometer-Rheostat-Trimmer-Tolerance-Colour Coding of Resistors-Capacitors: Fixed capacitors: Electrolytic Capacitors-Polarised-Nonpolarised-Ceramic Capacitors-Disc Capacitors-Variable Capacitors.

UNIT-II:

PN junction diode : Forward bias-Reverse bias-Zener Diode–BJT: Construction-Transistor biasing-Operation of NPN & PNP transistor- SCR-TRIAC-DIAC-UJT-Rectifier: Half wave– Full wave- Bridge.–SMPS.

UNIT-III:

Opto Electronic Device: Photo conductive cell- Photo Voltaic Cell- solar cells-Photo Tube-Photo Multiplier- Photo diode-Photo Transistor-Display Device: Light Emitting Diode-Liquid Crystal Device–~~SMPS.~~ (LCD)

UNIT-IV: (LED)

Introduction to Logic gates: AND-OR-NOT-Universal gates: NAND-NOR(truth table, logic operations) – Flip flops: JK-RS-D flip flop-T flip flop

UNIT-V: (SISO)

Shift registers: Serial –in Serial-out –Counter: Synchronous counters –Decade counter– Introduction to 8085 microprocessor –Block diagram of 8085 microprocessor-Multiplexer-De-Multiplexer-Encoder-Decoder

Text Book:

1.Basic Electrical Electronics and Computer Engineering – R. Muthesubramanian, S. Salivahanan & K.A. Muraleedharan Published by TATA Mc Graw Hill Second Edition 2010 Rs.273

2. Basic Electrical Electronics and Computer Engineering – R. Muthesubramanian S. Salivahanan Published by Mc Graw Hill Edition 2010 Rs.245

Reference:

1. Digital Principles & applications-Fourth Edition-Albert Paul Malvino

Unit I : Book 1 (P:No: 273-275,277-287,292-293)
Unit II : Book 1 (P:No: 320-329,343-349,368-370)
Unit III: Book 1 (P:No: 350-360,375,376)
Unit IV: Book 1 (P:No: 407-414)
Unit V : Book 1 (P:No: 415,416,420,421,504-507)
Book 2 (P:No:523-526)

Core Course IX– MICROPROCESSOR AND ITS APPLICATION CODE:15EL509
(For the candidates admitted to the course from June 2015)
(instruction hours 4)

UNIT I

8085 Microprocessor Architecture and Memory Interfacing:

Introduction to microprocessor -8085 microprocessor architecture - Pin out diagram - Timing diagram for op-code fetch, Memory read, Memory write, I/O read, I/O write operations.

8085 Instruction Set:

Instruction classification - Instruction format - Addressing modes, Data transfer operation - Arithmetic and logical operations - branching operations - stack - Subroutines.

UNIT II

8085 Programs:

8 bit addition - 8 bit subtraction - 8 bit Multiplication -8 bit division -16 bit addition - 16 bit subtraction - Sum of serial data bytes available in memory locations -Picking of largest number from a set of Numbers -Picking of smallest number from a set of Numbers - Arranging numbers in ascending order - Arranging Numbers in descending order.

UNIT III

Interrupts:

8085 - Interrupt – RST instruction-vectored and pending Interrupts

Serial I/O Data Communication:

Basic concepts in serial I/O (Seven categories) -software controlled Asynchronous serial I/O

Interfacing with simple I/O:-

LED interfacing-switches-Memory mapped I/O-I/O mapped I/O

UNIT IV

Microprocessor interfacing with programs:

Microprocessor based traffic light control- interfacing of stepper motor-Measurement and Display of speed of a motor- Water Level Indication, Temperature and measurement control.

UNIT V

Peripheral Devices and their Interfacing:

Programmable peripheral interface 8255 (Architecture, pin configuration, Modes:- BSR, 0, 1, 2) - programmable keyboard/display interface 8279(Architecture, pin configuration)- Programmable interval timer/counter 8253(Architecture, pin configuration, Six modes).

Text Book:

1. Microprocessor architecture programming applications with the 8085 third Edition by Ramesh S Gaonkar Penram Publications Rs.350
2. Microprocessors and Microcomputers by B.RAM, Danpat Rai & Sons (Rs 255)

Reference Book:

1. Introduction to Microprocessor by Adithya Mathur Tata McGraw Hill

Unit I- Book 2(P. No 3.1-3.8,3.12-3.15, 4.1-4.14) & Book 1(P.No 296-298,305)
Unit II- Book 2(P. No 6.3-6.6,6.22-6.34, 6.35,6.42-6.44,6.37), 8085 Manual.
Unit III- Book 1(P. No 385-390,524-537,150,151,155-159)
Unit IV- Book 2(P. No 9.45-9.49, 9.55-9.65)
Unit V- Book 1(P. No 450-452,460-479,494-503)

Core Course X – MODERN COMMUNICATION ELECTRONICS CODE:15EL510

(For the candidates admitted to the course from June 2015)
(instruction hours 5)

UNIT I

Frequency modulation:-Description of FM systems - Mathematical representation of FM-phase modulation-**FM receiver:** Block diagram of FM receiver - RF amp - Mixer - IF amp - Amplitude limiter - FM Demodulation by Balanced slope detector-Noise:-Atmospheric noise - Extraterrestrial Noise - Industrial noise - Thermal Agitation noise–Noise Figure: SNR and definition of Noise figure.

UNIT II:

Antennas: Basic considerations: Electromagnetic radiation mechanism - Elementary doublet - Current and voltage distributions – Resonant antenna, radiation pattern and length calculation– Non-resonant antenna - Terms and definitions. Types:-Directional high frequency antennas: Dipole arrays-Folded dipole- Yagi - Uda antenna-Rhombic antenna (Non resonant antennas) –UHF and microwave antennas: Properties of Parabolic reflectors - Horn antennas-Lens antenna- Helical antenna.

UNIT III:

Wave-guides: Rectangular wave guides-Introduction-reflection of waves from a conducting plane-parallel plane wave guide- mode of propagation-circular wave guides- other types of wave guides- multiple junction- T junction- Hybrid junction - Cavity resonator: fundamentals-Microwave **Oscillators and Amplifiers:**-Two cavity Klystron amplifier and its operation - Reflex klystron and its operation- Magnetron: Description- operation- Traveling-wave tube- Description- operation

UNIT IV:

Satellite Communication: Introduction - Kepler's laws - orbits - Geo-stationary orbits - Power systems - Attitude control - satellite station keeping - Antenna look angles - Limits of visibility - frequency plans and polarization - Transponders - Multiple access methods-Application:-Satellite Television-Direct broadcast satellite-Cable TV-Direct home reception-Telephone Service via satellite-Data communication services-Data broadcasting using satellite-Interactive data communication

UNIT V:

Radar Systems:-Fundamentals - Radar range equations - Basic pulsed Radar system –Block diagram and description–Antennas scanning and tracking- Display methods - Pulsed radar systems: Search Radar systems - Tracking Radar systems - Moving target indication: Doppler Effect - Block diagram of MTI - Delay lines - Blind speeds.

Text Book:

1. Electronics communication systems - Kennedy and Davis - Tata Mc- Graw hill Rs.394.
2. Satellite communications-Dr. D. C. Agarwal revised by A.K.Maini Khanna publishers, Fifth Edition (Rs. 150)
3. Electronic Communication - Dennis Roody and John Coolen, PHI Pvt. Ltd Fourth edition Rs. 525

Reference:

1. Electronic communications modulations and transmission – Robert J. Sohoen beck –II Edition PHI Pvt Ltd Rs.350

Unit I- Book 1 (P. No 15-18,25,26,80-84,89-92, 158-165)
Unit II-Book 1 (P. No 255-266,275-295,297,298)
Unit III-Book 1 (P. No 311-323,331-335,343-347,353-355,381-384,387-389,390-396,400-403)
Unit IV-Book 3 (P. No 711-734,742,743)
Book 2 (P. No 328-335)
Unit V-Book 1 (P. No 601-604,606,607,612,613,617-631)

Core Course XI – ELECTRONIC INSTRUMENTATION AND PROGRAMMABLE LOGIC CONTROLLERS CODE:15EL511

(For the candidates admitted to the course from June 2015 onwards)
(instruction hours 5)

UNIT I

Measuring Instruments: Permanent magnet moving coil Galvanometer– DC voltmeter – multi range voltmeter – Extending voltmeter ranges-AC voltmeter using Rectifiers –Average responding voltmeter - True RMS voltmeter -Ammeter shunts – Multi range ammeters, universal shunt, extending the range of ammeters – Digital Tachometer- Q meter.

UNIT II

Electrodynamometer wattmeter-Construction-theory-shape of scale of Electrodynamometer-Digital Voltmeter – ramp and integrating types-Multimeter.
Cathode Ray Oscilloscope:- Block diagram of CRT-CRO probes-Dual beam CRO-dual trace - CRO digital storage oscilloscope- Display Devices:- LCD-LED-Sensors:- Bio-Sensors-uses-nanosensor-Electrochemical sensors

UNIT III

Transducers: Electric transducers- Classification of transducers (on the basis of transduction used, primary and secondary, passive and active, analog and digital, transducers and inverse transducers)– factors influencing the choice of transducers- Unbounded strain guage - Resistive transducers-Resistance Thermometer-Capacitive transducers–LVDT- Piezo electric transducer-Potentiometeric transducer - Hall Effect Transducers.

UNIT IV PLC FUNDAMENTALS:

Introduction- PLC configuration: -processor & mounting rack- I/P and O/P modules- power supply - programming unit- system block diagram - Basic components and their symbols: control transformers-fuses-switches- indicator lamps- Relays
Fundamentals of ladder diagram: Basic diagram frame work-wiring-Boolean logic and Relay logic: AND- OR- AND OR and OR AND

UNIT V INSTRUCTION SET OF PLC:

Bit or Relay: Normally open- normally close- one shot-output latch- negated output- output-Timer **instructions**: ON Delay Timer- OFF Delay Timer- Retentive Timer- Reset Timer- counter Instruction: count up- count down- high speed counter- counter reset- clear- Comparison: Equal –Not equal – Less than –Less than or equal to- Greater than –Greater than equal to.

Text Book:

1. A Course in Electronics measurements and Instrumentation - A.K.Sawhney ,16th Edition– Dhanpat Rai co Publications, New Delhi. Rs 400.
2. Electronic Instrumentation – H.S. Kalsi – II Edition – Tata Mac Graw Publication. Rs 240.
3. Modern Electronic Instrumentation and Measurement Techniques - A.D.Helfric & W.D. Cooper , EEE Edition- PHI Rs 175.
4. Programmable Logic Controllers III Edition Garry Dunning – Cengage Learning Publication Rs 450.
5. Programmable Logic Controllers : Programming methods and applications –John R.Hackworth and Fedrick D. Hackworth Jr (E.Book).

Reference Book:

1. Transducers and instrumentation – D.V.S. Murty- PHI Edition.

Unit I- Book 3: (P.No 51-56,165,166) & Book 2: (P.No 62-68,75-79,92,93,96-99,152)
Unit II-Book 1(P.No 431-433,785,786,815,816,825-830) & Book 2(P.No 107-110,114-120)
Unit III-Book 1(P.No 935-942,949-953,966,967,975-97,1001-1004,1014,1028-1030,1040, 1041)
Unit IV-Book 5: (P.No 2.1 , 2.3-2.11,1.1-1.11, 1.12-1.20,)
Unit V-Book 4: (P.No 427-439,496-501,507-511,520-524)

Core Course XII – PRACTICAL V **CODE: 15ELP512**
(For the candidates admitted to the course from June 2015)

CHOOSE EIGHTEEN EXPERIMENTS **(instruction hours 3)**

PART- A (NINE)

1. Construction of Differentiator and Integrator using passive components
2. Measurement of Op-amp parameters (Open loop and close loop gain, Input and output impedance, CMRR).
3. Op-amp Monostable Multivibrator.
4. Op-amp Schmitt trigger.
5. Op-amp Window Comparator.
6. Op-amp Integrator & Differentiator.
7. Op-amp Clipper & Clamper.
8. Op-amp Phase shift Oscillator.
9. Op-amp Wein bridge Oscillator.
10. Characteristics of Photo Transistor.
11. Mathematical Operations Using Op-amp (Inverter, Multiplier, Divider, Averager, Voltage follower)
12. Clipper & Clamper using passive components

8085 µP Programming:

PART B (NINE)

1. 8 bit arithmetic operations. (Add, sub, mul, div).
2. 16 bit addition & subtraction and Stack operations (Addition, Subtraction).
3. Length of ASCII string
4. largest & smallest number.
5. 1's & 2's complement (8 bit, 16 bit) and Pattern comparison.
6. Sum of elements 8 and 16 bit.
7. Ascending and Descending order.
8. Block Transfer.
9. Assemble & Disassemble of a word.
10. Shift a 16 bit number by one, two bits and Mask of LSB and MSB bits.
11. Square of number
12. Multi byte addition, subtraction

Elective course I - MICROCONTROLLER AND ITS APPLICATION CODE: 15ELE501
(For the candidates admitted to the course from June 2015)
(instruction hours 3)

UNIT I

Microcontroller Architecture: 8051 hardware-Block diagram-oscillator and clock-PC and DPTR-A&B CPU registers-flags and PSW-internal memory-internal RAM-stack and stack pointer-Special function registers-internal ROM- Input/ output pins, ports and circuits – port 0, port 1, port 2, port 3- External memory – Connecting external memory.

UNIT II

Counter and timer: Timer counter interrupts- timer modes of operation–mode 0, 1, 2 & 3-(TMOD, TCON register)- Counting- serial data input and output- modes of operation – (SCON, PCON register) Interrupts- operation- IP,IE register

Program: 1. Find values of TMOD to operate as Timer in all modes.
2. Write a C program to sending letter 'A' to the serial port.

UNIT III

Instruction set: Addressing modes (four types) – external data moves – code memory read only data moves – push and pop op - codes – data exchanges.
Logical operation: Byte level – Bit level (PSW, IE, IP, TCON, SCON, Internal RAM Bit, SFR Bit) – Rotate and swap operations.

UNIT IV:

Arithmetic operation: Flags – Incrementing and decrementing – addition – subtraction – multiplication and division- Decimal Arithmetic-Jump and call instructions: Jump and call program range – Relative range-Short absolute-Absolute range-Jumps-Conditional - Unconditional – call and subroutines.

UNIT V:

Simple programs: 8 bit addition and subtraction – 16 bit addition and subtraction – 8 bit multiplication – 8 bit division – picking up of maximum number from a given array of data- picking up of minimum number from a given array of data.

Program:

1. Write a C Program for counter 1 in mode 2 to count up and display the state of TL1 count on P1.
2. Write a C Program to create a square wave of 50% duty cycle on bit 0 of port 1.

Textbook:

1. The 8051 Microcontroller architecture programming and applications II edition – Kenneth J.Ayala –Penram international publishing, Rs 350.
2. The 8051 Microcontroller and embedded systems II edition – Muhammed Ali Mazidi, Janish Gillispie Mazidi – Pearson education Publishing

Reference:

The 8051 Microcontroller architecture programming and applications- Raj kamal
Web sites: WWW.Atmel.com , WWW.Microchip.com

Unit I- Book 1 (P.No 60-80)
Unit II-Book 1(P.No 81-96) & Book 2 (Example 9.1,10.15)
Unit III-Book 1(P.No 133-144,152-161)
Unit IV-Book 1(P.No 170-183,190-213)
Unit V-Book 2(Example 4.2, 9.26), 8051 Manual reference for all programs.

ELECTIVE COURSE II: NANOTECHNOLOGY CODE:15ELE502

(For the candidates admitted to the course from June 2015)

(instruction hours 3)

UNIT- I:

Nanomaterials-Fullerences-Nanotubes-quantum dots-dendrimers-Nanoshells-Concept of nanotechnology:-Scale of things-Nanomaterials-Nanotubes and buckyball-Uses of carbon Nanotubes-buckyball.

UNIT – II:

Carbon nanotube – introduction – types – applications – structural materials used in day today life – electromagnetic field – chemical – mechanical – electrical –drug delivery vessel – current application.

UNIT – III:

Nano physics –quantum dot –application –quantum wire –quantum well –application – quantum point contact –application –Nano crystals – Nano crystal solar cell.

UNIT- IV:

Impact of Nanotechnology in our lives:

Nanocomposite-Nano crystals-Nanoparticle-Nano structured materials-Nano clays and Nanocomposite-Nanocomposite coating-Nanotubes-Nanofilters

UNIT- V:

Medical applications of Nanotechnology:

Biocompatibility-Creation of probes-Nano surgical techniques-Organ replacement-tissue repair-Disease & cures-telemere loss-Chemical accumulation-DNA damage-cancer Brain damage-Hormone deficiency –infections-Accidents

Textbook:

1. Nanotechnology by S.Shanmugam mjp Publishers, 2010 Rs. 320
2. Nanotechnology (A fundamental approach) –U.Kumar Published by Agrobios (India) 2008 Rs. 695

Reference:

1. Nano technology by Er.Rakesh Rathi
2. Nano technology by Richard booker, Earl boysen – Wiley dream tech publishers

Unit I- Book 2(P.No: 22-24,32-42)
Unit II-Book 1(P.No:40-44,49-64)
Unit III-Book 1(P.No: 65,69-77)
Unit IV-Book 2(P.No: 153-163)
Unit V-Book 2 (P.No: 179-184,186-189,190-193)

EDC – II: COMPUTER ELECTRONICS CODE:15NMEL502

(For the candidates admitted to the course from June 2015)
(instruction hours 2)

UNIT I:

Introduction to Computer – Hardware & Software – Block diagram (input, process, output) – Motherboard components:-Bus – CPU – Co-processor – CMOS memory – Real time clock – BIOS-support chips/chipsets.

UNIT II:

Memory: Primary memory – secondary memory – bits and bytes – RAM – DRAM – SRAM – ROM – PROM – EPROM – EEPROM – Flash memory-memory speed – mother board memory capacity – Extended memory- memory speed improvements-Cache memory-internal Cache memory-External Cache memory.

UNIT III:

keyboard: switch- organization-type(3 types)–Mouse: mechanical, opto-mechanical, optical mouse– scanners – digital camera – touch pad – voice input.

UNIT IV:

Printers – image formation method – printing mechanism– Monitor: Monitor Works-Shadow Mask-LCD Monitor

UNIT V:

DVD Drive: Data Storage Capacity-Multi layer Storage-Recordable DVD-Pen Drive: Flash memory-Advantage and Disadvantage-Features-Computer virus and its types

Text Book:

1. Modern Computer Hardware Course – Manahar Lotia, Pradeep Nair, Payal Lotia – BPB Publications – First Indian Edition 2006(Rs 297/).

Unit I: Book 1 (P:No: 1-3,31,32,35)
Unit II: Book 1 (P:No: 61-65,72-75)
Unit III: Book 1 (P:No: 127-134,146-150,164,169-172)
Unit IV: Book 1 (P:No: 269-271,499-501,506,507,509,510)
Unit V: Book 1 (P:No: 515-518,591-594,483-487)

CC-XIII -LSC I : DOMESTIC HOME APPLIANCES Code No:15EL613

(instruction hours 5)

UNIT – I:-

Modern Electrical Appliances: Working of Water Motors – Micro Wave Oven – Remote Control – Room heater – Immersion Heater – Electric Hot Plate – Fluorescent lamp – Ups – Inverter.

UNIT – II:-

Air Conditioning systems: Introduction – Air Conditioning cycle – Air Conditioning systems – Ice system for Air Conditioning – selection of system – Air condition for theaters – Air conditioning Equipment. Air Conditioning components – Air condition and controls – Air distribution – Air handling system – Room Air distribution – Duct system – Air distribution system – Duct design methods – Leakage of Air – Maintenance of duets.

UNIT – III:-

Refrigeration Components : Compressors – Condensers – Evaporators – Refrigeration controls : Hand Expansion value Automatic expansion valve – thermo static expansion valve – Capillary tube – low side and high side float – solenoid valves – Safety devices – Desert cooler – domestic refrigerator – Electrical circuit – Maintenance – Water coolers – cold storage – Dry ice.

UNIT – IV:-

Television Receivers and Video detectors:

Television Receivers: Types of Television Receivers – Receivers section – Antenna section – RF section – IF amplifier section – Essential of function of IF section – Vestigial side band selection – choice of Intermediate Frequencies.

Video Detector: Video detector – Video Amplifier – Picture tube circuiting and controls – Sound signal separation – Sound section – AGC sync separation – Sync processing AFC circuits – Vertical deflection circuit – low voltage power supply – EHT supply – Video signal detection – basic video detector – IF Filter – DC component of video signal – Inter carrier sound – Video detector requirements.

UNIT – V:-

Colour signal transmission and Reception, Essential and Application:

Essential: Compatibility – Natural light – Colour perception – three colour theory – luminance – hue and saturation – colour Television camera – luminance signal.

Transmission and Reception: PAL colour Television – Cancellation of phase errors PALD colour system C Block diagram only) merits and demerits of PAL system.

Applications: CATV – CCTV – Theatre Television –Video tape recording-Video home entertainment center – Video text data terminal

S.P. Bali – consumer electronics

Text Book:

1. Basic Electrical Engineering M.L Anwani Dhanpat Rai & Co.,
2. Refrigeration and Air Conditioning R.K. Rajput
3. Monochrome and colour Television R.R. Gulati Whiley Easter Limited.
4. WWW.answers.com., WWW.Wikipedia.org

TV; Smart TV – Internet TV
SWN; CCTV, video door phone
Smart; Kindle, palmtop, gadgets
Smart phone, PDA
Lap-NP

Unit I- Book 1(679-682,687,689,Web reference)
Unit II and III- Book 2(522-524,530-531,755-756,573-581,603,607-609,380,434,743-753)
Unit IV-Book 3 (131-148,214-222)
Unit V-Book 3(540-555,601-617,621,184-190,192-200)

Core Course XIV – INDUSTRIAL AND POWER ELECTRONICS CODE:15EL614

(For the candidates admitted to the course from June 2015)
(instruction hours 5)

UNIT I

Thyristor:SCR -Construction - Operation - Transistor analogy - methods of Turning on- turn off Mechanism –series and parallel operation of SCRs- forced commutation classification-UJT – construction – characteristics - relaxation oscillator-TRIAC-triggering-phase control-DIAC.
Applications of Thyristor:static circuit breaker- over voltage production-zero voltage switch-integral cycle triggering- time delay circuit-Logic and digital circuits- Fan Regulator-current Limiting circuit breaker- SMPS - UPS- Battery charger.

UNIT II

Opto Electronic Devices: Photo detector - Photo multipliers - photo conductive devices - LDR - Photo diode - Avalanche photo diode- Phototransistors - Light activated SCR - Opto isolators-Robotics:- law and basic components-classification-configuration-motions-degrees of freedom-sensors and uses of sensors-implementation-industrial applications

UNIT III

Inverters:- Types of inverters-Single phase bridge inverters- series inverter-three phase bridge inverters-Voltage source inverter- single phase voltage, source inverter-single phase full bridge voltage source inverter-three phase bridge voltage source inverter (Case 1)-voltage and frequency control-pulse width modulator inverters(three types)-current source inverter- modes of operation

UNIT IV

DC to DC Converter (Chopper):- DC chopper-step down and step up chopper-classification-configuration-series and parallel capacitor turn off chopper-effects of source inductance-Cycloconverter-types-Single phase- Center tapped and bridge - three phase-single to three phase-three phase to three phase

UNIT V

Pspice using or CAD: Introduction – description of PSPICE - circuit descriptions: Element values - Nodes – circuit elements – sources – types of analysis – output variables –DC circuit analysis:– resistors – operating temperature – Dc output variables - types of output-Independent DC sources: DC voltage sources- DC current source Dependent source: Voltage –controlled voltage source- Voltage controlled current source, current – controlled current source- current controlled voltage source.

Text Book:

1. An introduction to Thyristor and their applications – M.Ramamoorthy – Affiliated East west Press. (Rs 125)
2. Text Book on Power Electronics - Harish C. Rai – Galgotia Publications. III Edition(Rs 225)
3. Introduction to P Spice using or CAD for circuits and Electronics III edition – Muhammad H. Rashid. Pearson education series (Rs 325)

Reference Book:

1. Power Electronics - P.C.Sen – TMH Publishers.
2. Power Electronics – M.H.Rashid – PHI.
3. Electronics in Industry – George M.Chute and Robert D.Chute – Mc Graw Hill Pub.

Unit I- Book 1(P.No 6-14,33-40,175-178,45-52,56-61,62,63) & Book 2 (P. No 511,512,516,517, 524,510,151-152)
Unit II-Book 2(P.No 524,525 ,548-553,560,644-654,658-662,669,670,)
Unit III-Book 2 (P.No 273-275,278-281,286-289,292-295,298-300)
Unit IV-Book 2: (P.No 341-353,378-391)
Unit V Book 3: (P.No 19, 20,34-40,57-59,61-63,66-69)

CC- XV – PCB DESIGN, FABRICATION, ASSEMBLY AND TESTING
CODE:15EL615
(For the candidates admitted to the course from June 2015)
(instruction hours 5)

UNIT I

Basics of PCB : Introduction-Advantages –Classification-Manufacturing-Reading Drawing and Diagrams- General PCB design Considerations- Component Placement rules-Layout Design- Layout Design Checklist-Documentation.

UNIT II

Design Rules: Analog circuit – Digital circuits- High frequency circuits- Microwave circuits- Power electronic circuits.

UNIT III

Art work : Basic approach-General Design Guidelines: Conductor orientation-conductor routing-Conductor spacing –Artwork Generation Guidelines-Film Master Preparation-Automated Art work Generation-CAD –CAM.

UNIT IV

Techniques of PCB: Image Transfer-Laminate Surface Preparation-Screen Printing-Pattern Transferring Techniques-Printing Inks-Printing Process- LDI

Plating Process & Etching Techniques: Need for Plating- Special Plating Techniques-Etching Arrangements –Equipment and Techniques- Problem in Etching

UNIT V

Multi Layer & Flexible PCB Boards: Multilayer – Interconnection Techniques-Materials-Fabrication Process for Multilayer board- Rigid Flex PCB –Terminations-Advantages-Special Application

Testing of PCB: Automatic Board Testing- Testing of Assembled Boards

Text Book:

1. Printed Circuit Boards Design, Fabrication, Assembly and Testing-R.S. Khandpur-Tata Mcgraw –Hill Publishers (Rs.350).

Unit I : Book 1 (P:No: 1-2,5-16,104-110,127-134,142-153)
Unit II : Book 1 (P:No: 155-164,169-171,174-185)
Unit III: Book 1 (P:No: 193-204,210-223,245-251)
Unit IV: Book 1 (P:No: 283-296,303-308,310-312,335-338,374-379,380-382)
Unit V : Book 1 (P:No: 414-418,421-424,448-451,570-572,579-581)

Core Course XVI – MAJOR PRACTICAL – VI
CODE:15ELP616
(For the candidates admitted to the course from June 2015)
CHOOSE ANY TWENTY EXPERIMENTS **(instruction hours 3)**

PART A (TEN)

1. Characteristics of Diac & Triac.
2. Ripple Counter using JK Flip Flops - Up Counter (Count 0-F).
3. Ring Counter
4. Ripple Counter using JK Flip Flops - Down Counter (Count F-0).
5. Decade Counter using JK Flip Flops (Count 0-9).
6. Construction of logic probe and logic pulser
7. Characteristics of LDR.
8. Characteristics of Thermistor.
9. Shift registers using JK Flip Flops (PIPO, PISO)
10. Characteristics of SCR
11. Verification of Booleans theorem (Associative, Commutative, Distributive laws)
12. Characteristics of Opto –Coupler MCT2E.

PART B (TEN)

8051 Microcontroller Programming:

1. 8 bit addition (four type of addressing modes)
2. 8 bit subtraction (four type of addressing modes)
3. 8 bit Multiplication
4. 8 bit Division
5. 16 bit addition, 16 bit subtraction
6. Block transfer
7. Assemble of a word
8. Code Conversions: Decimal to Hexa, Hexa to decimal, ASCII to decimal
9. Sum of elements
10. Solving Expression ((P x Q) + (R x S))
11. Disassemble of a word
12. 1's and 2's complement 8 bit 16 bit

EC III – VLSI ,VHDL TOOLS AND EMBEDDED SYSTEMS CODE: 15ELE603

(For the candidates admitted to the course from June 2015)
(instruction hours 5)

UNIT I:

An overview of VLSI: Introduction –Complexity and design-Design flow-VLSI chip types-Basic Concepts-Introduction to MOSFET: Structure of MOSFET-Enhancement mode MOSFET-Depletion mode MOSFET-Basic structure of CMOS.

UNIT II:

VLSI Fabrication Process: Crystal growth and wafer preparation-Epitaxy-Oxidation-Diffusion: Constant source diffusion-limited source(Gaussian diffusion)-Parameters-affect diffusion-Dopants and their characteristics-Diffusion systems-Diffusion furnace-ion implantation-lithography-dielectric and polysilicon film deposition-etching-metallization-Fabrication of typical IC components: Monolithic resistors-Monolithic capacitors- diodes- transistors.

UNIT III:

VHDL Tools: Introduction-Hardware abstraction-Basic terminology-entity declaration-Architecture body-Structural style of modeling-Data flow style of modeling-Behavioral style of modeling-Mixed style of modeling.

UNIT IV:

Embedded systems:

Survey of Software Architecture: Introduction - A first look at Embedded Systems - Examples of Embedded Systems – Typical Hardware - Round Robin – Round Robin with Interrupts – Function Queue - scheduling Architecture – Real Time Operating System - Introduction to RTOS - Tasks and Task states – Task and data – shared data problem - Semaphores and shared data – ways to protect data.

UNIT V:

Embedded Software Development Tools: Cross Compiler – Assemblers – Linker/Locators for embedded software – Output File Formats -Locator Maps - Getting Embedded Software in to the target system – ROM -Emulator – In circuit Emulators –Debugging Techniques-using Laboratory tools – Logic Analyzer.

Text Book:

1. Introduction to VLSI circuits and systems-John P.Uyemura 2001edition Rs.502
2. Principle of VLSI-Dr.Dilip K.Roy Ist edition 2005 Galgotia publication Pvt Ltd Rs.149/-
3. A VHDL primer IIIrd edition PHI publication –J.Bhaskar Rs.275
4. An Embedded software primer by David E.Simon publisher Pearson Rs.350

Reference:

Introduction to VLSI design - Convey C. Mead
Unit I : Book 1 (P:No: 1-10)
Book 2 (P:No: 1-6,12-14)
Unit II : Book 2 (P:No: 119-144)
Unit III: Book 3 (P:No: 1,6-7,9-22)
Unit IV: Book 4 (P:No:1-10,115-132,137-168)
Unit V : Book 4 (P:No: 262-280, 283, 307-319)

A. V. C. COLLEGE (AUTONOMOUS), Mayiladuthurai

SCHEME OF EXAMINATIONS: M.Sc., ELECTRONICS SCIENCE

(For the Students admitted from 2014 onwards)

Sem.	Courses	Code	Ins. Hour	Credits	Total Credits
I	CC- I Network analysis and Synthesis	15PEL101	6	5	22
	CC –II Microcontroller and Their Applications	15PEL102	6	5	
	CC – III Electronic Instrumentation and MEMS	15PEL103	6	5	
	CC- IV Practical – I Digital Experiments	11PELP104	8	3	
	Elective – I VLSI Design and VHDL Programming	15PELE101	4	4	
II	CC- V Digital Signal Processing	15PEL205	6	5	20
	CC – VI Communication Systems	15PEL206	6	5	
	CC- VII Solar Photovoltaics and control Systems	15PEL207	6	5	
	CC-VIII Practical II General & Power Electronic Experiments	11PELP208	8	3	
	EDC-I offered by other departments	15EDEL201	4	2	
III	CC- IX Optical Fiber Communication and Telecommunication	15PEL309	6	5	24
	CC- X Biomedical Instrumentation	15PEL310	5	5	
	CC XI Programmable Logic Controller	15PEL311	5	5	
	CC- XII Practical III-Advanced Digital, Linear and Solar Photovoltaics Experiments	15PELP312	6	3	
	EDC – II offered to other departments	15EDEL302	4	2	
	Elective – II Remote Sensing	15PELE302	4	4	
IV	CC – XIII Mobile Communications	15PEL413	6	5	24
	CC – XIV Embedded Systems and *PSPICE* using Or CAD	15PEL414	6	5	
	CC – XV Practical IV- Microprocessor, Microcontroller and Interfacing Experiments	15PEL415	6	4	
	Elective – III Nano Technology and Its Applications	15PELE403	6	4	
	Project Work	15PELPR4	6	6	
Total					90

Max. Marks for each course: CIA: 25 + ESE: 75 = 100

Practical: CIA: 40 + ESE: 60 = 100

Extra Disciplinary Courses offered by the Department of Electronics Science:

1. Computer Hardware And Networking
2. Advanced Electronics

CORECOURSE I - NETWORK ANALYSIS AND SYNTHESIS

CODE: 15PEL101

(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

Network equations: Kirchhoff's laws – loop current and node voltage methods – parameter matrices – source transformation – star and Delta transformation.

Network theorems: Thevenin and Norton's theorems – Reciprocity – superposition – maximum power – duality theorem – Compensation theorem

UNIT II:

Network functions: One port and two port – ladder and general networks – poles and zeros – Restrictions of pole and zero- locations for driving point functions – Time domain behaviour.

Network Topology: Definition of graph of network – Tree and cutsets – network variables – incidence matrix – Tie set schedule and cut set schedule.

UNIT III:

Network parameter: Characterization of two port network in terms of Z. Y, h, g and ABCD parameter and image parameter – Equivalent circuit using above parameter – relation between two port networks.

Analysis of Parameter: T network ladder network- π network-Lattice network-Bridged T and Parallel T –Concept of Attenuators - Types of attenuators T, π , Lattice and bridge attentuators

UNIT IV:

Introduction to synthesis: Hurwitz polynomials – positive real functions – frequency response of reactive one – ports – synthesis of reactive one – ports by Foster's method and Cauer method – synthesis of RL and RC network by the foster and Cauer forms.

UNIT V:

Types of filter – constant k and L-M derived and composite filter – Terminating half sections – frequency and image scaling.

Frequency transformation active filter – sensitivity – single amplifier filter – all pass and notch filter – Butter worth filter – Higher order filters.

Text Book:

1. Circuit theory - Umesh Singha, Satya Prakash, New Delhi.(V)
2. Circuits and network analysis and synthesis
   - A Sudhakar, S.P. Shyammohan – Tata MC Graw Hill. (I, II, III, IV)
3. Network analysis - Van Valkenburg M.E. Prentice – Hall of India, New Delhi, 1988.
4. Network analysis and synthesis - Umesh singha, Satya Prakash.

Reference:

1. Circuit Theory - Dr. Premkumar and Dr.K. Arumugam
2. Theory & problems of Electric circuits - J.A. Edministor, schaum's outline series MC Graw – Hill Book co. 1965.

Core Course II - MICROCONTROLLERS AND THEIR APPLICATIONS

(For the candidates admitted to the course from June 2015 onwards) **CODE:15PEL102**

UNIT I:

Intel Microcontroller Architecture:

Introduction – 8051 Microcontroller Hardware – Oscillator and Clock – Program Counter and Data Pointer – Registers – Flags and PSW - Internal memory and RAM – Stack and Stack Pointer - Special function registers – Internal ROM- I/O pins, ports and circuits – External memory– Counters and Timers -modes of operations – Serial Data I/O – modes of operations - Interrupts.

UNIT II:

Intel Microcontroller Programming, design and applications:

Introduction -Addressing modes– Immediate – Register – Direct – Indirect- Instructions set – External data moves – Code memory read-only data moves- Push and pop op-codes- Data exchanges- Logical operations – Byte and Bit -level logical operations –Bit level Boolean operations – Rotate and swap operations- Arithmetic operations- increment and decrement - Addition- subtraction- multiplication- Division- Decimal Arithmetic – Programs:- Eight bit Addition, Subtraction, Multiplication, Division, Sixteen bit Addition ,Subtraction,1's and 2's complement, Maximum and minimum number, Ascending order, Descending order

UNIT III:

PIC
ARM

Instructions set:

Jump and Call Instructions - Jump and Call Program range – Jumps -- Call and Subroutines – Microcontroller Design (Expanding I/O, Memory mapped I/O).

Applications: – LED interfacing- Switch interfacing-LCD Interfacing – ADC Interfacing:- Series ADC MAX 1112 only and Parallel ADC 0804 IC only– Stepper motor Interfacing – Keyboard Interfacing – DAC Interfacing (ALP & C programs for above interfacing)

UNIT IV:

PIC Microcontroller architecture:

PIC Microcontroller architecture (16C74A) – Harvard architecture and pipelining – Program memory – Register file structure and Addressing modes – CPU Registers – Instruction set (for 16Cxx) – Simple operations- Applications (Smart Door Bell, LCD Controller) Simple programs:- LED interfacing- Switch interfacing

UNIT V:

External Interrupts and I/O port Expansion:

External interrupt input – Timer – Compare mode – Capture mode – Sleep mode – Synchronous serial port module – Serial peripheral interface (SPI) – Output port expansion – Input port expansion – LCD display – Code conversion for input and display – Display of constant strings.

Text Books:

1. The 8051 Microcontroller Architecture, Programming and Applications II edition – Kenneth J. Ayala – Penram International Publishing (India) – (Unit I, II and III).
2. Design with PIC Microcontroller – I edition – John B. Peatman, Pearson Education Asia. (Unit IV and V).

References:

1. The 8051 Microcontroller and Embedded Systems Using Assembly and C By Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. Mckinlay (Unit III)

CORECOURSE III: ELECTRONIC INSTRUMENTATION AND MEMS CODE: 15PEL103

(For the candidates admitted to the course from June 2015 onwards)

UNIT-I:

Meters:

DC ammeter-RF ammeter (Thermocouple)-Limitations of Thermocouple-Effect of frequency on calibration-Measurement of large current by thermocouple-DC voltmeter-Transistor voltmeter-Micro voltmeter-Ac voltmeter using rectifiers-Consideration in choosing an analog voltmeter-Series type ohmmeter-Shunt type ohmmeter.

UNIT-II:

Basics of Virtual Instrumentation & Sensors & Transducers:

Introduction: Block diagram of virtual instrument-Physical quantities and analog interface- hardware and software- User interface-advantages – Transducer-Resistive transducer-Inductive transducer-LVDT Transducer- Pressure Transducer: Capacitive Transducer-Load cell-Temperature Transducer: Introduction-Resistance temperature detector-resistance thermometer-Thermistor-Thermocouple-Platinum Thin film sensors-Proximity sensor-Velocity & Acceleration Sensors.

UNIT-III: Digital Instruments:

Introduction- Digital Multimeter-Digital Frequency meter-Digital measurement of time-Universal counter-Electronic counter-Digital tachometer-Digital PH meter-Automation in Digital instruments-Digital capacitance meter-Microprocessor based instruments

UNIT-IV: Data Acquisition Systems and Recorders:

Instrumentation Systems – Types of Instrumentation systems – Components of Analog data acquisition system – Types of Multiplexing system-Components of Digital data acquisition system – Uses of data acquisition systems-use of recorders in digital system-digital recording system.

Recorders – Recording requirements – Analog recorders – Graphic recorders (X-T), (X-Y) -Oscillographic recorder (Ultra Violet type) – Magnetic tape recorders – Components of a Tape recorder – Digital Tape recorders – Recording techniques (Return to Zero & Non Return to Zero).

UNIT-V: Overview of MEMS and Microsystems:

MEMS and Microsystems – Typical MEMS and Micro system products – Evolution of Micro fabrication – Microsystems and Micro electronics - The Multidisciplinary nature of Microsystems and Miniaturization

Applications of Microsystems in the automotive Industry – Applications of Microsystems in other industries.

Text Books:

1. Electronic Instrumentation- H.S.Kalsi(II Edition),(Unit 1,2,3)
2. A Course in Electrical & Electronic Measurements & Instrumentation - A.K. Sawhney Dhanpat Rai & Co(P) Ltd., (Unit 4)
3. MEMS & Microsystems Design and manufacture – Tai-Ran Hsu & the Mc Graw-Hill Companies. (Unit 5)
4. Gary M Johnson "Labview Graphical Programming" Tata MC GrawHill-NewDelhi-2nd edition 1996
5. Sanjay gupta & Joseph John "Virtual instrumentation using labview" Tata MC GrawHill co ltd. 1st edition 2005

Core course IV-Practical I – Digital Experiments **Code: 11PELP 104**
(For the candidates admitted to the course from June 2011 onwards)

Choose Any Twelve Experiments

1. Verification of Boolean's Theorem (De Morgan's, Associative, Commutative, and Distributive).
2. Implementation of Boolean Expressions using gates.
3. Study of Flip Flops (RS, JK, & D Flip Flops) using gates.
4. Study of Encoder, Decoder, Multiplexer and Demultiplexer.
5. Counter Design using Flip Flops.
6. Frequency Divider design using IC 7490.
7. Study of Shift Register (PISO, PIPO, SIPO, SISO).
8. Binary Adder & Subtractor using IC7483.
9. Implementation of 16-bit parity generator/checker using gates & IC'S.
10. Implementation of code converter (Gray-binary& Binary-Gray).
11. Characteristics of TTL gate, CMOS gate & its Interfacing
12. Construction of Logic Probe and Logic Pulser
13. Magnitude Comparator & Seven Segment Display.
14. Ring Counter & Johnson Counter
15. Synchronous up/down counters.
16. Asynchronous Up counter
17. Microprocessor Programming – Arithmetic and logic operations (8 & 16 bit)
18. Microprocessor Programming – Ascending & Descending order of Numeral data
19. Microprocessor Programming – Picking up of Maximum & Minimum values
20. Microprocessor Programming – To detect even or odd number & generation of Fibonacci numbers
21. Microprocessor Programming – Code Conversion

EC I - VLSI DESIGN AND VHDL PROGRAMMING Code: 15PELE101
(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

MOS transistor's – Inverters – super buffers – universal logic (NAND and NOR) circuits. - Scaling of MOS circuits- threshold voltage equation - MOS device equation – basic dc equation – II order effects MOS modules – Small signal ac characteristics - NMOS inverter.

UNIT II: Data and Control flow in Systematic Structure:

Introduction – Two phase clocks – shift register combinational and sequential circuits-programmable logic arrays – Finite State Machine – Folded PLAS and large PLAS.

UNIT III:

LSI Computer System Design:

System overview-overall structure of data path ALU – Registers – buses – barrel shifter – register array – system timing analysis.

UNIT IV:

Hardware Description Language

Basic language Elements: Identifiers-Data objects-Data Types-Operators-Behavioral Modeling: Entity Declaration-Architecture Body-Process Statements-Variable Assignment Statement-Signal Assignment Statement-Wait Statement-if statement-Case Statement-Null Statement-Loop Statement-Exit Statement-Next Statement-Assertion Statement-Report Statement-More on Signal Assignment Statement- -Multiple Processes-Postponed Processes

UNIT V:

Data flow modeling: Concurrent Signal Assignment Statement-Multiple Drivers-Conditional Signal Assignment Statement-Block Statement-Concurrent Assertion Statement-Value of a Signal.

Hardware Modeling: Modeling Synchronous Logic-Clock Divider.
VHDL Programs:- Half Adder, Full Adder, Decoder, Comparator

Text Books:-

1. Principle of CMOS VLSI design – Neil H.E.Weste (unit 1).
2. Basic VLSI Design - Daughlas A Puck Nell (unit 1).
3. Introduction to VLSI design - Convey C. Mead (unit 3)
4. A VHDL Primer – J.Bhasker – Pearson Education – III edition (unit 4 &5)

CC – V - DIGITAL SIGNAL PROCESSING CODE: 15PEL205

(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

Introduction to Digital Signal Processors:

Architecture of fixed point processor TMS 320 C5X – CALU, PLU, ARAU – Interrupts – addressing modes. Memory mapped registers – auxiliary registers - memory – input/output space- DMA.

Peripherals: peripheral control – parallel input ports - software programmable wait state generator – general-purpose I/O ports – serial ports

UNIT II:

Signal & system

Types of signal processing – classification of systems- classification of signal- discrete time signal – manipulation of discrete time signals. Discrete time system – linear time invariant system. Test of various systems. Linear constant coefficient difference equation. Frequency domain Representation of discrete time system.

The discrete Fourier transform – properties of discrete Fourier transform – inverse discrete Fourier transform.

UNIT III:

Decimation in time FFT Algorithms- Decimation in frequency FFT algorithms – problems in FFT Algorithms.

FIR filter: Design of FIR filters FIR by Kaiser Window method –. IIR filter: - Design by impulse invariant method with simple problems – design by bilinear transformation -Frequency transformation.

UNIT IV:

Effects of finite word length:

Rounding and truncation error-Quantization effects in A/D conversion of signal – Coefficient Quantization effects in direct form realization of IIR filter-limit cycle oscillation-product quantization. (Concepts only).

Application: Voice processing: Speech signal- Channel vocoder-sub band coding-Voice privacy-Application of Radar- Application of Image processing

UNIT V:

Introduction to MATLAB – Initializing variables – Multi dimensional arrays – sub arrays – displaying output data – data files – scalar and array operations – built-in MATLAB functions – introduction to plotting – debugging MATLAB programs – additional plotting features .

Applications: MATLAB Programs:- Generations of standard test signals – Linear convolution – Circular convolution-Low pass filter, High Pass filter, Cosine transformation-Move block of data, Addition, Subtraction- Wave form generation-Triangle, Sawtooth.

Text Books:

1. Digital signal processing Architecture, Programming & Applications – Salivahanan A. Vallavaraj, C. Ghana Priya, TMH publishing company, (Unit I, II, III, IV).
2. Digital Signal Processors – M.Baskar, Venkataramani, (Unit I).
3. MATLAB Programming for Engineers – Stephen J. Chapman, Thomson learning III edition, (Unit V).

Reference :

1. Architecture of DSP – Perter Pirsch John wiley – 1998.
2. TMS 320 C5X- User manual - Texas instrument 1997 Literature No. (SPRU056).

Core Course-VI **COMMUNICATION SYSTEMS**

CODE: 15PEL206

(For the candidates admitted to the course from June 2015 onwards)

UNIT – I:

Modulation systems:

Sampling Theorem (proof) – Pulse Amplitude modulation – Channel Bandwidth for PAM Signal – Natural sampling – Flat-Top sampling – Signal recovery through holding – Quantization – Quantization error – PCM – Companding – Differential PCM – Delta modulation – ADM (Adaptive Delta Modulation) – Vocoders.

UNIT-II:

Digital modulation Techniques:

Binary phase shift keying – Differential phase shift keying – Differentially encoded PSK – QPSK – QPSK Transmitter and Receiver – Binary FSK.

UNIT –III:

Networks:

Objectives – Network components – Circuit switched, message switched and packet switched Networks – Comparison Transmission Links- Terrestrial links – Satellite links – pure and slotted ALOHA – FDMA – TDMA – Radio links – CSMA – Optical fiber – Transmission modes – Half duplex full duplex – Polling – transmission protocols – Asynchronous – synchronous serial transmission – BSC – SDLC – X.21 – Routing (shortest path and Floyd's Algorithm only) – OSI and TCP /IP Reference models.

UNIT – IV:

Radar Systems:

Navigational Aids: Air port Radar – Air surveillance Radar – Precision approach Radar – Distance measuring equipment – Ground control Approach – Micro wave Landing systems – Instrumental Landing Aids – Automatic direction finders – Radio Campus – Direction finding; switched cardiod homing system- four course Radio Range – Omni directional Ranges – Doppler VOR – TACAN.

UNIT –V:

Satellite Communication:

Introduction – Kepler's laws – orbits – Geo-stationary orbits – Power systems – Attitude control – Satellite station keeping – Aligning the satellite dish – Limits of visibility – frequency plans and polarization – Transponders– Link analysis (Uplink, Down link, Cross link) – Multiple access methods- DTH-Home theatre.

Text Book:

1. Principle of communication system 2nd edition – Taub & Schilling Mc Graw Hill publications (Unit I & II)
2. Design and analysis of computer communication networks – Vijay Ahuja Mc Graw Hill, 1985(Unit III)
3. Electronic communication 4th edition- Dennis Roddy & John coolen PHI Publications (Unit V)
4. Microwave devices and circuits-P.C.Sarkar (Unit IV)

CORECOURSE VII – SOLAR PHOTOVOLTAICS & CONTROL SYSTEMS
CODE: 15PEL207

(For the candidates admitted to the course from June 2015 onwards)

UNIT I:

Solar Cell Fundamentals

Introduction-World energy requirement- Need for sustainable energy sources-Sustainable sun's energy-Current status of renewable energy sources-Place of Photovoltaics in energy supply-World production of solar PV modules and cost-Generation of carriers-recombination of carriers-Continuity of carrier concentrations-P-N junction under Illumination: Solar Cell-Upper limits of cell parameters Isc, Voc, Fill factor, Efficiency

UNIT II:

Solar Photovoltaic Applications

Solar radiation:- The sun and the earth-Extra terrestrial Solar radiations-Solar spectrum at earth surface, The sun earth movement-Declination angle- Angle of sunrays on solar collector-LAT-Sunrise, sunset and day length-path of sun motion-optimal angle for fixed collector surface- optimal inclination of collector in summer and winter- Sun tracking- two and one axis types-Estimating solar radiation empirically(three types)-Solar radiation on tilted surface-Measurement of solar radiation

Solar Photovoltaic Modules

Solar PV modules from solar cells-Series and parallel connection-Mismatch in cell/module-Mismatch in series connection-Hot spot in the module-By pass diode-Mismatch in parallel connection-**DC to DC converters:** Buck type DC to DC Converter Boost type DC to DC Converter- Buck -Boost type DC to DC Converter-DC to AC Converter (Inverter) – Single phase and three phase.

UNIT III:

Control Systems:

Introduction - Open loop and Closed loop systems – Multivariable control system – Differential equations of physical systems–Mechanical systems- Mechanical accelerometer-Fixed axis rotations – Gear trains– Electrical system-Thermal system- Mathematical models of above systems – Transfer function – Transfer function for electrical, thermal, mechanical systems- transfer function for armature and field control of DC motor-Block diagram reduction algebra and its rule-block diagram reduction for liquid level system– Signal flow graphs – construction-Mason's gain formula-Problems.

UNIT IV:

Time response analysis and design specifications:

Time response – Test signals – Response of first order system for various test signals – Steady state error: Static error and generalized error co-efficient –Controller- Main controllers-Proportional control- integral control–Derivative control- PI Control –PD control-PID Control- Effect of adding poles and zeros to transfer function.

UNIT V:

Compensators and stability control:

Compensating networks- necessity of compensating network – design procedures – types of compensating networks (electrical networks) – phase lead – phase lag – phase lead lag – networks using asymptotic Bode plots.

Stability- introduction- stability and location of the poles in S plane – stability criterion – meaning – Hurwitz stability criterion with example - Routh's stability criterion with example – relation between the Hurwitz and Routh stability criterion - special cases in Routh stability criterion.

Text Books:

1. Solar Photovoltaics- Fundamentals, Technologies and Applications Second Edition Chetan Singh Solanki PHI Publisher
2. Control systems Engineering - I.J.Nagrath and M.Gopal, Wiley Eastern Limited (Unit 3 &4)
3. Control system Engineering - Pankaj swarnkar, Cyber tech publication (Unit 4 & 5)

Reference:

1. Linear Control systems - B.S. Manke, Khanna Publications (Unit 4 & 5)
2. Control Systems – Nagoor Kani
3. Power Electronics by Muhammed.H.Rashid, PHI Publishers
4. http://pvcdrom.PV education.org/SEMICON/RECTYPE.HTML

CC-VIII- Practical II – GENERAL & POWER ELECTRONIC EXPERIMENTS

Code: 11PELP 208

(For the candidates admitted to the course from June 2011 onwards)

Choose Any Twelve Experiments

1. Op-amp – Inverting and Non-inverting, summing Amplifiers.
2. Op-amp – Generation of Square and Ramp waves.
3. Op-amp – Wien's Bridge Oscillator.
4. Op-amp – Solution of Linear Equations.
5. Op-amp – Log and Anti log Amplifiers.
6. Op-amp – Active Filter Design.
7. Measurement of Op-amp Parameters.
8. Voltage-to-Current Converter and Current-to-Voltage Converter.
9. FET amplifier – Frequency response.
10. Two Stage RC coupled Transistor amplifier – Frequency response.
11. Dual regulated power supply design using IC 78xx, 79xx.
12. Variable power supply design using LM 317.
13. Characteristics of Thermistor and LVDT.
14. Voltage controlled oscillator using 555 timers.
15. Astable and Monostable Multivibrator design using 555 timers.
16. Solid-state relay application.
17. AC and DC static circuit breaker.
18. Thyristor triggering circuits.
19. Low and high voltage cutoff.
20. Zero- voltage switch.

} any three.

Any other **two** experiments of relevant standard.

EDC-I: Computer Hardware and Networking **CODE: 15EDEL201**

(For the candidates admitted to the course from June 2015 onwards)

UNIT I

Introduction to Computer:

Computer-Hardware- Software-Input, process, output- Basic Computer System –Main system unit: Types of Main system unit-Front of the Main system-Back of the Main system unit- Inside the Main system unit-Modem –Working of Modem.

Motherboard: Motherboard components-Support chips on motherboard.

UNIT II

Modern Microprocessor:

Multimedia computer-Audio support- 5.1 channel speaker system –MIDI support-Video and broad cast sup[port- connecting sound card.

Keyboard: Keyboard organization-Enhanced PC AT keyboard

Mouse: Mouse Type-Optical Mouse-Connecting mouse-Mouse resolution- Scanner-Types-Working of Scanner-Digital Camera

UNIT III

Hard Disk Drive:

Data encoding method-HDD components-Logical working of HDD-Track and Sector-Format of Disk-Cluster-Absolute sector & relative sector-Partition –Memory:-Physical memory organanization:-DIP-SIPP-SIMM-DIMM-RIMM

UNIT IV

Printers:

Working of Laser Printer-PC to printer interface (Hardware)-USB: USB cable\ connector-Trouble shooting Laser printer

DVD Drive-DVD data storage capacity-Multilayer storage-recordable DVD:- DVD-R-DVD Ram-DVDR/W-DVD+R/W

Motherboard cabinet form factor:

ATX motherboard-ATX cabinet-pen drive-Flash memory-Memory cards.

UNIT V

Networking:

Setting up of a Network- Preparation for Network installation-Internet-Network configuration-Trouble shooting networking

Understanding Internet: Concept of Internet- WWW-Applications of Internet-Service on the internet-Internet protocols-Domain-Firewall.

Text Books:

1. Modern Computer Hardware Course - Manahar Lotia, Pradeep Nair & Fayal Lotia (BPB Publications)

CORE COURSE IX OPTICAL FIBER COMMUNICATION AND TELECOMMUNICATION

Code: 15 PEL 309 (Instruction hours 6)

(For the candidates admitted to the course from June 2015)

UNIT I:

Optical Fiber

General – Optical fiber – Importance of optical fiber – Propagation of light in different media – Propagation of light waves in an optical fiber – Basic Structure of an optical fiber and propagation of light wave through it – Acceptance angle and Acceptance cone of a fiber – Numerical aperture (general) – Numerical aperture of a graded index fiber – Modes of Propagation – Meridional and skew rays – Single mode Propagation – Comparison of step and graded index fiber – Applications – Classification of fibers : Step index – Step index monomode – graded index multimode fiber – Plastic fibers

UNIT II:

Fiber Fabrication , Losses, Splicing

Fiber fabrication: External CVD – Characteristics of External CVD method – **Losses** :-Attenuation in optical fibers - Material losses - Absorption loss – bending losses – Radiation induced losses – Inherent defect losses – Inverse square law loss – Transmission loss – Temperature Dependence of fiber losses – **Splicing** Splicing of fibre – Electric arc Fusion Splicing – Mechanical Splicing – Steps involved in Splicing procedure

UNIT III:

Light Sources for Optical fibers:

LED – The Process involved in LEDs – Structures of LED – LED Materials- Output Power Characteristics of LED – Fiber LED coupling – Modulation Band width of LED – Spectral Emission of LEDs – laser: laser operation – Types of Lasers - Semiconductor Laser diode

Modulation & Communication Systems

General – Transmitter for fiber optic communication – High performance Transmitter Circuit (LED Digital transmitter) – LED Analog Transmitter – Laser Transmitter – Digital Laser Transmitter – Analog Laser Transmitter – Fiber optic Receiver – High Performance Receiver – Repeaters – Fiber Based Modems

UNIT IV:

Telecommunication

Beginning of Telecommunication - Telecommunication for voice& data application in Business – Central Exchange – Operator Switch Board – Long Distance Operator Switch Board – Line & Telephone Numbering & Automated Switching - Circuit Switching –Computer Controlled Switching – Switching Control by Microprocessor – Plastic Insulated Cable – Plastic Cable Colour Code

Functions of Telephone

Invention of the Ringer – Ringer Detectors – The Dial and Dual Tone Multifrequency Pad – Hands free Phones vs Speaker Phones – Key systems – Key systems Automated Attendant

UNIT V:

Applications

LAN - Putting LAN together – Connecting two LAN to each other – Medium – Network Interface Card – Packets & Frames – ETHERNET Frame – WAN: Packet Switched Network – Packet Data Network – Packet Assembler / Disassembler – ATM – Voice over ATM

Internet

Evolution of the Internet – TCP /IP protocol – The IP Packet – generating the IP address – Internet domain names – Browsing the Internet – File transfer protocol-
E-mail over the Internet - TELENET

Text Books

1. Optical Fibers & Fiber Optic Communication System by subir Kumar Sarkar, 4th Edition - S.Chand & Company, Rs: 125/-
2. Introduction to Telecommunications (Voice, Data & The internet) by Marion Cole, 2nd Edition–Pearson Education Publication, Rs: 399/-

Reference book:

1. Optical Fiber Communication & Sensors by Arumugam-Anuradha agencies 2002.
2. Optical Fiber Communication by Gerd Keiser-McGraw-Hill.
3. Fundamentals of Telecommunication by Roger. L. Freeman, 2nd Edition – Johnwiley & son,Inc., Publication

Unit 1: Book 1: 1-3, 4-12, 14-16, 22-27
Unit 2: Book 1: 39-41, 81-83, 85-86, 87-91,184-187
Unit 3: Book 1: 112-125, 209-217, 218-223,224-226
Unit 4: Book 2: 3-4, 11-17, 70-72, 74,76-77, 90-91, 99-100, 158-160, 113-114, 116-117, 122-123,124-125

Bio medical Instrumentation 15PEL510

UNIT-I: (Instruction hours 5)

Human physiological Systems:

Cells and their structure – Nature of cancer cells- Transport of ions through cell membrane – Resting and Action potentials – Bio-Electric Potentials –Nerve tissues and organs - Different Systems of human body (from Skeletal system to muscular system)- components of the Bio-medical instrument system-Bio-potential Electrodes:- Electrodes-half cell potential-purpose of electrode paste-Electrode material- Types of Electrodes:-Micro-Electrode (Metal and Non-metal), Depth and needle electrodes-Surface Electrodes

UNIT-II:

Transducers:

Transducers:–Active Transducers:-Magnetic Induction, Piezo Electric, Photovoltaic, Thermoelectric - Passive Transducers (resistive transducers):-Strain Gauge Transducer and strain gauge pressure transducer- Photo Electric type Resistive Transducers- Thermister type Transducers- Metallic wire Transducers – capacitive Transducers- calculation of Sensitivity-capacitance Pressure Transducer

UNIT-III:

Bio-potential Recorders:

Electro Cardiography ECG:– Origin – Lead Configuration (Bipolar and Unipolar, Chest, Frank lead)- Recording Setup (8 subdivisions) –Analysis of ECG signals-Echocardiography-Electro Encephalography EEG:-Origin- Brain waves-Placement of electrodes- Recording Setup (modern EEG unit)– Analysis of EEG – Electromyography (EMG) - Recording Setup – conduction velocities in motor nerves-Electro Retino Graphy and Electrooculography-recorders with high accuracy.

UNIT – IV:

Physiological Assist Devices:

Pacemakers:–Energy requirements – Methods of stimulation - Modes of operation:- Ventricular Asynchronous, Ventricular Inhibited, Atrial Sequential Ventricular Inhibited pacemakers - Artificial heart valves:- requirements and natural heart valves –Different types of artificial heart valves-problems regarding artificial heart valves-Defibrillators:-Internal Defibrillators-External Defibrillators:-A.C Defibrillator –D.C Defibrillator- Heart-lung machine-Kidney machine – Dialysis Types:- Hemodialysis- Peritonial dialysis - Blood Flow meters:-Electromagnetic and applications – Ultrasonic - Ultrasonic Doppler (three types) - Laser and NMR-Measurement of Glucose and Cholesterol using meters.

UNIT–V:

Bio- Telemetry:

Elements and Design – Radio telemetry systems:- Single channel transmission –Transmission of bioelectrical variables:-Tunnel diode, Hartley type F.M, Pulsed Hartley –Radio telemetry with a sub carrier -Multiple channel telemetry system (FDM, TDM) – Problems in implant telemetry- Uses of biotelemetry– Lasers in medicine – principle – instrumentation – Advantages – Applications:-Photo thermal, Photo chemical – Endoscopes:-Introduction- different types–Endoscopic laser coagulator Cryogenic surgery – Nuclear imaging Techniques -CT SCAN – Principle – Block Diagram – Applications (Six types).

ECG, EEG.

TEXT BOOK:

1. Bio-medical Instrumentation by Dr. M. Arumugam, Anuradha Publications, Kumbakonam- Reprint 2008- Rs.200

REFERENCE:

1. Handbook of Bio-medical Instrumentation by R.S.Khadpur, II-Edition Tata M.C.Graw Hill Education.
2. Bio-medical Instrumentation and Measurement by Cromwell, II Edition, Pearson Publications

Unit 1: Book 1:1-16,20,21-29
Unit 2: Book 1:33-36, 39-54
Unit 3: Book 1:117-128,130-132,142-160
Unit 4: Book 1:164-175,182-195,202-204,211-215,233-245
Unit 5: Book 1:310-320,347-367

PLC 15PEL311

UNIT I: (Instruction hours 5)

Programmable Logic Controller

Introduction-Origin of PLC- uses of PLC-Work of PLC –Instructions get into the PLC Memory-PLC Size Classifications-Fixed and Modular PLC Hardware:- Fixed PLCs-Modular I/O PLCs-CPU - Input Modules- Discrete Input – Discrete AC Input – AC Input Specifications – DC Input –Sinking and Sourcing –DC Input Module Operation and Specification - Output Modules- Discrete Output – TTL - Relay

UNIT II:

Fundamentals of Ladder Diagram

PLC Configuration - Processor and Mounting rack - Input and output modules - Power supply and Programming unit - System block diagram – Switches: Pushbutton-Pushbutton Switch Actuators - Selector Switches and Limit Switches - Indicator Lamps – Relays - Time Delay Relays: Delay-On Timer (TON) Relay-Delay-Off Timer (TOF) Relay - Basic diagram Framework-Wiring-Reference Designators -Boolean Logic and Relay Logic: AND-OR-AND OR And OR AND-Ground Test

UNIT III:

Programmable Logic Controller Processors

Introduction- Processor Function:-Processor's Operating System - Flash Memory- Operating Systems-Processors Scanning: Input Scan-Program Scan-Output Scan-Service Communication-House Keeping and Overhead-OMRON CQM1 Operating cycle-The Watchdog Timer-Processor Ports-RS-232C Communication Standard-Processor operating Modes-Choosing the Correct processor for an Application

UNIT IV:

Instruction Set

Basic Relay Instruction: Normally open - Normally closed - One shot - Output Latching-Negated Output – Timer: On-Delay – Off-Delay – Retentive Timer – Reset – Counter: Count up – Count Down - High Speed Instruction-Comparison: Equal Instruction – Not Equal – Less Than Less Than or Equal – Greater Than – Greater Than or Equal- Data Handling Instruction: Move – Masked Move – Copy- Logical Instructions: AND-OR-EX-OR – NOT-Program Flow Instruction: JSR – SBR – MCR – IIM and IOM - REF-Math Instruction

UNIT V:

Application of Programmable Logic Controller

ON Delay Circuit - Priority Determination Design ON and OFF Delay Circuit-Drilling Control – Latching Relay - Packing Line Control-Simple Sequence Control Concept - Filling Draining Control operation-Conveyor belt Motor Control-Compare – ADD – SUB - Car Park Control

Text Books

1. Introduction to Programmable Logic Controllers - 3rd edition, Gary Dunning CENGAGE Learning Publication, Rs: 450/-(Unit I, III, IV)
2. EBOOK 1 - Programmable Logic Controllers: Programming Methods and Applications By John R. Hackworth and Frederick D. Hackworth,(Unit II)
3. EBOOK 2 - OMRON PLC (Unit V)

Reference:

1. Programmable Logic Controllers by Frank D.Petruzelle III Edition TATA Mc –Graw Hill Education (EBook)

Pages: Unit1: Book 1: 3-8, 9-11, 15-24, 199-220, 237- 248
Unit2: e book1:2.3-2.11, 2.10, 1.3-1.6, and 1.7-1.21
Unit3:Book1:299-312,317-320,346-347
Unit4:Book1:427-439,496-501,507-510,520-530,532,537-543,576-578,586-588,591,598-599
Unit5: e book2:6.19, 6.20-6.22, 6.28-6.30, 6.33, 6.36-6.39, 6.62-6.63, 6.69, 6.75, 6.77 and 6.81-6.82

CC-XII practical -III
Advanced Digital Linear And solar photo voltaic Experiments

(For the candidates admitted to the course from June 2015)

CODE: 15PELP312 (Instruction hours 3)

ADVANCED DIGITAL, LINEAR EXPERIMENTS (ANY EIGHT)

1. Experiments with PLL – Frequency Multiplier.
2. DAC & its applications.
3. Solving Differential Equations.
4. UJT Characteristics & Applications (Relaxation Oscillator & Pulse Generator)
5. Thermo EMF of a Thermocouple by Direct Deflection Method.
6. Pulse Amplitude Modulator & Demodulator.
7. Pulse width Modulator.
8. Study of sample & Hold system.
9. Application of Temperature sensor – LM 334.
10. Programmable Gain Amplifier.
11. Active filters design using op-amp (HPF, LPF and BPF).

SOLAR PHOTOVOLTAICS EXPERIMENTS (ANY EIGHT)

12. Measurement of I-V characteristics of PV module (module 1, module 2, module 3, module 4)
13. Series and parallel connection of PV Modules
14. Measurement of angle equal to the latitude angle of the location
15. Measure the points under the condition of sun tracking when sunlight is falling perpendicular to the PV module
16. Solar Cells Connected In Series Using Simulator
17. Solar Cells Connected In Parallel Using Simulator
18. Dark and Illuminated Current – Voltage Characteristics of Solar Cells in Series
19. Dark and Illuminated Current – Voltage Characteristics of Solar Cells in Parallel
20. Measurement of solar cell lifetime using lifetime measurement kit
21. Spectral Response Measurement Using Solar Spectral Response Meter
22. Solar cell simulation using Solar Simulators

Any other experiments of relevant Standard

Advanced Electronics 15EDE302
Ins. Hrs (4)

UNIT I:

Solar Cell Fundamentals

Introduction-World Energy Requirement – Need for Sustainable Energy Sources: Limited Fossil Fuels –Environmental impact of fossil fuels-Energy security and potential for conflicts- Sustainable sun's Energy: Advantages – Conversion Challenges – Other Energy Alternatives- Current status of Renewable Energy Sources: Wind Energy – Solar Thermal – Biomass Energy – Place of Photovoltaics in Energy Supply - Wafer-based Silicon solar cell – Thin Film Amorphous Silicon – Thin Cadmium Telluride-Thin film crystalline silicon-other technologies-World production and cost

UNIT II:

P-N junction under Illumination-Solar Cell

Generation of Photo voltage – Light Generated Current –I-V equation-Solar cell Characteristics- DC to DC Converters - Buck type – Boost type – Buck Boost type –
DC to AC Converter: Single Phase – Three Phase-Measurement of solar radiation- Solar photovoltaic modules from solar cells-series and parallel connection of cells-Mismatch in cell/module-mismatch in series connection-hot spot in the module-bypass diode-mismatching in parallel connection

UNIT III:

Physiological Assist Devices

Pacemakers: Energy requirement-methods of stimulation-Artificial Heart valves Defibrillators: – Types of Defibrillators (internal and external) -External:-AC Defibrillators – Synchronised DC Defibrillators -Nerve and Muscle Stimulator:- Stimulation of nerves – Heart lung machine - Kidney machine – Dialysis – Hemodialysis - Peritonial dialysis

UNIT IV:

Bio-potential recorders:

ECG (Origin, Lead configuration, recording setup) – EEG (Origin, Brain waves, Placements of Electrodes, recording setup and EEG Unit) – EMG (recording set up, conduction velocity determination) - CT scan (Principle, block diagram, Application) – Endoscope and types

UNIT V:

Nanotechnology

History and Scope – Nano size and Properties – Application of Nanomaterials: Nano Sensors – Food and Agriculture Industry – Environment – Textiles – Paints – Defense and Space Applications

Text Books

1. Solar Photovoltaics (Fundamentals, Technologies and Applications)
by Chetan Singh Solanki - 2nd Edition, PHI Publications, Rs:495/-(UNIT I, II)
2. Bio medical Instrumentation by Mr.D.Arumugam - 10th Edition,
Anuradha Publications, Rs: 200/- (UNIT III, IV)
3. Text book of Nanoscience and Nanotechnology by B S Murthy, P Shankar, Baldev Raj, B B Rath and James Murday – 1st Edition, Universities Press Publication, Rs: 350/- (UNIT V)

Reference Book:-

1.Hand book of Bio medical Instrumentation by R.S.Khandpur II Edition TATA MC-Graw Hill

Pages:-

Unit 1: Book 1: P. No 3-21
Unit 2: Book 1: P. No 89-94, 363-368, 374-376, 320-321,324-333
Unit 3: Book 2: P. No 164-167, 182-188, 190-193, 195-196, 202-204,211-215
Unit 4: Book 2: 117-128, 144-152, 153-156, 360-367,356-359
Unit 5: Book 3: 1-4, 8-10, 119-120, 134-135, 137-138, 138-139, 140-141, 141, 143-146

Elective II REMOTE SENSING CODE NO:15PELE302 (Instruction hours 4)

(For the candidates admitted to the course from June 2015)

Unit I:

CONCEPTS & FOUNDATIONS:

Introduction – Energy sources and Radiation principles – Energy interactions in the atmosphere - Energy interactions in the Earth surface features – Data acquisition and Interpretation – Reference data – An ideal remote sensing system –Characteristics of real remote sensing systems.

Unit II:

PLATFORMS & PHOTOGRAPHIC SYSTEMS & THEMATIC MAPPER:

Balloons -Aircraft –Earth Resource Technology Satellites – Geostationary Operational Environmental Satellite – Advanced Very High Resolution Radiation (AVHRR) method – Indian Remote Sensing (IRS)- Elements of Photographic Systems :– Introduction – Basic negative to positive photographic sequence – film exposure – spectral sensitivity of Black and white films – color film – color IR film - Aerial film cameras – Film resolution

Unit III:

SENSING METHODS: Across Track Scanning - Along Track Scanning - Thermal Radiation Principles – Interpretation of Thermal Scanner image – Side looking Radar System – Synthetic Aperture Radar - Transmission Characteristics of Radar signals – Interferrometric Radar – LIDAR

Unit IV:

VISUAL INTERPRETATION & IMAGE PROCESSING: Introduction – Fundamentals of visual interpretation of image – Elements of image interpretation –Geometric Corrections- Radiometric Corrections– Noise removal – Image enhancement – Manipulation techniques

Unit V:

APPLICATIONS OF REMOTE SENSING, GIS & GPS:Application of Remote sensing Technology in predicting, monitoring and Assessing Disasters –Wildfire – Earthquake – Flood – Volcano – Tornado - Geographical information system Principles – Cartography – Definition- Methodology of Cadastral maps –Its application areas – GPS– Elevation readings using GPS – Applications for GPS-GPS Survey method-case study(Sample survey locations based on accessibility analysis in Kumbakonam town)

Text Book:

1. Remote Sensing and Image Interpretation - Thomas M.Lillesand & Ralph W. Kiefer, Jonathan W.chipman 5th edition Published by John Wiley & Sons (asia), Pvt. LTD., Singapore Rs.619(Unit – I, II (Photographic Systems), III, IV)

2. Principles of Remote Sensing & GIS – Dr.P.H.Anandh, V.Rajesh Kumar,Sri Venkateswara Publishers Rs.325.(Unit- V)

3. Remote sensing of the Environment an earth resource Perspective – John.R.Jensen, Published by Pearson education Pvt. Ltd.,(Unit – II(Platforms))

Reference:

1. Basics of Remote sensing and GIS – Dr. S.Kumar, Laxmi Publications(P) Ltd, NewDelhi

Unit I: Book-1(P.No. 1-17, 23-32,35-39)

Unit II: Book-3(P.No. 58-61,64-69,184-188,201-208,220-221)
Book -1(P.No.58-59,61-67,83-94,99-111)

Unit III: Book-1(P.No. 331-366,642-652,659-663)

Unit IV: Book-1(P.No. 193- 200, 495-509) 509-550

Unit V: Book-2(P.No. 248-259,266-270, 281-282, 366-372,377-379)

Core Course –XIII MOBILE COMMUNICATIONS CODE: 15PEL413

(For the candidates admitted to the course from June 2015) (Instruction hours 6)

UNIT I:

Wireless Networks:

Introduction-Difference between wireless and fixed telephone networks-Development of wireless networks-First, second and third generation -common channel signaling (CCS)-Integrated Services Digital Network (ISDN)-Signaling System No. 7 (SS7)-An example of SS7 Global cellular network interoperability-Personal communication Services/Networks (PCS/PCNs)-Protocol for network access-Network database-Universal Mobile Telecommunication System (UMTS).

UNIT II:

Multiple access techniques: Introduction- Frequency division multiple access [FDMA] – Time division multiple access [TDMA] –Spread Spectrum Multiple Access(SSMA)- Coded Division Multiple Access CDMA -Space Division Multiple Access(SDMA)- Capacity of cellular CDMA in single cell-multiple cell - Capacity of SDMA -CDMA digital cellular standard(IS-95)-Frequency and channel specifications-Forward CDMA channel –Reverse CDMA channel.

UNIT III:

Cellular concept: Introduction-Frequency reuse-channel assignment strategies- handoff strategies- prioritizing handoffs-practical handoff considerations- Interference and system capacity-Co-channel interference and system capacity-channel planning for wireless systems -Adjacent channel interference- truncating and grade of service –improving coverage and capacity in cellular systems-cell splitting-sectoring-Repeaters for range extension-Microcell Zone concept.

UNIT IV:

Global System For Mobile Communication:

GSM architecture – Layer modeling-Transmission- Channel and channel modes- multiple access scheme- channel coding and interleaving-Radio resource (RR) management – Mobility management (MM) - Communication management (CM) - Network management (NM).

UNIT V:

Introduction to Mobile Wimax: IEEE 802.16-IEEE 802.16 MAC-IEEE80216e-Mobile Wimax end to end network architecture-Analysis of MIMO techniques for mobile Wimax systems:-Introduction-Performance trade off-multiple antenna system-Antenna array techniques-MIMO system-M multiple antenna in Wimax: Transmit diversity-Spatial multiplexing- comparison of MIMO option- Multimedia application, services & Deployment:-Wimax Qos support: Scheduling service-Qos provisioning and service flow management-Integrated cross layer system: System overview-priority service flow mapping and performance- GPRS Communications- Introduction-concept - Application.

Text Book:

1. Wireless Communications principles and practice by T.S.Rappaport PHI publication second edition Rs.375
2. Mobile cellular Telecommunications by William C.Y.Lee McGraw-Hill International Editions Rs.302
3. Mobile WiMAX by K.Wang-cheng chen & J.Roberto,B.Demarca-Willey Pub.(E-Book).

Reference:

1. Mobile communications IInd edition by Jochen Schiller pearson Edu.publication

Unit I: Book-1(P.No. 491-500,510-~~523,527~~-531)
Unit II: Book-1(P.No. 449-459,461-462,~~469-483,~~484-487,567-580)
Unit III: Book-1(P.No. 57-~~76~~, 77-80, 86-89, 90-96)
Unit IV: Book-2(P.No. 464-485)
Unit V: Book-3(P.No. 1-10, 15-28,247-254) & Pdf material Pages (1-87) in www.srohid.tripod.com/gprs_usha.pdf

Book 1 Pearson education!
Unit I: Book 1: P.N - 493-503, 512-533
Unit-II: Book 1: P.N - 449-461, 463-464, 476-489, 569-582)
Unit-III: Book 1: P.N - (57-74), 77-80, 86-89, 90-96

2, 3 Gsm model
FDMA
TDMA

Core Course XIV - Embedded Systems and PSpice using OrCAD

Code : 15PEL414 [Ins. Hr : 6]

(For the candidates admitted to the course from June 2015)

UNIT I

Embedded systems: Introduction - application areas- Categories of Embedded systems(1.3.1- 1.3.4)- Overview of Embedded system architecture- Specialties of Embedded systems(1.5.1-1.5.7)- Recent trends in Embedded systems(1.6.1- 1.6.7)-Architecture of Embedded systems: Hardware architecture(2.1.1-2.1.9)-Software architecture(2.2.1-2.2.3) – Application Software – Communication Software – Development/ Testing tools- Real time Operating systems- Handheld Operating systems

UNIT II

Programming of Embedded Systems: Overview of ANSI C- GNU Development tools- Bit manipulation using C- simple program of Bitwise.c- Calculation of CRC- simple Program of CRC-16 algorithm- Memory management- Timing of programs- simple Program of ttiming.c- Device Drivers-simple Program of syscall.c- productivity tools (3.7.1-3.7.5)- Code optimization- C-Coding Guidelines:-programming in C++ - programming in JAVA

UNIT III

Applications of Embedded systems: Embedded software development on 89S51 Microcontroller Platform – Integrated Development Environment(Keil IDE) – Cross-Platform development tools- Application development(To toggle the LEDs)- AVR Microcontroller Platform – Development Environment(AVR Studio IDE) – Cross- Platform development tools- Application development(To toggle the LEDs)- Applications using Intel®Strong ARM Platform – Architecture of Prayog – Applications (Interfacing IrDA card with Prayog) – RFID Systems- RFID Tag – RFID Reader- Application (RFID Tag ID Creation for ID Card)

UNIT IV

PSPICE using OrCAD:

Circuit analysis & descriptions& analysis: P-spice introduction- description-platform-limitations-input files-element value-nodes-circuit elements –Sources -Output variables-p - spice output commands-Format of circuit files- Format of output files -OrCAD capture DC circuit analysis: Independent DC sources- Dependent DC sources-Dc output variables-Types of outputs- AC circuit analysis: Ac output variable-Independent AC sources-Transmission lines-Multiple analysis

UNIT V

Advanced SPICE commands & models: Behavioral modeling-value-.subckt-.ends-.func-.global-.inc-.lib-.nodeset-.options-.param-fourier & noise analysis-.sens-.step-dc parametric sweep-Monte carol analysis-dev/lot devices-Sensitivity-Device model and statements:-Diode model-Diode statement-BJT model-BJT statements -Running a PSPICE file on spice-running a SPICE file on PSpice.

Textbook:

1. Embedded / Real-Time Systems: Concepts, design and Programming by Dr. K.V.K.K. Prasad (Black Book) published Dreamtech (Rs. 479) (Unit I, II, III)
2. Introduction to PSpice using OrCAD for Circuits and Electronics by Muhammad H. Rashid – publisher Pearson 3rd edition. Published by Dorling Kindersley Pvt. Ltd(Unit IV, V)Rs.325

Reference:

1. An Embedded software primer by David E.Simon publisher Pearson Rs.350

Unit I : Book 1 (P:No: 19-31,33-60,66-67)
Unit II : Book 1 (P:No: 69-72,74-76,77-79,81-82,83-90,92-97)
Unit III: Book 1 (P:No: 404- 411,415-423,427-430,456-459,461-465,466-471)
Unit IV: Book 2 (P:No: 19,20,24-25,27,32-44,50-55,62-78,150-153, 167-170)
Unit V : Book 2 (P:No:177-213,227- 230,255-260,408-409)

CORE COURSE XV: MICROPROCESSOR, MICROCONTROLLER AND INTERFACING EXPERIMENTS PRACTICAL -IV **Code: 15PELP415** (Instruction hours 4)

[Any TWELVE Experiments]

1. Microprocessor 8279 On-board Display (Message Display, Character Display, Rolling Display, Blinking display)
2. Study of 8255 – using Add-on-board (All modes)
3. Study of Eight digits – 7-segment display using 8085 (Display a characters, Rolling a Display)
4. Traffic Light Control using 8085 Microprocessor
5. Microcontroller programming III (Logical operations AND, OR, NOT, EX-OR), Hexa decimal Up and down counter, Decimal up and down counter
6. Code Conversion using 8085 Microprocessor (Decimal to Hexa decimal conversion, Hexa decimal to Decimal conversion, ASCII to Decimal conversion, BCD to Hexa, Hexa to BCD, Hexa to ASCII, ASCII to Hexa)
7. Stepper Motor Interfacing using Microprocessor (To find the speed, Clockwise direction, Anti-clockwise direction, to find an angle, to rotate forward & reverse direction)
8. Microcontroller Programming-I (8-bit Addition, subtraction, multiplication, division, 1's and 2's complement , 16-bit addition, subtraction)
9. Microcontroller Programming-II (Block transfer, Sum of the elements in array, Disassembling a word, Assemble a word, Decimal to Hexa decimal conversion, Hexa Decimal to Decimal conversion, ASCII to Decimal conversion)
10. Traffic Light Control using 8051 Microcontroller
11. On board display using 8051(Word Display, Character Display, Rolling Display, Blinking display)
12. Stepper Motor interfacing using Microcontroller (To find the speed, Clockwise direction, Anti-clockwise direction, to find an angle, to rotate forward & reverse direction)
13. DAC – Interfacing 8085 (Generation of square wave, Generation of triangular wave, Generation of Ramp wave, Generation of Staircase wave, Generation of Sine wave)
14. Factorial of a number using CALL and RETURN Instruction 8051 and Code Conversion using 8051 Microcontroller (Decimal to Hexa decimal conversion, Hexa decimal to Decimal conversion, ASCII to Decimal conversion, Decimal to ASCII)
15. 8051-Simulator programs (LED flashing using SET B and CLR Instruction, Read the Switch, AND, OR, NAND, NOR Operations, Flashing the instruction using CPL Instruction, Running light)
16. Temperature conversion using 8085 (Centigrate scale to Fahrenheit scale Conversion, Fahrenheit scale to Centigrate scale conversion)
17. Decimal Counter using 8085 Microprocessor (Decimal counting from 0 to 9, Decimal Counting from 0 to 99)

Any other Experiment of relevant Standard

ELECTIVE II: NANOTECHNOLOGY AND ITS APPLICATIONS

(Instruction hours 6)

CODE: 15PELE403

(For the candidates admitted to the course from June 2015)

UNIT- I:

Core Concept of Nanotechnology:- Introduction and Generation-Nano Scale- Two Dimensional Nanomaterials: Carbon nanotubes – Inorganic nanotubes – Nanowires – Biopolymers – Nanoribbons - Construction: Top Down-Bottom up-Spintronics-Electronics and Opto Electronics: Semiconductor Opto Electronics-Memory and data Storage-New methods for data I/P and O/P-Plastic Electronics – Biomedical Science : Drug delivery – tissue engineering – laboratory-on a chip – Microfluidics – Charge coupled devices - Photometry

UNIT – II:

Nano Tools: - Molecular Building Blocks:- Looking at the atom-Holding atoms-Bonding atoms with electrons-Moving on up to molecules-Molecular Structure-Turning on the light:- Thinking about light-Light Spectroscopy waves Clocking light frequency-Kicking out a photon-Spectroscopy:- I R Spectroscopy-Raman Spectroscopy-UV Spectroscopy -Microscope:- Atomic Force Microscope-Scanning Electron Microscope-Transmission Electron Microscope-Scanning Tunneling Microscope.

UNIT – III:

Bouncing bucky balls-creating bucky balls-grow up nanotube-producing nanotube-structure of carbon nanotube-scanning the properties of nanotube-putting nanotube-growing nanowires –nanowires at work-linking the brain with the computer–transistor's road ending – FET to SET: constructive destruction- voltage inverter-carbon nanotube field effect transistor – solid state light emitter – New Chips Fabrication: fabrication's make-e-beaming-chip fabrication contenders – Magnetic Random Access Memory: M T J- V M RAM– Millipede Drive – Holographic Data Storage System (H D S S)

UNIT- IV:

DVD-phase change memory –Nanotube RAM-molecular memory-the energy challenge – solar cell sticker – potential of nano solar cells - hydrogen fuel cells- putting hydrogen into production – storing hydrogen - lab-on-a chip-soft lithography-moving honey-viscosity-surface tension-electrical charges- Biosensing with nano wires-super X-ray vision-Tracers in Fullerences-Quantum dots-Genes mapping – Microarray -DNA chain gang – drugs in pharmaceutical – nano way of delivering new drugs: oil and water – micelles – special delivery – stepping with c_{60} – Cancer with nanoshells – Biomimetics

UNIT- V:

Medical Applications of Nanotechnology: DNA damage-Cancer-Brain damage-Hormone deficiency-Infection-Blood related diseases-Nanotechnology for rapid detection of viruses-Veterinary Applications of Nanotechnology: Vaccines production-Immunoassay testing-Environment, health and Safety Applications of Nanotechnology: Mammalian pharmacokinetics of carbon nanotubes using intrinsic near I R fluorescence-loading Magnetic Nanoparticle into sperm cells does not affect their functionality-Nanotechnology Food and Safety: Genetically modified organism-detecting contaminations-Biosensor and agriculture

Textbook:

1. Nano technology by Richard booker, Earl Boysen –Wiley dream tech publishers Rs 299 (UNIT II, III, IV)
2. Nano technology by Rakesh Rathi-S.chand Publishers (UNIT I)
3. Nanotechnology (A fundamental approach) –U.Kumar Published by Agrobios (India)2008 Rs. 695 (UNIT V)

Reference:

1. Text book of Nanoscience and Nanotechnology by B S Murthy, P Shankar, Baldev Raj, B B Rath and James Murday – 1st Edition, Universities Press Publication, Rs: 350/-

Unit I: Book 2(P.No: 29-31,39-42,47-49,57-59,60-63,67-70)
Unit II: Book 1(P.No: 40-58)
Unit III: Book 1(P.No: 69-71,73-81,118-148)
Unit IV: Book 1(P.No: 148-150,201-209,222-269)
Unit V: Book 3(P.No: 188-196,211,214,221,225,233,237,242)