

**Scheme – 2013** 

Scheme and Syllabus for III to VIII Semester of B.Tech. Degree Programme in Electronics and Communication Engineering G. Pulla Reddy Engineering College (Autonomous): Kurnool Accredited by NBA of AICTE and NAAC of UGC An ISO 9001:2008 Certified Institution Affiliated to JNTUA, Anantapuramu.

## ANNEXURE-II FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination (Effective from 2013-2014)

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<u> </u>	B.Tech. ECE III Semester					Scheme: 2013				
S.	Course	Course Title	Cr edi	Sch	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
No	No.		ts	L	D/T	Р	End Exam	Internal Assessment	Tot al	
Ι		Theory								
1	HU201	Managerial Economics and Financial Accountancy	3	3	0	0	70	30	100	
2	BS202	Complex Variables and Special Functions	3	3	1	0	70	30	100	
3	EC201	Probability Theory and Stochastic Processes	3	3	0	0	70	30	100	
4	EC202	Electronic Devices and Circuits	3	3	0	0	70	30	100	
5	EC203	Signals and Systems	3	3	1	0	70	30	100	
6	EE210	Circuit Theory	3	3	0	0	70	30	100	
7	ML201	Quantitative Aptitude	2	1	1	0	_	100	100	
II		Practical								
8	EC204	Electronic Devices & Circuits Lab	2	0	0	3	70	30	100	
9	EC205	Basic Simulations Lab	2	0	0	3	70	30	100	
		Total	24	19	03	06	560	340	900	

## FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination (Effective from 2013-2014)

B.Tech.	ECE IV	Semester
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S.	Course	Course Title		Schem pe	e of Inst eriods/wo	ruction eek	Schem Max	e of Examinat kimum Marks	tion
No	No.	course rice	ts	L	D/T	Р	End Exam	Internal Assessment	Tot al
Ι		Theory							
1	EC206	Analog Electronic Circuits	3	3	0	0	70	30	100
2	EC207	Pulse & Digital Electronics	3	3	1	0	70	30	100
3	EC208	Networks & Transmission Lines	3	3	0	0	70	30	100
4	EC209	Electromagnetic waves	3	3	1	0	70	30	100
5	EE211	Electrical Technology	3	3	0	0	70	30	100
6	ML202	Soft Skills	2	1	2	0	-	100	100
II		Practical							
7	EC210	Analog Electronic Circuits Lab	2	0	0	3	70	30	100
8	EC211	Pulse & Digital Electronics Lab	2	0	0	3	70	30	100
		Electrical Circuits and							
9	EE212	Machines Lab	2	0	0	3	70	30	100
		Total	23	16	04	09	560	340	900

**Scheme: 2013** 

#### HU201 : MANAGERIAL ECONOMICS & FINANCIAL ACCOUNTANCY (MEFA) (Common to III Semester CSE & ECE)

Scheme : 2013

**Internal Assessment : 30** 

End Exam: 70End Exam Duration: 3 Hrs

#### **Course Outcomes:**

- CO 1:To understand the application of Managerial Economics in various aspects of decision making
- CO 2: To think and analyze the critical problems in accountancy
- CO3: To enhance their leadership qualities and understand the key elements to be an entrepreneur
- CO 4: To acquire entrepreneurial abilities among the engineers

#### Unit: 1

Introduction to Managerial Economics & Demand Analysis

Managerial Economics: Definition of Managerial Economics, Characteristics and Scope, Managerial Economics and its Relation with other subjects and its Uses, Role and Responsibilities of Managerial Economist

Demand Analysis: Meaning, Types of Demand, Demand Determinants, Law of Demand – Its assumptions and exceptions, Law of Diminishing Marginal Utility

## Unit: 2

Elasticity of Demand and Demand Forecasting

Elasticity of Demand: Definition, Types of Elasticity of Demand, Practical Significance of price elasticity of demand, Measurement of Price Elasticity of Demand

Demand forecasting – Importance, Factors, Purposes of Demand Forecasting, Methods of Demand Forecasting.

## Unit: 3

Theory of production & cost analysis and Market Structures

Production Analysis: Meaning of production function, Isoquants & Isocosts, The law of diminishing Marginal Returns, Law of Returns to Scale, Internal and External Economies of scale.

Cost Analysis – Cost concepts, Cost output relationship for Short Run and Long Run, Break Even Analysis – Its Importance, Limitations and Managerial uses

Market Structures: Types and Features of different Competitive situation–Perfect Competition – Monopoly – Monopolistic and Oligopolistic Competition, Price output determination in case of perfect competition and Monopoly.

## Unit: 4

Types of Business Organizations & Capital and its Significance

Types of Business Organizations: Features and Evaluation of Sole Proprietorship, Partnership, Joint Stock Company.

Capital and its Significance: Types of Capital – Estimation of fixed and working capital requirements – Methods and sources of raising fixed and working capital

## Unit: 5

Introduction to Financial Accountancy

Principles of Accountancy: Introduction to Accountancy, Double Entry System of Book Keeping-Meaning – Scope – Advantages, Journal Entries, Ledger, Preparation of Trial Balance.

L	T/D	P	¢
3	0	0	3

## Unit: 6

**Final Accounts** 

Preparation of Final Accounts: Trading Account, Profit & Loss Account, Balance Sheet with adjustments, Final Accounts problems.

## **Text Books:**

- 1) Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi
- 2) Y.K Bhushan, Business Organization & Management, S Chand & Co., New Delhi.
- 3) S.P Jain and K.L Narang, Financial Accounting, Kalyani Publishers, New Delhi.

## **Reference Books:**

- 1) Shukla & Grewal, Advanced Accountancy, S.Chand& Co., New Delhi
- 2) M.C Shukla, Business Organization and Management, S.Chand& Co., New Delhi.

## NOTE:

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for Sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### BS202: COMPLEX VARIABLES AND SPECIAL FUNCTIONS (Common to B.Tech III Semester ECE & EEE)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

#### **Course outcomes:**

- 1. Students are able to understand and apply Bessel and Legendre functions in solving electrical engineering problems.
- 2. Students shall apply numerical solutions in engineering, science and also in many branches of applied mathematics.
- 3. Students are able to understand and apply Statistics in many fields of learning such as physical sciences and engineering.
- 4. Students shall apply Complex techniques in the area of transmission lines, control systems, signal processing and electromagnetic field theory.

#### Unit - I

**Complex Variables:** Analytic functions, Cauchy-Riemann equations, sufficient condition for analyticity, Harmonic function, Method to find the Conjugate function, Milne – Thomson method. Conformal Mapping ( $e^z$ ,  $z^2$ , sinz, cosz), Bilinear Transformation.

#### Unit – II

**Complex Integration & Series :** Simple and Multiple Connected regions, Cauchy's Integral theorem, Cauchy's integral formula, Generalized Integral formula. Taylor's series, Maclaurin's series and Laurent's series. Residue theorem, Method of finding residues. Evaluation of real integrals by contour integration, Integration round the unit circle and in the interval  $(-\infty, \infty)$ .

## Unit-III

**Interpolation :** Operators, relation between the operators. Newton's forward and backward interpolation formulae. Lagrange's and Inverse Lagrange's interpolation formulae. Cubic Spline interpolation.

## Unit - IV

**Bessel Functions:** Solution of Bessel''s equation, Recurrence relations for  $J_n(x)$ , Generating function, Jacobi series, Orthogonality of Bessel''s function.

#### Unit – V

**Legendre Functions:** Solution of Legendre''s equation, Rodrigue''s formula, Legendre polynomials, Generating function, Recurrence relations for  $P_n(x)$ , Orthogonality of Legendre polynomials.

#### Unit – VI

**Numerical Methods & Statistics:** Solution of first order Differential equations. Taylor's method, Picard's method, Euler's and modified Euler's methods. Runge-Kutta methods of second and forth order. Normal distribution, properties. Correlation coefficient, Lines of regression.

## **Text Books:**

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 2005

2. T.K.V Iyengar, et.al. "A Text book of Engineering Mathematics", Vol-3 S. Chand&co.2011 **Reference Books:** 

1. S.S.Sastry, "Introductory Methods of Numerical Analysis", PHI, 2010

2. Erwin Kreyszig "Advanced Engineering Mathematics", John Wiley and Sons 8<sup>th</sup> Edition,2008

#### NOTE:

L	T/D	Р	С
3	0	0	3

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**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC201: PROBABILITY THEORY AND STOCHASTIC PROCESSES (PTSP) (For B.Tech. ECE III Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd ExamEnd Exam Duration : 3 Hrs

L	T/D	P	С
3	0	0	3

#### Course Outcomes: Students will be able to

CO1. Understand the concept of probability using an appropriate sample space.

CO2. Compute statistical Averages such as Expectations, Moments about origin and central Moments using density and distribution functions on single random variable.

CO3. Understand the properties of joint density and distributions on a multiple random variable and the concept of central limit theorem.

CO4. Compute operations such as Joint moments about the origin and central moments on multiple random variables.

CO5. Understand the concept of random processes and their temporal and their spectral Characteristics.

CO6. Analyze the response of an LTI system using random inputs.

#### Unit-I

**Probability Theory**: Probability and axioms of probability, Joint Probability and Conditional Probability Total Probability, Baye's Theorem and Bernoulli's trials,.

#### Unit-II

**Single Random Variables**: Definition of a Random variable, Classification of Random variables, Distribution and Density functions- Gaussian, Uniform, Exponential, Binomial, Poisson"s, Rayleigh, Chi square, Conditional distributions and density functions.

**Operations on single random variable**: Expectation, Moments about the origin, Central Moments, Variance, Skew and Kurtosis, Chebyshev"s Inequality, Markov Inequality, Characteristic functions, Moment Generating function, Transformation of random variables.

#### Unit-III

**Multiple Random Variables:** Joint Distribution Function and its Properties, Joint Density and its Properties, Marginal Distribution and Density Functions, Conditional Distribution and Density – Point Conditioning and Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem.

## **Unit-IV**

**Operations on Multiple Random Variables:** Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments, Schwartz Inequality, Joint Characteristic Functions, Jointly Gaussian Random Variables& prosperities, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

#### Unit-V

**Random Processes-Temporal Characteristics**: Random Process Concept, Classification of Random Processes, Distribution and Density Functions, Stationarity and Statistical Independence. Ensemble Averages, Time Averages, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions.

**Random Processes-Spectral Characteristics**: Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

#### **Unit-VI**

**Linear Systems with Random inputs**: Linear system Fundamentals, Random signal response of linear systems, System evaluation using random noise, spectral characteristics of system response.

#### **Text Books**:

1. Peyton Z. Peebles, Probability Random variables and Random signal principles 4th Edition, TMH, 2009.

2. Athanasios Papoulis and Unni Krishna Pillai, Probability, Random variables and stochastic processes,

4th Edition, PHI, 2009.

#### **Reference books:**

- 1. Henry Stark and John W.Woods, Probability and Random processes with applications to signal processing, 3rd edition ,Pearson Education, 2009.
- 2. R.P.Singh and S.D. Sapre, Communication Systems Analog & Digital, 2nd edition, TMH 2007.
- 3. Simon Haykin, Communication Systems, 2nd Edition, John Wiley, 2009.
- 4. I.J.Nagrath, S.N.Sharan, R.Ranjan, S.Kumar, Signals and Systems, 11th Edition, TMH, 2008

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**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC202: ELECTRONIC DEVICES AND CIRCUITS (EDC) (Common to B.Tech. III Semester ECE & EEE)

# Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

## **Course Outcomes: Students will be able to**

CO 1: Understand the operating principles of basic electronic devices like p-n Diode, Zener diode and BJT.

CO 2: Understand and analyze the design of BJT amplifier and to design amplifiers.

CO 3: Analyze & the FET amplifier and its biasing techniques and able to design FET amplifiers

CO 4: Analyze and design CE, CB and CC amplifiers in single stage as well as in multistage.

## Unit-I

**Review of Semiconductor Physics & Transistor:** Energy band diagram- Fermi-level, Drift and diffusion concepts, Continuity equation, Minority carrier injection, and Potential variation within graded semiconductor, Contact potential difference, p-n junction diode & Zener diode characteristics, Rectifiers with filters, Eber"s moll model and small signal model of bipolar junction transistor, Graphical determination of h parameters.

## Unit-II

Transistor Biasing: Need for biasing, Operating point, DC and AC load lines, Bias stabilization

techniques: fixed bias, collector to base bias, self-bias, Stabilization against variations in  $I_{co},\,V_{BE}$  and  $\beta$  for the self bias circuit, Bias compensation techniques, Thermal runaway and thermal stability.

## Unit-III

**Junction Field Effect Transistor (JFET):** Principle of operation, Characteristics of JFET, FET small signal model, Graphical determination of  $g_m$ ,  $r_d$  and  $\mu$ , FET as Voltage Variable Resistor (VVR),Advantages of FET over BJT.

## **Unit-IV**

**FET Biasing**: Biasing techniques: Fixed bias, Source self-bias, Voltage divider bias **MOSFETS**: Depletion and enhancement types of MOSFETs.

## Unit-V

**Single Stage Amplifiers :** Transistor as an amplifier, Transistor Low frequency hybrid Model, Analysis of a transistor amplifier circuit using h-Parameters, Comparison of CB, CC and CE amplifier configurations, Emitter Follower, Linear analysis of transistor amplifier circuits, Miller"s Theorem and its Dual.

## Unit-VI

**Multistage Transistor Amplifiers:** Types of coupling – RC coupled, Direct coupled, Analysis of two cascaded amplifier stages, Approximate CE, CB and CC models, CE amplifier with emitter resistance, Darlington, Bootstrap and Cascade amplifiers, Frequency response of an amplifier at Low and High frequencies, Bandwidth of cascaded amplifier stages.

## **Text Books:**

- 1. J.Milliman, C.Halkias & Satyabrata Jit, "Electronic Devices and Circuits", 2nd Edition, TMH,2007.
- 2. J. Milliman & C.Halkias, "Integrated Electronics" -TMH, 2007
- 3. Robert Boylestad & Lowis Nashelsky, "Electronic Devices and Circuit Theory", 5th Edition PHI, 1993
- 4. Allen Mottershed, "Electronics devices and circuits", PHI

#### **Reference Books:**

- 1. Ben.G.Streetman, "Solid state electronic devices", PHI
- 2. David .A. Bell, "Electronic devices and circuits", 4th Edition, PHI, 1999.
- 3. Nagrath, "Analog and Digital Circuits", TMH

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## EC203: SIGNALS AND SYSTEMS (SAS) (For B.Tech ECE III Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	3

## Course outcomes: Students will be able to

CO 1: Understand the analysis and classification of signals and systems.

CO2: Analyze frequency domain description of periodic and aperiodic signals and their characteristics.

CO3: Analyze the characteristics of LTI systems and understand the discretisation of signals. CO4: Apply the concepts of Convolution and Correlation to find the response of a system and check the degree of similarity between the signals

CO 5: Understand the frequency domain representation and spectral analysis of Continuous time signals and systems using Laplace Transforms and Discrete time signals and systems using Z-Transforms.

#### Unit-I

**Introduction:** Basic continuous and discrete time signals, Classification of Signals and Systems and their properties, Basic operations on signals, Elementary signals, Singularity functions: Impulse, Step and Ramp functions.

#### Unit-II

**Fourier Series and Fourier Transforms:** Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Spectrum and its significance, Amplitude and Phase spectra, Fourier transform(FT), Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals.

## Unit-III

**Signal transmission and Sampling:** Linear time invariant (LTI) system, Transmission of signals through continuous and discrete time LTI systems, Transfer function of an LTI system. Distortion less transmission through LTI system, Causality & stability, , Sampling of continuous time signals, Sampling theorem, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Practical aspects of sampling; pulses of finite duration, Flat top sampling

#### **Unit-IV**

**Convolution and correlation of signals :** Graphical method of convolution, auto correlation and Cross correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation, Applications of convolution and correlation.

#### **Unit-V**

**Laplace transforms:** Laplace transform(LT), Concept of region of convergence (ROC) for Laplace transforms, Properties of Laplace transforms, Laplace transform of periodic signals. Inverse Laplace transform. Laplace transform solution for electric circuits, System impulse response and definition of system transfer function.

## Unit-VI

**Z-transforms :** Z-Transform of Discrete time signal, Region of Convergence(ROC) and its properties, Constraints on ROC for various classes of signals, properties of Z Transforms, System function, Causlity and stability, Inverse Z Transform, Unilateral Z Transform.

## **Text Books**:

- 1. Simon Haykin, Communication Systems, 2<sup>nd</sup> Edition, Wiley-Eastern.
- 2. Oppenheim A.V and Willsky, Signals and Systems, 2<sup>nd</sup> Edition, Pearson Edition.
- 3. B.P.Lathi, Communication Systems, Wiley Eastern.

#### **References Books:**

- 1. Simon Haykin and Van Veen, Wiley, Signals & Systems, 2<sup>nd</sup> Edition.
- 2. Simon Haykin, Signals and Systems, Wiley-Eastern.
- 3. Hwei Piao Hsu, Schaum"s, Outline of Theory Problems of Signals and Systems, McGraw-Hill Professional.

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**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EE210: CIRCUIT THEORY (CT) (For B.Tech ECE III Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	P	С
3	0	0	3

#### Course Outcomes: Students will be able to

CO 1: Understand the response of the circuits which contain R, L and C components for step, ramp and parabolic excitations

CO 2: Analyze an electrical DC and AC circuits using kirchoff's laws, network reduction techniques, Nodal, Mesh analysis and network theorems.

CO 3: Analyze the composite magnetic circuit with the help of dot convention and mutual inductance concept.

CO 4: Analyze the Cutset and Tieset Matrices to obtain KCL and KVL equations for planar electric circuits.

CO 5: Apply the resonance concept to Filter applications.

CO 6: Analyze the transient response of the RL, RC and RLC for DC and AC circuits using Laplace transform method.

#### Unit-I

**Introduction to Electrical Circuits**: Resistance, Inductance, Capacitance, Specifications of R, L,C and their V-I characteristics, Independent and dependent sources, Response for various types of excitations – step, ramp and parabolic signals, Power and energy in R-L-C components.

#### Unit-II

**Network Analysis**: Kirchhoff's laws-network reduction Techniques-series, parallel, series parallel, Star – to – Delta or Delta – to – Star Transformations, Source Transformation, Nodal analysis, mesh analysis, super node and super mesh for D.C excitations.

## Unit-III

**Analysis of AC Concepts:** Concept of impedance, impedance triangle, admittance, concept of complex power, real, reactive power and power factor, Analysis of series, parallel and series-parallel (RL, RC and RLC) circuits with suitable examples and phasor diagrams.

**Magnetic Circuits:** Concept of mutual inductance in coupled circuits- coefficient of coupling – dot convention – composite magnetic circuit analysis.

#### **Unit-IV**

#### **Network Topology:**

Definitions, Graphs, Tree, incident matrix, Basic Cutest and Tie set schedules, Matrices for Planar Networks, Duality and Dual Networks

#### **Resonance:**

Resonance in series and parallel circuits – bandwidth and Q factor, Half-Power Frequencies

## Unit-V

#### **Network Theorems:**

Super Position, Reciprocity, Thevenin"s, Norton"s, Maximum Power Transfer, Milliman"s, Tellegen"s, and Compensation Theorems for DC and AC excitations.

## **Unit-VI**

Transient Analysis: Transient response of RL, RC and RLC circuits for DC and sinusoidal excitations using Laplace transform method.

## **Text Books:**

1. William Hayt & Kemmerly, *Engg. Circuit Analysis*, 6<sup>th</sup> Edition, TMH, 2006 2. Joseph A Edminister, *Theory and problems of Electric circuits*, 4<sup>th</sup> Edition, TMH, 2004

3. D. Roy Choudary, Networks and Systems, New Age International, 2007.

4. Van Valkenburg, *Network analysis*, 3<sup>rd</sup> Edition, PHI,2005

5. Sivanaga Raju, G. Kishor and C. Srinivasa Rao (2010), "Electrical Circuit Analysis", Cengage Learning

## **Reference Books:**

1. A.Sudhakar and S.P.Shyam Mohan, *Circuits and Networks*, 2<sup>nd</sup> Edition, TMH, 2002

2. Smarajit Ghosh, Network Theory, PHI, 2005.

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End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## ML201 : QUANTITATIVE APTITUDE (QA)

(Common for all branches of III-Semester)

L	T/D	Р	С
1	1	0	2

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

#### **Numerical Ability**

Number Systems, HCF and LCM, Decimal Fractions, Square Roots and Cube Roots, Linear and Quadratic Equations

Averages, Mixtures & Allegations, Ages, Ratios, Proportions and Variations, Percentages, Profit and Loss

Time, Speed and Distance, Time and Work

Permutations and Combinations, Probability, Clocks and Calendars

#### Introduction to concepts of Reasoning

Cubes, Series and sequences, Odd man out, Coding and decoding

#### **General Mental Ability**

Puzzles and Teasers

#### **References Books:**

- 1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi.
- 2. R.S. Aggarwal, *Quantitative Aptitude*, S.Chand Publishers, New Delhi.
- 3. Sharon Weiner-Green, Ira K. Wolf, Barron's GRE, Galgotia Publications, New Delhi.
- 4. Ethnus, Aptimithra, McGraw Hill Publishers
- 5. R.S Aggarwal, Verbal and Non-Verbal Reasoning, S.Chand Publishers, New Delhi.
- 6. Shakuntala Devi, Puzzles to Puzzle You, Orient Paper Backs Publishers, New Delhi.
- 7. Shakuntala Devi, More Puzzles, Orient Paper Backs Publishers, New Delhi.
- 8. Ravi Narula , Brain Teasers, Jaico Publishing House, New Delhi.
- 9. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai.

## DISTRIBUTION AND WEIGHTAGE OF MARKS

There shall be four objective type (Paper / PC based) tests, carrying 25 marks each, during the semester. The sum of the marks scored in all these four tests shall be the final score.

#### EC204: ELECTRONIC DEVICES & CIRCUITS LAB (EDC (P))

#### (For B.Tech III Semester - ECE)

Scheme : 2013 Internal Assessment : 30 End Exam : 70 End Exam Duration : 3 Hrs Course Outcomes:

L	T/D	Р	С
0	0	3	2

• Students are able to design and analyze the Characteristics of different devices and amplifier circuits.

#### **Electronics Workshop Practice (2 lab sessions)**

- 1. Identification, specifications and testing of R, L, C components (colour codes), potentiometers, Bread boards, CDS, PCB.
- 2. Identification, specifications and testing of active devices : Diodes, BJT, FET, SCR, & UJT
- Study and operation of Multimeters , Function generators ,Regulated power supplies CRO & DSO

#### List of Experiments (For laboratory examination – Minimum of 10 experiments))

- 1. Forward and reverse bias characteristics of PN junction diode Characteristics
- 2. Zener diode characteristics and Zener diode as voltage regulator.
- 3. Half Wave Rectifier with and without filters.
- 4. Full Wave Rectifier with and without filters.
- 5. Input and output characteristics of BJT in CB Configuration.
- 6. Input and output characteristics of BJT in CE Configuration.
- 7. FET Characteristics.
- 8. Frequency response of CE Amplifier.
- 9. Frequency response of CC Amplifier.
- 10. UJT Characteristic and UJT Relaxation Oscillator.
- 11. SCR Characteristics.
- 12. LED Characteristics.

#### EC205: BASIC SIMULATIONS LAB (BS (P))

#### (For B.Tech. ECE III Semester)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Students are able to understand the basic difference between continuous time & discrete time domain signals.
- Students are able to understand the process of sampling the band limited continuous time domain signals.

#### **List of Experiments:**

- 1. Operations on matrices
- 2. Generation of signals
- 3. Even and odd parts of signal
- 4. Convolution between signals
- 5. Auto-correlation and Cross-correlation between signals
- 6. Computation of Unit Sample response and Unit step response of signals
- 7. Finding the Fourier transform of signal
- 8. Laplace transform of signals
- 9. Location of poles and zeros in the Z-plane
- 10. Sampling theorem verification
- 11. Verification of linearity and Time Invariance property
- 12. Gibbs phenomenon
- 13. Removal of noise by Auto-Correlation
- 14. Verification of Weiner-Khinchine relations

#### EC206: ANALOG ELECTRONIC CIRCUITS (AEC) (For B.Tech IV Semester ECE & EEE)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

## Course Outcomes: Students will be able to

CO1: Understand the frequency response of amplifiers, employing BJT and FET, at high frequencies, using their equivalent models.

CO2: Understand the basic operation of differential amplifier and its characteristics.

CO3: Analyze and design amplifiers with negative feedback and positive feedback.

CO4: Understand basic concepts and operation of large signal amplifiers and tuned amplifiers.

CO5: Understand the construction and principle of operation of special purpose electronic devices

- Tunnel diode, Photo diode, varactor diode, UJT, LED, LCD and thyristors.

## Unit-I

**Transistor at High Frequencies**: Hybrid- $\pi$  model, Hybrid- $\pi$  conductances, and capacitances,

CE short circuit current gain, Parameters and  $f_T$ , Current gain with resistive load, Single stage CE transistor amplifier frequency response, Gain-bandwidth product (GBW).

## Unit-II

**FET Amplifiers:** FET small signal analysis, Low frequency CS and CD amplifiers, CS and CD amplifiers at high frequencies.

**Differential Amplifiers:** Ideal differential amplifier, CMRR, Emitter-coupled differential amplifier, Differential amplifier supplied with constant current, Practical considerations, Transfer characteristics of differential amplifiers.

## **Unit-III**

**Feedback Amplifiers:** Classification of amplifiers, Concept of feedback, Transfer gain with feedback, General characteristics of negative feedback amplifiers- Gain, Bandwidth, Input resistance, Output resistance & Noise, Method of analysis of feedback amplifier, Analysis of feedback (Voltage & Current series, Voltage & Current shunt) amplifiers.

## **Unit-IV**

**Oscillators:** Barkhausen criterion, RC Phase shift oscillator using FET & BJT, General form of LC oscillator circuit, Hartley and Colpitts oscillators, Wien-bridge oscillator and Crystal oscillator its significance.

## Unit-V

**Large Signal Amplifiers:** Classes of operation, Class A amplifiers (Series-fed, Transformer coupled, Push pull), Class B amplifiers (Push pull, Complementary-symmetry), Crossover distortion and Class AB operation, Class C amplifiers and efficiency.

## **Unit-VI**

**Tuned Amplifiers:** Need of tuned amplifiers, Analysis of single stage capacitive coupled tuned amplifier.

Special semiconductor devices: Principle of operation, Characteristics and applications of- Tunnel

diode, Varactor diode, Photo Diode, Photo transistor, UJT, SCR, DIAC and TRIAC, LCD, LED.

## **Text Books:**

1. Millman and Halkias, "Integrated Electronics", 2nd Edition, TMH 2010.

2. Allen Mottershed, "Electronic Devices and Circuits", 28th Edition, PHI 2006.

3. Donald A.Neamen, "Eletcronic Circuit Analysis and Design", 2<sup>nd</sup> Edition, Mc Graw Hill 2001.

4. G. K. Mithal, "Electronic Devices and Circuits", 23rd Edition, Khanna pub. 2006

## **Reference Books:**

- 1. Bogart Theodore, "Electronic Devices and Circuits", 6th Edition, PE 2008.
- 2. Millman and Grabel, "Microelectronics", 2nd Edition, TMH 2003.
- 3. Henry Zanger, "Semiconductor Devices and Circuits", John wiley 1984.

## NOTE:

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc.

Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC207: PULSE AND DIGITAL ELECTRONICS (PDE) (For B.Tech ECE IV Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	3

Course Outcomes: Students will be able to

CO 1: Understand linear wave shaping circuit operation

CO 2: Formulate switching operations of transistor, sampling gates and digital circuit building blocks

CO 3: Revise the Fundamentals of Numbering systems

CO 4: Design and validate the combinational & Sequential circuits

CO 5: Model the FSM & ASM Charts for Sequential Circuits

#### Unit-I

**Linear Wave Shaping:** High pass, Low pass RC circuits, Their response for sinusoidal, Step, Pulse, Square and ramp inputs, RC network as differentiator and integrator.

**Non Linear Wave Shaping**: Diode clippers, Clipping at two independent levels, Transfer characteristics of clippers, Clamping operation, Clamping circuits using diode with different inputs, Clamping circuit theorem.

#### Unit-II

**Switching Characteristics of Diode and Transistor**: Diode as a switch, Piecewise linear diode characteristics, Transistor as a switch, Saturation parameters of Transistor and their variation with temperature, Transistor-switching times, Design of transistor switch.

**Multivibrators:** Design and Analysis of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

## Unit-III

**Number Systems:** Binary, Octal, Decimal, Hexadecimal systems, Conversion of number systems, Weighted and non-weighted codes, Digital Data Representation: Fixed - Signed magnitude, 1<sup>st</sup> complement, 2<sup>st</sup> complement, Floating point – Biased exponent, Binary arithmetic, Hamming code, Error detection and correction.

## **Unit-IV**

**Logic Gates and Simplification of Boolean Expressions:** OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR gates, Boolean theorems, Switching functions: types, Sum of products, Product of sum, Canonical forms, Minimization of Boolean functions using K-maps and tabulation methods.

**Sampling gates:** Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates.

## Unit-V

Combinational Circuits: Binary adders and Subtractors using signed magnitude, 1"s

complement, 2"s complement, Carry look-ahead adders (fast adders), BCD adders and Subtractors, Decoders, Encoders, multiplexers, De-multiplexers, Parity generator and checker. Code conversion circuits, Magnitude comparator.

## **Unit-VI**

Sequential Circuits : Finite state model of sequential circuits, Flip-flops, shift registers, Asynchronous and Synchronous counters, Ring and Johnson counters, Design of non-binary counters, Synthesis of synchronous sequential circuits, Melay and Moore machines, Minimization of states.

## **Text Books:**

1. Milliman and Taub, Pulse, Digital and Switching Waveforms, McGraw-Hill.

nd 2. M. Moris Mano, Charles R.Kime, Digital Logic and Computer Design Fundamentals, 2 Edition, Pearson Ed.

3. Zvi Kohavi, Switching and Finite Automata Theory, TMH. 4. R.P.Jain, *Modern Digital Electronics*, 3<sup>10</sup> Edition, TMH.

**Reference Books:** 

th

1. David .A. Bell, Solid State Pulse Circuits, 4 Edition, PHI. th

2. Wakerly, Digital Design- Principles and Practices, 4 Edition, PHI.

## NOTE:

End Exam: The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC208 : NETWORKS AND TRANSMISSION LINES (NTL) (For B.Tech ECE IV Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

#### Course Outcomes:Students will be able to

CO1: Understand the characteristics of one port and two port networks - Z, Y, h, g and ABCD parameters

CO2: Understand the characteristics of symmetrical and asymmetrical networks

CO3: Design filters, attenuators and equalizers

CO4: Understand the signal behaviour through a transmission line

CO5: Analyse the reflection coefficient, standing wave ratio, input impedance and the location of maxima and minima of a transmission line at UHF

CO6: Design single stub network and double-stub network for matching load impedances using Smith Chart.

#### Unit-I

#### **Two port Networks**:

Terminals and terminal pairs, Driving point and transfer functions for two port Networks - Z, Y, h, g, ABCD parameters, Equivalence of two port networks. Inter connection of two ports, analysis of reciprocal networks.

#### **Unit-II**

#### **Characteristics of Networks:**

Symmetrical networks, Characteristic impedance and propagation constant. Asymmetrical networks, Image and iterative impedances, Image transfer constant & iterative transfer constant, Properties of L, T and PI sections, Lattice, Bridged -T, Twin –T networks. L –matching networks.

#### **Unit-III**

**Filters Basics:** The Decibel and Neper, Types of Filters, Characteristics of the filter. **Constant K filters:** Low pass, High pass, Band pass, Band stop filters design. **m-derived filters:** m-derived low pass, High pass, Band pass, Band stop filters design. Composite filter design, Equalizers, Attenuators.

#### **Unit-IV Transmission lines**:

Types of transmission lines, Primary constants, Skin effect, Transmission line equations from source and load end, Infinite line, Secondary constants, Velocity of propagation, Group velocity. Terminations: Open and short circuited lines, Transmission line as circuit element, Line distortion, Distortion less line, loaded lines.

#### **Unit-V Characteristics:**

Properties of transmission lines at UHF, Reflection coefficient, Standing waves, Characteristics of half wave, Quarter wave and 1/8 wave lines.

#### **Unit-VI Smith Chart:**

Construction and applications of Smith chart, Transmission line matching. Single and double stub matching.

#### **Text Books:**

1. Van Valkunberg, Network Analysis (Unit-I).3rdEdition, PHI 1974.

2. Umesh Sinha, Networks and Transmission Lines, 8thEdition, Satya Prakashan

#### **Reference Books:**

1. John D Ryder, Networks Lines and Fields, 2<sup>nd</sup> Edition, Prentice Hall 2003.

2. Johnson, Transmission Lines and Networks, TMH.

3. V K A Atre, Network Theory & Filter Design, New Age International.

4. A.Sudhakar and S.P.Shyam Mohan, Circuits and Networks, 3<sup>rd</sup> Edition, TMH 2007 **NOTE:** 

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC209 : ELECTROMAGNETIC WAVES (EMW) (For B. Tech ECE IV Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	3

Course Outcomes: Students will be able to

CO1: Understand the principles of vector algebra, vector calculus and their physical interpretations in electromagnetic fields.

CO2: Analyze Gauss"s law and its applications.

CO3: Apply concepts and principles of electrostatic and magnetostatic fields to solve complex problems.

CO4: Analyze Maxwell's equations for static and time varying electromagnetic fields. CO5: Understand the formation and characteristics of electromagnetic wave propagation.

## Unit-I

**Co-ordinate Systems and Vector Calculus:** Vector Algebra, Co-ordinate systems-Cartesian, Cylindrical and Spherical, Transformation of Vector functions from one Co-ordinate system to another. Gradient, Divergence, Curl and their physical interpretations, Stokes theorem, Divergence theorem.

## Unit-II

**Electro Static Fields-I:** Coulomb"s law, Electric field intensity, Field due to different charge distributions-Line charge, Sheet charge and Volume charge distributions. Electric flux and Flux density, Gauss's law and its application. Maxwell's first equation in integral and point forms.

## **Unit-III**

**Electro Static Fields-II:** Energy expended in moving a point charge in an electric field, Line integral, Potential difference and Potential, Potential field of a point charge and system of charges, Potential gradient, Dipole, Energy density in the electrostatic field. Current and current density, Continuity of current, Metallic conductors, Nature of dielectric materials, Boundary Conditions for perfect dielectrics and conductors, Capacitance-examples, Poisson's and Laplace equations-examples.

## **Unit-IV**

**Magneto static Fields:** Biot-Savart's law, Ampere's circuital law, Magnetic flux and magnetic flux density, Scalar and vector magnetic potentials, Force on a moving charge, Differential current element and force between two differential current elements, force and torque on closed circuit, Magnetization and permeability, Magnetic boundary conditions, Energy in a magnetic field.

## Unit-V

**Time Varying Fields & Maxwell's Equations:** Faraday's law, Lorentz Force Equation, Maxwell's equations in various forms, Displacement Current Density.

## **Unit-VI**

**Uniform Plane Wave:** Wave motion in free space, perfect, lossy dielectrics and good conductors. Poynting theorem, Polarization, Reflection of plane waves- normal and oblique incidence (Perpendicular and Parallel Polarizations)

#### **Text Books:**

- 1. Hayt.W.H, Engineering Electromagentics, 7th Edition, TMH.
- 2. Sadiku, Engineering Electromagnetics, 3rd Edition, Oxford University Press.
- 3. G.S.N.Raju, *Electromagnetic Field Theory and Transmission Lines*, 1st Edition, Pearson Ed.

#### **Reference Books:**

- 1. Jordan and Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd edition, Pearson Ed.
- 2. John.D.Kraus, *Electromagnetics*, 6th Edition, Mc Graw-Hill.
- 3. Nanapeneni Narayana Rao, Elements of Engg. Electromagnetics, 6th Edition, Pearson Ed.

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EE211: ELECTRICAL TECHNOLOGY (ET) (For B. Tech ECE IV Semester)

# Scheme: 2013Internal Assessment : 30End ExamEnd ExamConstantEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

## Course Outcomes: Students will be able to

- CO1: Understand the constructional features and principle of operation of DC generators and their types.
- CO2: Understand the basic magnetic concepts and application to transformer
- CO3: Understand the constructional features and principle of operation of transformer and able to analyze transformer performance through vector diagrams.
- CO4: Understand the constructional features and principle of operation of induction motors and able to analyze the performance through circle diagram.
- CO5: Understand the constructional features of alternator and able to find out the regulation of alternator through synchronous impedance method.
- CO6: Understand the principle of operation of synchronous motors and starting methods. Understand the construction and different types of single phase induction motors.

## Unit-I

**D.C.Generators:** Constructional features-single lap and wave windings-EMF equation-methods of excitation- characteristics of shunt, series and compound generators.

## Unit-II

**D.C. Motors:** Principle of operation —torque equation- speed-torque characteristics of shunt, series and compound Motors – Losses and efficiency–testing– Swinburne''s test and brake test– Speed control of DC shunt motor- 3 point and 4 point starters.

## **Unit-III**

**Transformers:** Principle of operation –constructional features-useful and leakage fluxes-EMF equation- leakage reactance-vector diagram-equivalent circuit of single phase transformer – types–Constructional features – Phasor diagram on No Load and Load – Equivalent circuit **Performance of Transformers:** Losses and Efficiency of transformer and Regulation – OC and SC tests– all-day efficiency-parallel operation-auto transformers.

#### Unit- IV

**Polyphase Induction Motors:** A.C Windings-Pitch factor and Distribution factor- EMF equation -Constructional features -Principle of operation– Slip-Torque characteristics – Equivalent circuit-Circle Diagram- Losses and Efficiency-.Methods of Speed control-Star-delta and rotor rheostat starters-applications.

#### Unit-V

Alternators: Constructional features – salient pole and turbo alternators-concept of synchronous reactance-vector diagram- regulation –determination by Synchronous Impedance Method – synchronizing of alternators to infinite bus bar.

## **Unit-VI**

**Synchronous Motors:** Principle of operation-V and inverted V curves, methods of starting, hunting and its suppression -applications.

**Single Phase Induction Motors:** Construction- Characteristics –starting split phase and shaded pole methods- single phase series motor.

## **Text Books:**

1. M.S Naidu and S. Kamakshaiah, Introduction to Electrical Engineering, TMH Publications.2. T.K. Nagasarkar and M.S.Sukhija, Basic Electrical Engineering, Oxford University Press, 2005

## **Reference Books:**

1. V.K Mehta, Principles of Electrical Engineering, S.Chand Publications.

2. I.J. Nagarath amd D.P Kothari, Theory and Problems of basic electrical engineering, PHI Publications

3. David V. Kerns, JR. J. David Irwin, Essentials of Electrical and Computer Engineering

## NOTE:

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## ML202 :SOFT SKILLS (SS)

#### (Common to B.Tech IV Semester CIVIL, EEE & ME and V Semester ECE & CSE Branches)

#### (Draft Syllabus)

Scheme : 2013 Internal Assessment : 100

L	T/D	Р	С
1	1		2

The purpose of this course is to provide exposure to the students to the soft skills that are crucial to an employee's ability to work EFFECTIVELY.

#### **Course Outcomes:**

- Students will be able to demonstrate the competence to use grammar with an understanding of its basic rules
- Students will be able to communicate effectively and enhance their interpersonal relationship building skills with renewed self confidence
- Students will be able to work together in teams and accomplish objectives in a cordial atmosphere
- Students will be able to face interviews, GDs and give presentations
- Students will be able to understand and develop the etiquette necessary to present themselves in a professional setting

#### **Course Work**

To achieve the objectives, the following course content is prescribed.

#### Contents

- Revision and reinforcement of language skills grammar vocabulary
- Communication Skills Barriers to Communication Strategies to overcome the barriers
- Non Verbal Communication Body Language Proxemics Kinesics
- Emotional Quotient self analysis of emotional responses
- Group Discussions understanding the objective and skills tested in a GD types of GDs roles in a GD dos and don"ts in a GD
- Team Work importance of team work team vs group attributes of a successful team working with groups dealing with people group decision making
- Goal Setting importance of goal setting difference between goals and dreams importance of writing goals SMART goals short term goals long term goals
- Time Management scheduling how to delegate effectively plugging time leaks learning to say "No"
- Presentation Skills Oral Presentations PPTs Prepared Speeches Extempore
- General Awareness & Current affairs
- Business Etiquette telephone and email etiquette dining etiquette dos and don"ts in a formal setting

#### References

- 1. Stephen R. Covey, "The Seven Habits of Highly Effective People", Pocket Books Publishers, London
- 2. Infosys Campus Connect Portal –//http::campusconnect.infosys.com//
- 3. Shiv Khera, "You Can Win", MacMillan India Publishers, New Delhi
- 4. Stephen R. Covey, A. Roger Merrill and Rebecca R. Merril, "First Things First", Pocket Books Publishers, London
- 5. Gloria J.Galanes, Katherine Adams, John K Brillhart, "Effective Group Discussion: Theory and Practice".
- 6. Priyadarshani Patnaik, "Group Discussion and Interview Skills with VCD", Foundation Books.
- 7. Sangeeta Sharma & Binod Mishra, "Communication Skills for Engineers and Scientists", PHI Learning Private Limited.
- 8. Dr. Shalini Verma, "Body Language- Your Success Mantra", S.Chand, 2006.
- 9. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.
- 10. Krishna Mohan and Meera Bajerji, "Developing Communication Skills", MacMillan India Ltd.

## DISTRIBUTION AND WEIGHTAGE OF MARKS

For the Soft Skills subject there shall be continuous tests for 50 marks and viva-voce for 50 marks.

## EC210 : ANALOG ELECTRONIC CIRCUITS LAB (AEC (P)) (For B.Tech ECE IV Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
0	0	3	2

## **Course Outcomes:**

Students are able to design and analyze the Characteristics of different amplifier circuits.

## List of Experiments (12 Experiments to be done)

## i) Design and Simulation in Simulation Laboratory using any simulation Software (Minimum 6 Experiments)

- 1. Two stage RC Coupled Amplifier
- 2. Boot Strap Emitter Follower
- 3. Darlington Emitter Follower
- 4. Common Source FET Amplifier
- 5. CE Amplifier(with & without Feedback)
  - i) Current Series Feedback
  - ii) Voltage Shunt Feedback
- 6. Voltage Series Feedback Amplifier
- 7. Single Stage Tuned Amplifier
- 8. Common Drain Amplifier
- 9. RC Phase Shift Oscillator
- 10. Wien Bridge Oscillator
- 11. Differential Amplifier
- 12. Power Amplifiers
  - i) Class B Push Pull Amplifier
  - ii) Class C Amplifier

## ii) Testing in the Hardware Laboratory (6 Experiments)

- 1. Two stage RC Coupled Amplifier
- 2. Boot Strap Emitter Follower
- 3. Darlington Emitter Follower
- 4. Common Source FET Amplifier
- 5. CE Amplifier(with & without Feedback)
  - i) Current Series Feedback
  - ii) Voltage Shunt Feedback
- 6. Voltage Series Feedback Amplifier
- 7. Single Stage Tuned Amplifier
- 8. Common Drain Amplifier
- 9. RC Phase Shift Oscillator
- 10. Wien Bridge Oscillator
- 11. Differential Amplifier
- 12. Power Amplifiers

- i) Class B Push Pull Amplifier
- ii) Class C Amplifier

## **Equipment Required for the Laboratory**

- **1.** Software Simulations for Electronic Circuits
  - i) Computer Systems with Latest Specifications
  - ii) Connected in LAN(Optional)
  - iii) Operating Systems(Windows XP)
  - iv) Suitable Simulation Software

## 2. Hardware Requirement for Electronic Circuits

- i) Regulated Power Supply
- ii) CRO"s
- iii) Function Generators
- iv) Multi-meter
- v) Components

## EC211: PULSE AND DIGITAL ELECTRONICS LAB (PDE(P)) (For B.Tech ECE IV Semester)

# Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

## **Course Outcomes:**

 $\triangleright$ 

Students are able to design and analyze the Characteristics of different pulse and digital circuits.

## List of Experiments (12 Experiments to be done)

- 1. Linear Wave Shaping.
- 2. Non-Linear Wave Shaping Clippers.
- 3. Non -Linear Wave Shaping Clampers.
- 4. Transistor As A Switch.
- 5. Astable Multivibrator.
- 6. Monostable Multivibrator.
- 7. Bistable Multivibrator.
- 8. Schmitt Trigger.
- 9. Sampling Gates
- 10. Study of Logic Gates (Using Discrete Components)
- 11. Verification of Logic Gates and Adders
- 12. BCD to Excess-3 Code Converter
- 13. Multiplexer & Decoder
- 14. Shift Register and Ring Counter
- 15. Asynchronous Decade Counter

#### **Equipment Required for the Laboratory**

- Hardware Requirement for Electronic Circuits
- i) Regulated Power Supply, Function Generators

ii) CRO's, Multi-meter Components

## EE212 : ELECTRICAL CIRCUITS AND MACHINES LAB (ECMP) (For B.Tech ECE IV Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Able to prove network theorems.
- Able to study the load regulation characteristics of generators and Motors
- Able to study about the regulation characteristics of 1-phase transformer and Alternators

#### List of Experiments:

- 1. Load test on DC Compound Generator.
- 2. Swinburne"s Test.
- 3. Brake Test on Three Phase Squirrel cage Induction Motor.
- 4. Regulation of Alternator.
- 5. Load Test on Single Phase Transformer.
- 6. OC and SC test on Single Phase Transformer.
- 7. Brake Test on DC Shunt Motor.
- 8. Determination of self-inductance, Mutual inductance and coefficient of coupling.
- 9. KCL and KVL.
- 10. Thevenin"s Theorem.
- 11. Norton"s Theorem.
- 12. Superposition Theorem..

## **ANNEXURE-II**

#### FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination (Effective from 2013-2014)

## **B.Tech. ECE V Semester**

S.	Course	Course Title	C re	Scheme of Instruction periods/week		Scheme of Examination Maximum Marks			
No.	No.		di ts	L	D/ T	Р	End Exam	Internal Assess ment	Tot al
Ι		Theory							
1.	EC301	Analog Communications	3	3	0	0	70	30	100
2.	EC302	Linear IC Applications	4	3	1	0	70	30	100
3.	EC303	Electronic Measurements and Instrumentation.	3	3	0	0	70	30	100
4.	EC304	Antennas and Wave Propagation	3	3	0	0	70	30	100
5.	EE316	Linear Control Systems	3	2	1	0	70	30	100
6.	EC305	Computer organization	3	3	0	0	70	30	100
7.	ML203	Business English & Technical Writing	2	2	1	0	-	100	100
Π		Practical							
8.	EC306	Analog Communications Lab	2	0	0	3	70	30	100
9.	EC307	Linear IC Applications Lab	2	0	0	3	70	30	100
		Total	25	19	03	06	560	340	900

#### FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination (Effective from 2013-2014)

B	B.Tech. ECE VI Semester						S	Scheme: 20	13
S.	S. Course		Cr Instruction periods/week		of on eek	Scheme of Examination Maximum Marks			
No.	No.	Course The	its	L	D/ T	Р	End Exa m	Internal Assessm ent	Tot al
Ι		<u>Theory</u>							
1.	EC308	Microprocessors & Microcontrollers	3	3	1	0	70	30	100
2.	EC309	Digital System Design using HDL	3	3	0	0	70	30	100
3.	EC310	Digital Communications	3	3	0	0	70	30	100
4.	EC311	Microwave Engineering	3	3	0	0	70	30	100
5.	EC312	Digital Signal Processing	3	3	0	0	70	30	100
6.		Interdisciplinary Elective	3	3	0	0	70	30	100
II		Practical							
7.	EC313	Digital Communications Lab	2	0	0	3	70	30	100
8.	EC314	Digital Signal Processing Lab	2	0	0	3	70	30	100
9.	EC315	Microprocessors & Microcontrollers Lab	2		0	3	70	30	100
		Total	24	18	01	9	560	340	900

Scheme: 2013

## EC301: ANALOG COMMUNICATIONS (ACM) (For B.Tech ECE V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

Upon successful completion of the course, students will be able to :
CO1:- Analyze the basic amplitude modulation and demodulation schemes
CO2: Analyze the modulation and demodulation design for angle modulation techniques.
CO3:- Apply the principles of various pulse modulation and demodulation schemes.
CO4:- Evaluate figure of merit for different analog modulation schemes.
CO5:- Determine coding efficiency and channel capacity of information of a signal source.

#### Unit-I

**Amplitude Modulation:** Block diagram of general communication system, Need for Modulation, Generation and demodulation of AM, Band width, Power relations, Generation and demodulation of DSB-SC.

Single Side Band Modulation (SSB): SSB modulation, Coherent detection, Vestigial side band modulation, Frequency division multiplexing (FDM), Comparison of various AM systems-problems.

## Unit-II

**Angle Modulation:** Frequency Modulation and Phase Modulation, FM narrow band and wide band techniques, Band width, Generation of FM, Direct and indirect FM, Demodulation of FM-frequency and phase discrimination methods.

## Unit-III

**Pulse Modulation Schemes:** Review of sampling theorem, Generation and demodulation of PAM, PWM, and PPM, Time division multiplexing (TDM). **Unit-IV** 

**Pulse Code Modulation (PCM):** PCM, Companding, Band width, Noise in PCM systems, Transmitters and receivers of Differential Pulse code modulation(DPCM), Delta Modulation(DM), Adaptive Delta modulation( ADM). **Unit-V** 

**Noise:** Various types of noise, Equivalent noise band width, Noise figure, Noise temperature, Noise figure of cascaded stage amplifiers.

**Noise in AM and FM:** Noise in AM and FM, Figure of merit of AM, DSBSC, SSB, and FM, Threshold effect, Pre-emphasis and De-emphasis circuits.

#### Unit-VI

**Information Theory:** Information, Entropy, Rate of information and information capacity, Shannon–Hartley law and its significance, Shannon–Fano and Huffman coding techniques, Channel capacity for Binary symmetric channel, Binary erase channel.

## **Text Books:**

- 1. S.S.Haykin, *Communication Systems*, 2<sup>nd</sup> Edition, Wiley Eastern, 2007
- 2. Taub and schilling, Principles of Communication Systems, TMH, 2002

#### **Reference Books:**

- 1. Kennedy, Electronic Communication Systems, TMH, 2008
- 2. B.P.Lathi, Modern Digital and Analog Communication Systems, BPB, 2001
- 3. A.B.Carlson, Communication Systems, Mc.Graw-Hill, 2000

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.
## EC302: LINEAR IC APPLICATIONS (LICA) (For B.Tech ECE - V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	4

#### Course outcomes: Students will be able to

- CO 1: Understand the basic concepts and characteristics of opamp using BJT and FET.
- CO 2: Understand the applications of opamp with feedback and 555 timer
- CO 3: Design basic opamp application circuits such as linear and non-linear wave shaping circuits, filters and waveform generators
- CO 4: Understand the principle of operation and applications of PLL, IC regulators and data converters.
- CO 5: Understand the specifications and operation of logic families using BJT and MOSFETs.

#### Unit-I

**Op-Amp Fundamentals:** Differential amplifier concept, op-amp ideal characteristics, Practical inverting and non-inverting op-amp, Study of typical IC op-amp and its different stages, Features of 741 op-amp, dc characteristics: i/p bias current, i/p offset current, Offset voltages, Offset balance, Thermal drift, ac characteristics: frequency response, stability of op-amp, Frequency compensation, Slew rate, op-amp parameters, Brief analysis of opamp using JFET, Introduction to dual OP-AMP TL082 as a general purpose JFET –input operational amplifier: pin configuration and features.

#### Unit-II

**Op-amp Applications-I** : Summing amplifier, difference amplifier, Current to voltage and voltage to current converters, Instrumentation amplifier, clippers and clampers, Precision AC to DC converters, Integrator, Differentiator, Log & antilog amplifier, Sample and hold circuits.

#### **Op-amp Applications-II**

**Comparators and active filters:** Comparators, window detector, Schmitt trigger, Pulse, Square and triangle wave generators, Active filters (Butterworth filters up to second order only).

# Unit-III

**Timers & Waveform Generators**: 555 Timer: Astable and Monostable modes, Applications, waveform generators: IC 566 and IC 8038.

**Phase Locked Loops:** Principle of operation, Lock and capture ranges, detailed study of different blocks of PLL, IC 565 PLL, and Applications of PLL.

#### Unit-IV

**IC Regulators**: General form of series Regulators, Fixed voltage regulator, IC 723 voltage regulator, switching regulators (SMPS).

#### Unit-V

**D/A and A/D Converters** : DACs : Weighted resistor, R-2R ladder type and inverted R-2R ladder, ADCs: Parallel comparator type, Successive approximation and dual slope types, over sampling ADC, Specifications of converters.

#### Unit-VI

**Logic Families:** Specifications of logic gates, DTL, HTL, TTL, ECL, MOS and CMOS circuits, CMOS bilateral switch, Comparison of logic families, TTL driving CMOS and CMOS driving TTL.

#### **Text Books:**

1. Roy Choudhury & Shail B.Jain, Linear Integrated Circuits, 4/e, New Age Int. Pub. 2010.

2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4/e, PHI, 2003.

3. Moris Mano, Digital Logic and Computer Design, Pearson Ed., 2011.

4. TL082: Data sheet: <u>http://www.ti.com/lit/ds/symlink/tl082.pdf</u>

5. Application note:http://www.ti.com/lit/an/sloa020a/sloa020a.pdf

## **Reference Books:**

1. S. Salivahanan, V.S.K. Bhaaskaran, Linear Integrated Circuits, TMH, 2008.

2. Anand Kumar, Pulse and digital Circuits, PHI, 2/e, 2010.

3. R.P. Jain, Modern Digital Electronics, TMH, 3/e, 2003.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC303: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (EMI) (For B.Tech. ECE VSemester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

# **Course Outcomes: Students will be able to**

CO1: Understand the characteristics of an instrumentation system and analyze the errors in measurements and their rectification.

CO2: Know the basic working of different instruments used for measurement.

CO3: Analyze different bridges and also to know about major components present in CRO.

CO4: Understand about different types of transducers and working of a data acquisition System.

## Unit-I

**Measurement and Error:** Measurement, Generalized measurement system, Static and dynamic characteristics of Instrumentation system, Calibration, errors and their statistical analysis, PMMC instrument, specifications of an instrument, Electronic voltmeters-AC voltmeters using rectifiers, ammeters and multimeters.

## Unit-II

**AC bridges:** Condition for Bridge Balance, Measurement of Inductance-Maxwell bridge, Measurement of capacitance-Schering bridge. Measurement of Resistance- Kelvin bridge, Wheatstone bridge. Hay''s bridge, Wein Bridge, LCR Bridge and Q-meter.

#### Unit-III

**Analog & Digital Instruments:** Standard and AF sine & square wave signal generators, Function generators, Wave analyzers, Harmonic distortion analyzer, Spectrum analyzer, Analog Vs Digital instruments, Principle & operation of DVMs-Ramp type, Dual slope type, Successive approximation type, Digital frequency meter.

#### **Unit-IV**

**CRO:** Basic CRO operation, Deflection sensitivity, Cathode ray tube, Time base circuits, Delay line, CRO probes, measurements with CRO, Lissajous Figures, Analog storage CRO, Digital storage CRO, Sampling oscilloscope.

## Unit-V

**Transducers:** Sensors and Transducers, Classification & Selection of transducers, Temperature Sensors, Temperature transducers, Strain gauges, LVDT, Piezo electric transducers. Measurement of physical parameters-Force, Velocity, Acceleration, Pressure, Speed, Displacement and Humidity.

## Unit VI

**DAS:** Introduction to DAS, Data Logging, Use of ADC, Sample & Hold circuit, Multiplexers and de-multiplexers in DAS.

**Computer controlled test systems:** Introduction to testing an audio amplifier, testing a radio receiver, Instruments used in computer controlled instrumentation, IEEE-488 Electrical interface, Digital control description.

## **Text Books:**

- 1. William D. Cooper & Albert D. Helfrick, *Modern Electronic Instrumentation and Measurement Techniques*, PHI, 2<sup>nd</sup> Edition, 1990.
- 2. A.K. Sawhney, A course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co., (Pvt). Ltd., Nineteenth Edition, 2011.
- 3. H.S. Kalsi, Electronic Instrumentation, TMH, 2<sup>nd</sup> Edition, 2006

#### **Reference Books:**

- 1. K. Lal Kishore, *Electronic Measurements and Instrumentation*, Pearson Education, 2012.
- 2. J.B. Gupta, A course in *Electronics & Electrical Measurements and Instrumentation*, S.K. Kataria and Sons, 2012.
- 3. D.V.S Murthy, *Transducers and Instrumentation*, PHI, 2<sup>nd</sup> Edition, 2013.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC304: ANTENNAS AND WAVE PROPAGATION (AWP) (B.Tech. ECE V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

## Course outcomes: Student will be able to

- CO1: Analyse parametric integral expressions for a given current source.
- CO2: Determine directions of maximum signal radiations and the nulls in the radiation patterns.
- CO3: Design array antenna systems from specifications.
- CO4: Understand propagation of radio waves in different atmospheric layers.

## Unit-I

Antenna Basics: Introduction, Radiation mechanism, Current distribution on a thin wire antenna. Basic antenna parameters, Radiation patterns, Beam area, Radiation intensity, Beam efficiency, directivity, Gain, Antenna aperture, Effective height.

## Unit-II

**Radiation fields of wire antennas:** Potential functions and the electromagnetic field, Potential functions for sinusoidal oscillations Electric dipoles, Short electric dipole, Fields of a short electric dipole, Radiation resistance of short electric dipole, Assumed current distribution, Half wave dipole, Radiation resistance, Quarter wave monopole.

## **Unit-III**

Array of Point Sources: Point sources and their arrays.

**Linear Array:** BSA and EFA, Parasitic array, Point source, Power pattern, Examples of power patterns, Field patterns, Array of two isotropic point sources, Pattern multiplication, Linear array of n Isotropic point sources of equal amplitude and spacing (EFA and BSA), Null directions, Binomial array.

## **Unit-IV**

**Resonant and Non-Resonant Radiators:** Introduction to Resonant Antenna and Non Resonant Antenna, Long wire antenna, V–Antenna, Inverted V-antenna, Rhombic Antenna, Helical Antenna **VHF, UHF and Microwave Antennas**: Dipoles with parasitic Elements, Folded Dipole, Yagi-Uda Array Antenna, Flar sheet and corner reflectors, Parabolic Reflector antenna, Spill over loss, Aperture efficiency, Basic characteristics of Cassegrain Reflector Antenna., Loop Antenna , slot Antenna, Horn Antenna & Frequency Dependent Antenna: Principle & Log-periodic Antenna.

## Unit-V

**Micro Strip Antennas:** Basic Characteristics, Feeding Methods, Rectangular, Circular patch quality factor, Bandwidth efficiency, Introduction to Smart antennas.

**Measurements**: Introduction, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by comparison, Absolute and 3-Antenna Methods).

# **Unit-VI**

**Radio Waves Propagation:** Radio waves, Fundamental equation for FRISS free space propagation, Modes of propagation, Structure of atmosphere, Sky wave propagation (neglecting earth"s magnetic field), Virtual Height, MUF, Skip distance.

**Space wave propagation** - Range of space wave propagation, Effective earth radius, Field strength of space wave propagation, Duct propagation

# **Text Books:**

- 1. J.D. Kraus, RJ. Marhefka and Ahmad S. Khan, *Antennas and Wave Propagation*, TMH, New Delhi, 4'h ed., (Special Indian Edition), 2010.
- 2. C.A. Balanis, Antenna Theory, John Wiley & Sons, 3rd ed.. 2005.
- 3. K.D. Prasad, *Antennas and Wave Propagation*, Satyaprakashan Tech India publications , New Delhi, 2001

# **Reference books:.**

- 1. E.V.D. Glazier and H.R.L. Lamont *Transmission and Propagation*, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
- 2. Jordan E. C. and Balmain, *Electro Magnetic Waves and Radiating Systems*, PHI, 1968, Reprint 2003.
- 3. R.E.Collins, Antennas and Radio Propagation, McGraw-Hill, 1987.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# EE316: LINEAR CONTROL SYSTEMS (LCS) (B.Tech. ECE - V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
2	1	0	3

## **Course Outcomes:**

CO1. Understand and develop model of a system, concept of open loop and closed loop system.

CO2. Understand the behavior of open loop and closed loop systems.

CO3. Analyze the stability of a control system through numerical and graphical techniques in time and frequency domain.

CO4. Able to realize the compensator and estimate the controllability and observability of control systems.

## Unit – I

**Equations and Models of Linear Systems:** open-loop and closed-loop systems, control system components, servomotor, tachometer, synchros, position control systems, Transfer functions, equations of electrical and mechanical systems.

#### Unit – II

**Block Diagrams:** block diagram representation and manipulation, signal flow graphs-mason's gain formula to determine overall system gain.

**Feedback Characteristics of Control Systems:** Feedback and non-feedback systems, effects of feedback, regenerative feedback.

## Unit – III

**Time Response:** Types of input, transient response of second order system for step input, timeresponse specifications, steady state error and error constants, proportional, derivative and integral controls.

Concept of Stability: Stability of systems-Routh Hurwitz criterion, Relative stability.

#### Unit – IV

**Root Locus:** Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques.

**Frequency Response:** Co-relation between time and frequency response, frequency domain specifications, resonant peak (Mp) and resonant frequency(Wp) for a second order system, relative stability-gain margin(GM) and phase margin (PM),

#### Unit – V

**Frequency Plots:** Bode plots, , Polar plots, Nyquist criterion for open loop stable system, M and N circles,

Unit – VI

**Compensation (Without Design):** The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators.

**State Variable Analysis:** Introduction, concepts of state, state variables, state transition matrix, and state model, state model of linear systems, state-space representation using phase variable and physical variables, solution of state equations. Concept of Controllability and Observability.

#### **Text books:**

- 1. Nagrath and Gopal (2003), "Control systems Engineering", New Age International Publications.
- 2. B.C.Kuo (2003), "Automatic Control Systems", Oxford.
- 3. K. Ogata (2003), "Modern control Engineering", Pearson
- 4. Naresh K.Sinha (1998), "Control Systems", New Age International Publishers.

5. B.S.Manke (1996), "Linear Control Systems".

# **Reference books:**

- 1. Madan Gopal (2003), "Control Systems", TMH.
- 2. Dorf, Bishop (1998), "Modern Conrtol systems", Addison Wesley
- 3. (Shaum's out line series) (1986), "Feedback control systems", TMH
- 4. R.C.Shukla, "Control Systems", Dhanpat Rai.
- 5. Ashok Kumar, "Control Systems", TMH.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# EC305: COMPUTER ORGANIZATION (CO) (For B.Tech. ECE - V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

## **Course Outcomes:**

CO1: Analyze the concepts of Microprogramming, Register organization and common bus design using multiplexers and Tristate buffers.

CO2: Recognize the architectures of processors used in computing systems, Instruction formats of various memory mapped, I/O mapped instructions and Interrupt handling.

CO3: Realize Micro-programmed control units for a simple processor, address mapping and instructions.

CO4: Understand CPU, Stack organization and basic Addressing modes.

CO5: Understand I/O organization, direct memory organization, memory hierarchy and virtual memory concept

CO6: Design ALU for fixed point and floating point processor.

CO7: Analyze the importance of arithmetic and instruction pipelining used in processor design.

# Unit-I

**Register Transfer and Micro-Operations**: Register transfer, Bus and Memory transfers, Arithmetic, Logic and Shift micro-operations, Arithmetic logic shift unit.

# Unit-II

**Basic Computer Organization and Design:** Instruction codes, Computer registers, Computer instructions, timing and control, Instruction cycle, Memory reference instructions, Input /output and Interrupt, design of basic computer.

## Unit-III

**Micro-Programmed Control**: Control memory, Address sequencing, Micro-program example, Design of control unit, Micro-program sequencer.

#### **Unit-IV**

**Central Processing Unit:** General register organization, stack organization, Instruction formats, Addressing modes, Data transfer and manipulation, Program control.

**Computer Arithmetic**: Algorithms for fixed point and signed 2"s complement binary arithmetic operations, Floating point arithmetic operations.

#### Unit-V

**Input/Output Organization**: Peripheral devices, input/output interface, Asynchronous data transfer, Modes of transfer, Priority interrupt, DMA.

**Memory Organization**: Memory hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory.

#### Unit-VI

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC pipeline, Vector processing and Array Processing.

## **Text Books:**

1. M.Morris Mano, Computer System Architecture, PHI, 3/e, 2007.

# **Reference Books:**

- 1. John P.Hayes, Computer Architecture and Organization, McGraw Hill, 3/e, 1998
- 2. Hemachar, *Computer Organization*, Mc Graw Hill, 5/e, 2002.

3. K.Hwang& F.A. Briggs, *Computer Architecture and Parallel Processing*, Mc Graw Hill, Indian Edition, 2013.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## ML203: BUSINESS ENGLISH & TECHNICAL WRITING (BETW) (Common to B.Tech IV Semester ECE& CSE Branches)

Scheme : 2013 Internal Assessment : 100 End Exam :-End Exam Duration : 3 Hrs

L	T/D	Р	С
2	1	0	2

## **Course Outcomes:**

- Students will be able to use grammatically acceptable English
- Students will be able to demonstrate all aspects of language skills for a successful professional career
- Students will be able to use English effectively in interpersonal and professional contexts
- Students will be able to write technical content effectively
- Students will be able to handle business correspondence effectively

## **Course Work**

To achieve the objectives, the following course content is prescribed for the Business English and Technical Writing Laboratory Sessions.

## Contents

- Revision of grammar and vocabulary:
  - articles, prepositions, tenses, concord
  - voices, reported speech, sentence types
  - synonyms, antonyms, one word substitutes, idioms, collocations
  - word making, affixes, commonly used foreign words, words often confused
  - jumbled sentences and jumbled paragraphs
  - common errors in English pertaining to both grammar and vocabulary (TOEFL type)
- Reading Comprehension practice tests
- Listening Comprehension practice tests
- Speaking skills with focus on correct pronunciation
- Writing Cover Letters for Job Applications/ Resume Preparation/ Statement of Purpose for Internships, Apprenticeships, Admissions in Universities, etc.
- Writing Technical Reports/ Proposals/Formats of Research Articles, Journal Papers, Project Reports
- Email writing
- Writing Business Letters/ Formats of Letters, Block Letters/Memos

## References

1. Raj N Bakshi, "English Grammar Practice", Orient Longman.

- 2. Sangeeta Sharma & Binod Mishra, Communication Skills for Engineers and Scientists, PHI Learning Private Limited.
- 3. Marilyn Anderson, Pramod K.Naya and Madhucchanda Sen, Critical Reasoning, Acedemic Writing and Presentation Skills, , Pearson Publishers.
- 4. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Ltd., 2005.
- 5. Raymond V. Lesikar, Marie E. Flatley, "Basic Business Communication: Skills for Empowering the Internet Generation", 11th Edition, Tata McGraw-Hill. 2006.
- 6. Dr A. Ramakrishna Rao, Dr G.Natanam & Prof S.A.Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual", Anuradha Publications, Chennai, 2006.
- 7. Dr. Shalini Verma, "Body Language- Your Success Mantra", S.Chand, 2006.
- 8. Andrea J. Rutherford, "Basic Communication Skills for Technology", 2nd Edition, Pearson Education, 2007.

# DISTRIBUTION AND WEIGHTAGE OF MARKS

## **Business English and Technical Writing Examination**

For Business English and Technical Writing subject, there shall be continuous PC based evaluation during the semester for 80 marks and viva voce to be conducted by an external examiner for 20 marks.

## EC306: ANALOG COMMUNICATIONS LAB (ACM (P)) (For B.Tech V Semester ECE)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

## **Course Outcomes:**

- Student will be able to design various receiver circuits.
- Students will be able to measure and analyze receiver characteristics.

# List of Experiments:

- 1. Amplitude Modulation and Demodulation
- 2. Frequency Modulation and Demodulation
- 3. SSB modulation and Demodulation
- 4. Balanced modulator
- 5. Pulse Amplitude Modulation
- 6. Pulse width Modulation
- 7. Frequency Division Multiplexing
- 8. Analog Sampling and Reconstruction of signals
- 9. Preemphasis and Deemphasis
- 10. Study of Spectrum analyzer to analyse AM and FM signals
- 11. Simulation of Amplitude modulation
- 12. Simulation of DSBSC modulation

#### EC307: LINEAR IC APPLICATIONS LAB (ICA (P)) (For B.Tech. ECE - V Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Student will be able to design small applications using Opamp and Timer.
- students will be able to verify various analog circuits using ICs such as 741,555 etc.

#### List of Experiments (Minimum of 12 experiments to done)

- 1. Inverting and Non-inverting Amplifier.
- 2. Summing and differential amplifier.
- 3. Integrators and differentiators.
- 4. Precision Rectifiers
- 5. Schmitt Trigger & Square wave Generator
- 6. Square and Triangle Wave Generator.
- 7. Active Filters II Order LPF
- 8. Active Filters II Order HPF
- 9. Digital to Analog Converter.
- 10. 723 Low Voltage and High Voltage Regulator
- 11. 555 Timerin Astable and Monostable Modes
- 12. Sample and Hold Circuit
- 13. 8038 Waveform generator
- 14. Phase Locked Loop (PLL)

#### **Equipment required for the laboratory:**

Dual power supply

Component development system

Function generator

CRO

Probes

IC Tester

#### EC308: MICROPROCESSORS AND MICRCONTROLLERS (MP&MC) (For B.Tech. ECE & EEE - VI Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	3

## **Course Outcomes:**

#### At the end of the course, the student will be able to

- **CO 1:** Understand the definition, features and comparisons of 8 & 16 bit Microprocessors and 8 bit Microcontrollers.
- **CO 2:** Understand the architecture of 16 bit processor Intel 8086 & 8 bit controller Intel 8051.
- **CO 3:** Understand the addressing modes, instruction set and assembler directives of 8086 microprocessor and 8051 microcontrollers respectively.
- **CO 4:** Use the programming model of 8086 microprocessor and the 8051 microcontroller for assembly language programs respectively.
- CO 5: Understand the memory and peripherals interface with 8086 microprocessor
- CO 6: Understand the memory and peripherals interface 8051 microcontroller.

## Unit-I

Introduction of Microprocessors: 8-bit, 16-bit microprocessors.

8086: 8086 CPU architecture, segmented memory, Maximum mode and Minimum mode. Addressing modes,8086 instruction set.

#### Unit-II

**8086 Programming model:** Simple programs on Arithmetic operations Sorting, Searching, Code conversions, String manipulations. Assembler directives, Assembly language programming using MASM / TASM. Procedures & Macros.

#### Unit-III

**8086 Interfacing: Memory Interfacing:** Interfacing of Static memory and Dynamic memory. **I/O Interfacing:** 8255 (Programmable Peripheral Interface), 8255 applications – Stepper Motor interfacing, DAC interfacing Waveform generation and ADC interfacing. **Unit-IV** 

**Peripheral Interfacing:** 8254(Programmable Timer / Counter), 8251(USART), 8257 (DMA Controller), 8259 (Programmable Interrupt Controller). **Unit-V** 

**Introduction to MCS51 family:** 8051 Micro controller Architecture, Input / Output ports and circuits, External memory, counters and Timers, Serial data input/output, interrupts. **Unit-VI** 

**Programming and Interfacing**: Instruction set, Programming with 8051 Micro controller. Interfacing LCD, LEDs, Stepper Motor.

## **Text Books:**

- 1. A K Ray, K M Bhurchandi, *Advanced Microprocessors and Peripherals*, 2<sup>nd</sup> Edition, Tata McGraw Hill Education Private Ltd, 2010.
- 2. Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2<sup>nd</sup> Edition, Pearson Education, 2008.

#### **Reference Books :**

- 1. John Uffenbeck, *The 8086/8088 Family: Design, Programming, and Interfacing*, 3<sup>rd</sup> Edition, Pearson Ed, 2006.
- 2. Barry B. Brey, *The Intel Microprocessors-Architecture, Programming and Interfacing*, 8<sup>th</sup> Edition, Princeton Hall India,2009.
- 3. Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publication Ltd, 2006.
- 4. Gaonkar Ramesh, *Microprocessors Architecture, Programming & Applications with 8085/8080A*, 5<sup>th</sup> Edition, Penram International publication Ltd, 2010.
- 5. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, *Microprocessors and Microcontrollers*, 3<sup>rd</sup> Edition, Oxford University Press, 2010.
- 6. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, Microprocessors and Interfacing, OUP India, 2012.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC309: DIGITAL SYSTEM DESIGN USING HDL (HDL) (For B.Tech. ECE - VI Semester)

Scheme :2013**Internal Assessment : 30** :70 End Exam **End Exam Duration : 3 Hrs** 

**Course Outcomes:** Student will be able to

CO1 : Understand the Basic programming skills in VHDL

CO2 : Design and write a code for VHDL using dataflow modeling

CO3 : Design of sequential and combinational circuits using VHDL

CO4 : Design and write a code for VHDL using structural modeling

CO5: Design and write the programs using subprograms, packages and test benches

#### **Unit-I**

Introduction to VHDL: History, VHDL terms, Traditional design methods, Traditional schematics, Symbol versus entities, Schematics versus architectures, Component instantiation, Behavioral descriptions, Concurrent signal assignment, Event scheduling, Sequential statements, Architecture selection, Configuration statements.

Basic language elements: Identifiers, Data objects, Data types: Scalar, Complex, Access and file type, Operators.

#### Unit-II

Dataflow Modeling: Architecture body, Concurrent signal assignment, Delta delay, Multiple drivers, Conditional signal assignment, Block statement, using Sequential and combinational simple examples: Multiplexer, De-multiplexer, 4-bit adder, Priority encoder, Decoders, One bit comparator, BCD to 7-segment decoder, 74381 ALU,

#### Unit-III

Sequential modeling: Entity declaration, Architecture body, Process statement, Variable assignment statement, Concurrent vs Sequential signal assignment statement, Wait statement, If statement, Case statement, Null statement, Loop statement, Exit statement, Next statement, Assertion, Report statement, examples. Multiple Processes. Using Sequential and combinational examples: Multiplexer, De-multiplexer, 4-bit adder, Priority encoder, Decoders, Latches and flipflops, Counters, Shift Registers, Synchronous Design and other examples. **Unit-IV** 

Structural Modeling: Architecture body, Component declarations, Component instantiation, Simple examples. Generic and configurations: Generics, Configurations, Configuration specification, Declarations, Conversion functions. Sequential and combinational examples. Unit-V

Subprograms, Packages and Libraries: Subprograms: Functions, Conversion functions and procedure, Package declaration, Package body, Design file, Libraries. Converting real and integer to time

# Unit-IV.

Model Simulation: Simulation, writing a test bench, Dumpling results into a text file, Reading vectors from a text file. Modeling a Moore FSM, a Melay FSM.

L	T/D	Р	С
3	0	0	3

#### **Text Books:**

1. Douglas Perry, VHDL, 4th Edition. Tata McGraw-Hill, 2002

2. Stephen Brown, *Fundamentals of Digital Logic with VHDL Design*,2<sup>nd</sup> Edition TMH, 2009.

3. J.Bhaskar, VHDL Primer, 3<sup>rd</sup> Edition, Pearson Ed, 2003.

## **Reference Books:**

Charles H. Roth Jr, *Digital System Design Using VHDL*, PWS Publications, 1998.
Alan B. Marcovitz, *Introduction to Logic Design*, 2<sup>nd</sup> Edition, TMH, 2005.

3. Cypress Semiconductors Data Book

## **NOTE:**

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC310: DIGITAL COMMUNICATIONS (DCM) (For B.Tech VI Semester ECE )

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course outcomes:**

Upon successful completion of the course, students will be able to:

CO1:-Analyze various methods of digital transmission and elements of digital communication System.CO2:- Understand the concepts of baseband data transmission and M-ary signaling schemes.CO3:- Apply the principles of block codes and convolutional codes.

**CO4:-** Analyze various coherent and non-coherent digital modulation techniques. **CO5:-** Understand the concepts of Spread spectrum modulation and various multiple access techniques.

## Unit-I

**Introduction:** Elements of Digital Communication Systems, Sampling theorem, Ideal sampling, Practical sampling, Quantization (uniform & non uniform). **Unit-II** 

**Baseband Data Transmission:** Baseband PAM and Duo-binary PAM systems, M-ary signaling schemes, Signal shaping, Eye diagrams, Scrambler &Unscrambler, Synchronization. **Unit-III** 

**Linear Block Codes**: Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, Encoding, Syndrome calculation, BCH Codes.

**Convolution Codes:** Introduction, encoding of convolution codes, Time domain approach, Transform domain approach. Graphical approach: State, Tree and Trellis diagram decoding using Viterbi algorithm.

## **Unit-IV**

**Digital Communication Techniques for Coherent Systems:** Optimum receiver, Description of ASK, FSK and PSK Systems (coherent), Description of QPSK, MSK and QAM Schemes, Determination of probability of errors, Probability of error for ASK, FSK and PSK schemes(coherent)

# Unit-V

**Digital Communication Techniques for Non Coherent Systems:** Description of Non-coherent reception of ASK and FSK Signals, Description of non-coherent reception of PSK signal, Determination of probability of occurrence of error, Probability of error in the received Non-coherent ASK and FSK signals.

Comparison of ASK, FSK and PSK Signaling Schemes in terms of bandwidth, error probability, signaling speed etc.

#### Unit-VI

**Spread Spectrum Modulation:** Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, Processing gain, FH spread spectrum.

Multiple Access Techniques: TDM and FDM systems, TDMA, FDMA & CDMA.

## **Text Books:**

1. K. Sam Shanmugam, *Digital and Analog Communication Systems*, Wiley-India, 2<sup>nd</sup> Edition, 2005

2. Simon Haykin, *Digital Communication*, Wiley Eastern, 2<sup>nd</sup> Edition, 2006. **Reference Books:** 

1. John G.Proakis, Digital Communications, Mc Graw-Hill, 4th Edition, 2008.

- 2. Taub and Schilling, Principles of Communication Systems, McGraw-Hill, 3rd Edition, 2008.
- 3. S. Rappaport, Wireless Communications, PHI, 2nd Edition, 2010.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC311: MICROWAVE ENGINEERING (MWE) (For B.Tech ECE - VI Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

#### At the end of the course, the student will be able to

CO 1 --- Understand basic concepts of microwaves & operating principles of waveguides and cavity resonators.

CO 2 --- Understand the operation of various microwave junction devices and derive their respective S- matrices.

CO 3 --- Gain complete knowledge about various microwave tubes and solid state devices.

CO 4 --- Design various microwave tubes and solid state devices for given specifications.

CO 5 --- Understand about measurement of various parameters and characteristics of microwave signals.

## Unit-I

**Guided Waves and Wave Guides**: Microwave frequencies advantages and applications, Rectangular and circular wave guides . Wave equations rectangular and circular wave guides for TE and TM modes, Cutoff frequency and wave length, Group and phase velocity, Wave impedance, Guide attenuation, Rectangular and cylindrical resonators, Q of the resonators. **Unit-II** 

**Passive Microwave Devices**: Introduction to Scattering parameters and its properties, Derivation of S- matrix for E-plane, H-plane, Magic tee, directional couplers, Hybridring. Microwave propagation inferrites, Faraday rotation, Gyrator Circulator and isolators. **Unit- III** 

**Microwave Tubes-I**: Velocity modulation, Current modulation, Operation and performance of two-Cavity klystron, Reflex klystron oscillator **Unit-IV** 

**Microwave Tubes-II** : Travelling wave tube (TWT) amplifier. Magnetron: Magnetron- mode separation, frequency pushing and frequency pulling and applications. **Unit-V** 

**Microwave Solid State Devices**: PIN diode, Varactor diode Gunn effect , GUNN diode, IMPATT , TRAPATT and BARITT Diodes, Parametric amplifier- Principle and characteristics. **Unit-VI** 

**Microwave Measurements:** Bolometric and thermocouple methods for measurement of power, Frequency, Attenuation, VSWR, Impedance measurements and measurement of scattering parameter For 3 and 4 port devices.

## **Text Books:**

1. Samuel Y.Liao, *Microwave devices and circuits*, 3<sup>rd</sup> Edition, PHI 2003.

2. M. Kulkarni, *Microwave & Radar Engineering*, 3rdEdition, Umesh Publications 2003.

## **Reference Books:**

- 1. O P Gandhi, Microwave Engineering and Applications, Pergamon Press 1989.
- 2. R.E. Collins, Foundation of Microwave Engineering, 2ndEdition, Wiley 2003.
- 3. E.C. Jordan and Balmain, EM Fields & Waves and Radiating System, 2ndEdition, PHI 2003.
- 4. Sushrut Das, *Microwave Engineering*, 1<sup>st</sup> Edition, Oxford University Press, 2014

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC312 :DIGITAL SIGNAL PROCESSING (DSP) (For B.Tech ECE - VI Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

The students are able to

**CO1:** understand the concept of continuous and discrete time signals

CO2: understand the concept of DFT.

CO3: implement DFT using Fast Fourier Transforms

CO4: analyze the IIR and FIR filters

CO5: understand the DSP processors

#### Unit-I

**Introduction:** Introduction to digital signal processing: Discrete time signals and sequences, linear shift invariant systems, stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems – DTFT, DFS. **Unit-II** 

**Discrete Fourier Transform:** Discrete Fourier Transform (DFT), Properties of DFT, Computation of DFT, Circular Convolution, Overlap add method, Overlap save method. **Unit-III** 

**Fast Fourier Transforms:** Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation infrequency FFT Algorithms, Inverse FFT, comparison of DFT&FFT computations. **Unit-IV** 

**IIR digital filters:** Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Mapping of differentials, Impulse invariance, Bilinear transformation technique. Realization of IIR filters. **Unit-V** 

**FIR Digital Filters:** Characteristics of FIR Digital Filters, Frequency response, Design of FIR Digital Filters using Fourier series method, Windowing Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters, Realization of FIR filters. **Unit-VI** 

**Introduction to DSP Processors:** Introduction to programmable DSPs: Multiplier and Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

**TMS320C67XX Processor:** Features of TMS320C67XX processors, Internal architecture, addressing modes, External memory access, Peripherals.

#### **Text Books:**

- 1. V. Oppenheim and R. W. Schaffer, Discrete Time Signal Processing, PHI.
- 2. John G. Proakis, Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms, and Applications, Pearson Education, 2007.

- 3. Emmanuel C.Ifearchar, Barrie W.Jervis, DSP A Practical Approach, Pearson Ed.
- 4. B. Venkataramani, M. Bhaskar, Digital Signal Processors Architecture, Programming and Applications, TATA McGraw Hill, 2002.

## **Reference Books:**

- 1. Andreas Antoniou, Digital Signal Processing, TATA McGraw Hill, 2006
- 2. MH Hayes, Digital Signal Processing, Schaum"s, Outline Series, TATA Mc-Graw Hill, 2007.
- 3. P. Ramesh Babu, Digital Signal Processing, Scitech Publications.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC313: DIGITAL COMMUNICATION LAB (For B.Tech VI Semester ECE)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Student will be able to implement and analyze various digital modulation schemes
- Student will be able apply channel coding techniques for data transmission

#### List of Experiments:

- 1. Amplitude shift keying
- 2. Frequency shift keying
- 3. Phase shift keying
- 4. Pulse position modulation and demodulation
- 5. Delta modulation and demodulation
- 6. Time division multiplexing
- 7. Differential pulse code modulation and demodulation
- 8. Data conditioning and Carrier modulation

## Simulation using MATLAB software

- 9. Probability of error for ASK
- 10. Probability of error for PSK
- 11. Probability of error for FSK
- 12. Probability of error for QPSK

#### EC314: DIGITAL SIGNAL PROCESSING LAB (DSP (P)) (For B.Tech ECE VI-Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
0	0	3	2

## **Course Outcomes:**

- Student will be able to develop MATLAB coding for implementation of DSP algorithms.
- Student will be able to programming on DSP processors.

## List of Experiments:

## **MATLAB** Programs

- 1. Linear Convolution
- 2. Autocorrelation & Cross correlation and verification of Auto correlation Properties.
- 3. Verification of Sampling Theorem.
- 4. IIR Filter Design Butterworth
- 5. IIR Filter Design Chebyshev
- 6. FIR Filter Design Windowing Method
- 7. Circular Convolution using DFT- IDFT method

#### **Using DSP Kits:**

- 8. Linear convolution & Circular Convolution
- 9. N-Point DFT & Computation of non-real time PSD
- 10. To implement audio loopback
- 11. FIR Filters
- 12. Implementation of adaptive algorithm for noise cancellation

# EC315: MICROPROCESSORS AND MICROCONTROLLERS LAB (MP&MC (P)) (For B.Tech. ECE - VI Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
0	0	3	2

## **Course Outcomes:**

- Student will be able to perform programming on microprocessors and microcontrollers
- Student will be able to interface and control real time peripherals.

#### List of Experiments :

Introduction to Assembly Language Programs Using 8086 Kits

- 1. Arithmetic Programs
- 2. Searching and Sorting
- 3. Factorial and Fibonacci Series generation

## Assembly Language Programs Using TASM and Debug:

- 4. String Related Programs
- 5. Procedures
- 6. Macros

## **Interfacing Experiments**

- 7. Stepper Motor Interfacing
- 8. Programming 8253 and Relay Interfacing

## **Microcontroller Experiments**

Introduction to microcontroller programming and usage of system programming board

- 9. Interfacing an LED and a Switch to 89S52
- 10. Program on Dancing LEDs using 89S52
- 11. LCD Interfacing to 89S52
- 12. Stepper Motor Interfacing to 89S52

# **FOUR YEAR B.TECH. DEGREE COURSE** Scheme of Instruction and Examination

Scheme of Instruction and Examination (Effective from 2013-2014)

**B.Tech. ECE VII Semester** 

S.	Course	Course Title	Cr	Scheme of Instruction periods/week		Scheme of Examination Maximum Marks			
No.	No.	Course The	its	L	D/T	Р	End Exa m	Internal Assessment	Tot al
Ι		Theory							
1.	EC401	VLSI Design	4	3	1	0	70	30	100
2.	EC402	Digital Image Processing	3	3	0	0	70	30	100
3.	EC403	Embedded Systems	3	3	0	0	70	30	100
4.	EC404	Optical Communications	3	3	1	0	70	30	100
5.		Professional Elective - I	3	3	0	0	70	30	100
6.		Global Elective	2	2	0	0	-	100	100
II		Practical							
7.	EC405	Microwave & Fiber Optics Lab	2	0	0	3	70	30	100
8.	EC406	VLSI Lab	2	0	0	3	70	30	100
9.	EC407	Project Work Preliminary	2	0	0	3	50	50	100
		Total	24	17	02	09	540	360	900

## FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination (Effective from 2013-2014)

## **B.Tech. ECE VIII Semester**

**Scheme: 2013** 

S.	Course	Course Title	Cr edi	Scl Ins peri	heme tructi ods/w	of on eek	Scheme of Examination Maximum Marks		ation ss
110.	110.		ts	L	D/ T	Р	End Exam	Internal Assessment	Total
Ι		Theory							
1.	EC408	Mobile Communications	3	3	0	0	70	30	100
2.	EC409	Computer Networks	3	3	0	0	70	30	100
3.		Professional Elective - II	3	3	0	0	70	30	100
4.		Professional Elective -III	3	3	0	0	70	30	100
II		Practical							
5.	EC410	Embedded Systems Lab	2	0	0	3	70	30	100
6.	EC411	Project Work	6	0	0	6	50	50	100
		Total	20	12	0	09	400	200	600

## Scheme: 2013

## EC401: VLSI DESIGN (VLSI) (For B.Tech. ECE VII Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	1	0	4

## Course Outcomes: Students will be able to

**CO1**: Understand in the field of VLSI design and technology, basic electrical properties of active devices involved.

**CO2**: Expose the VLSI basic circuit design with the help of stick diagrams, design rules and layout configurations.

CO3: Expose basic gate level design, electrical properties, physical dimensions and driving capabilities of the gates.

**CO4**: Design simple subsystem like adders, shifters, ALU, multiplier, comparators, counters, memory elements for mathematical computations.

CO5: Design and Synthesize standard cells PLD"S, FPGA for VLSI design.

CO6: Analyze basic CMOS testing principles and system level techniques.

## Unit-I

**Introduction to VLSI and Basic Electrical Properties:** Introduction to IC Technology – MOS, PMOS, NMOS, CMOS &BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Encapsulation.

Basic Electrical Properties of MOS and BiCMOS Circuits:  $I_{ds}V_sV_{ds}$  relationships, MOS transistor threshold Voltage,  $g_m$ ,  $g_{ds}$ , Figure of merit, Pass transistor, NMOS Inverter, Various pull ups and Pull downs, CMOS Inverter analysis and design, Bi-CMOS Inverters.

## Unit-II

**VLSI Circuit Design Processes:** VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2µ CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

## **Unit-III**

**Gate Level Design:** Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance( $R_S$ ) concept and Sheet Resistance  $R_S$  in MOS, Area Capacitance Units, Calculations Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

#### Unit-IV

**Subsystem Design:** Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Counters, High Density Memory Elements.

#### Unit-V

Semiconductor IC Design and VHDL Synthesis: PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic(PLA"S), Design Approach. VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, Test Principles.

## **Unit-VI**

CMOS Testing : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

## **Text Books:**

1. Kamran Eshraghian, EshraghianDougles and A. Pucknell, Essentials of VLSI circuits and systems, PHI, 2005 Edition.

2. Weste and Eshraghian, Principles of CMOS VLSI Design, Pearson Education, 1999.

## **Reference Books:**

1. John .P. Uvemura, Introduction to VLSI Circuits and Systems, JohnWiley, 2003.

2. John M. Rabaey, Digital Integrated Circuits, PHI, EEE, 1997.

Wayne Wolf, Pearson Education, *Modern VLSI Design*, 3rd Edition, 1997.
S.M. SZE, *VLSI Technology*, 2<sup>nd</sup> Edition, TMH, 2003.

#### NOTE:

Internal Assessment: The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# EC402: DIGITAL IMAGE PROCESSING (DIP) (For B.Tech. ECE - VII Semester)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

Course Outcomes: Students will be able to

CO1: Understand the relationships between pixels in digital images and can perform various

linear and non-linear operations on pixels in a digital image.

CO 2: Apply various image enhancement techniques both in spatial and frequency domain.

CO3: Perform image restoration and segmentation on real time images.

CO4: Understand and apply image transformations and can perform various image Enhancement operations for various color images.

CO5: Understand image compression models and also about different types of Compression

techniques.

# Unit-I

**Introduction**: Definition, Applications Of Digital Image Processing, Fundamental Steps, Components Of Image Processing System, Human Visual System, Simple Image Formation Model, Image Sampling And Quantization, Spatial And Gray Level Resolution, Image Interpolation, Some Basic Relationships Between Pixels, Linear And Non Linear Operations.

# Unit-II

## **Image Enhancement :**

**Spatial Domain:** Basic Gray Level Transformations, Histogram Processing, Enhancement Using Logical And Arithmetic Operations, Image Subtraction, Image Averaging, Basic Of Spatial Filtering, Smoothing And Sharpening Spatial Filters, Combining Spatial Enhancement Methods. **Frequency Domain:** Introduction To Fourier Transforms, Basics Of Filtering In Frequency Domain, Fundamental Steps In Filtering In Frequency Domain, Smoothing Frequency Domain Filters, Homomorphic Filtering.

## **Unit-III**

**Image Restoration:** Model Of Image Degradation/Restoration Model, Noise Models, Restoration In Presence Of Noise Only-Spatial Filtering, Adaptive Filters, Periodic Noise Reduction By Frequency Domain Filtering, Linear Position Invariant Derivations, Algebraic Approach To Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

## **Unit-IV**

**Image Compression:** File format (bmp, tiff, pcx, gif, jpeg.), Compression fundamentals, Image Compression Models, Error Free Compression: VLC, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding, Lossy Compression: Lossy Predictive Coding, Block Transform coding, Digital Watermarking

Unit-V

**Image Segmentation:** Fundamentals, Detection of Discontinuities: Point, Line, Edge detection, Edge Linking and Boundary Detection: Local Processing, Regional Processing Global Processing via Hough Transform.

#### **Unit-VI**

#### **Image Transform and Color Image Processing :**

**Image Transform:** Introduction One and Two Dimensional Discrete Fourier Transform (DFT), Properties of DFT, Properties of Discrete Cosine and Sine transforms, Properties of Slant, KL and Haar transforms.

**Color Image Processing:** Color fundamentals, Color models: RGB, CMY and CMYK, HSI, Converting colors from RGB to HIS, HIS to RGB manipulating HIS component images, Pseudo color Image Processing, Full Color Image Processing.

#### **Text Books :**

- 1. Rafael Gonzalez & Richard Woods, *Digital Image Processing*, 3<sup>rd</sup> Edition. Pearson publications, 2012.
- 2. Anil K. Jain, Fundamental of Digital Image Processing, PHI publication, 2013.

#### **Reference Books :**

- 1. Pratt, *Digital Image Processing*, 2<sup>nd</sup> Edition, Wiley Publication, 1991.
- 2. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, Digital Image Processing, Mc. Graw Hill, 2011.
- 3. S. Sridhar, Digital Image Processing, Oxford University Press, 2011.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC403: EMBEDDED SYSTEMS (EMS) (For B.Tech. ECE -VII Semester)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

#### At the end of the course, the student will be able to

CO1: Understand the definition and characteristics of Embedded Systems.

CO2: Understand the architectures of MSP, programming models & interface various peripherals of MSP controllers.

CO3: Understand the Linux commands and Kernel operations

CO4: Understand the architecture and programming model & interface various peripherals of Intel Atom

CO5: Understand the architecture and programming model & interface various peripherals of ARM Processor.

## Unit-I

**Introduction**: Definition of Embedded System, Embedded Systems Vs General Computing Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

## Unit-II

**MSP430:** Family, Architecture - MSP430, Address Space, On Chip Peripherals, Register sets, Addressing Modes, Instruction Set. Interfacing GPIO

#### **Unit-III**

**Introduction to Linux:** Basics, Command line tools, Shell commands, Introduction to Shell Scripting. Overview of Embedded Linux Kernel.

#### Unit –IV

**ATOM Processors:** Introduction to Intel Atom Processors, Architectural details, Interfacing array LEDs, DC Motor.

#### UNIT –V

**ARM 9 Processor:** ARM Design Philosophy, RISC vs CISC, ARM9 processor family, Block Diagram, Registers, Program Status Register, Five Stage Instruction Pipeline, Architecture Revision.

## UNIT –VI

**ARM 9 Programming Model**: Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions. Introduction to Thumb Instruction Set.

#### **Text Books:**

- 1. Shibu K.V, Introduction to Embedded Systems, Tata Mc Graw Hill, 2009.
- 2. John H. Davies, MSP430 Microcontroller Basics, Elsevier, 2008.
- 3. Steve Furber, ARM System on Chip Architecture, 2<sup>nd</sup> Edition, Addsion Wesley Professional,2000.

## **Reference Books:**

1. Mazidi Muhammad Ali, Mazidi Janice Gillespie & Mc Kinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2<sup>nd</sup> Edition, Pearson Education, 2008.

- 2. Raj Kamal, Embedded Systems Architecture, Programming and design, 2<sup>nd</sup> Edition, TMH, 2006.
- 3. Arnold S Burger, *Embedded System Design An Introduction to Processes, Tools and Techniques*, 1<sup>st</sup> Edition, CMP Books, 2007.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC404: OPTICAL COMMUNICATIONS (OC) (For B.Tech. ECE VII Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	1	0	3

## Course Outcomes: After the completion of the course the students will be able to

- CO1 Understand in the optical laws and Historical background of optical communications.
- CO2 Explore the Elements and optical laws of Optical Communications.
- CO3 Address the advantages and limitations of the Optical Communications
- CO4 Furnish Signal Degradation and Dispersion in Optical fibers.
- CO5 Formulate the behaviour of Optical sources and Photo Detectors
- CO6 Understand SONET/SDH Networks
- CO7 Evaluate the Power launching and coupling performance of the Optical receivers.

#### Unit-I

**Overview of Optical Communications:** Introduction and Historical background, Elements of optical fiber communication, Advantages & Applications of optical fibers.

**Optical Fiber Waveguides:** Nature of light-Spherical and planar wave fronts, Basic optical laws and definitions, Optical fiber modes and configurations, Mode theory of circular waveguides, Single and multimode step index fibers, Fiber materials and fabrication.

## Unit-II

**Signal Degradation in Optical Fibers:** Attenuation-Absorption, Scattering and bending losses in optical fibers, Core and cladding losses.

**Signal dispersion in optical waveguides:** Intra modal dispersion (Material dispersion and wave guide dispersion), Intermodal dispersion, Pulse Broadening

## Unit-III

**Optical Sources and Photo Detectors:** LED"s –Structures, Light source materials, Internal quantum efficiency, Modulation capability, principles and operation of Febry perot and DFB laser diodes, Physical principles of PIN and APD, Noise in photo detectors.

## **Unit-IV**

**Optical Receiver and Digital Transmission Systems**: Fundamental receiver operation, Digital receiver performance calculation, Analog receivers, Point-to-point links, Link power budget, Rise-time budget, Wavelength Division Multiplexing (WDM)

**Power Launching in Optical fibers:** Source-to-fiber power launching basics, fiber joints and splices, fiber connectors.

#### Unit-V

**Optical Networks:** Basic concepts of SONET/SDH, Transmission formats and speeds, SONET/SDH Rings, SONET/SDH Networks.

#### Unit-VI

**Optical Fiber Measurements:** Measurement of Attenuation-Cut back technique, Insertion loss method and OTDR, Measurement of dispersion-Time domain and Frequency domain measurements.

## **Text Books:**

1. Gerd Keiser, Optical Fiber Communications, 3rd Edition, Mc Graw Hill, 2004.

2. John M. Senior, *Optical Fiber Communications Principles and Practice*, 2nd Edition, Pearson, 2009.
#### **Reference Books:**

- 1. D.C. Agarwal, Fiber Optic Communication, 2nd Edition, S.Chand& Co, 2004.
- 2. Djafar K. Mynbaev, Fiber Optic Communications Technology, Pearson, 2001.
- 3. John Gowar, Optical Communication Systems, 2nd Edition, PHI, 2004.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC405: MICROWAVE AND FIBER OPTICS LAB (MWFO (P)) (For B.Tech. ECE - VII Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Students will be able to understand the working principle and measure characteristics of various microwave devices and components.
- Students will be able to measure frequency, wavelength and VSWR at microwave frequencies.
- Students will be able to design a communication system using optical fiber as medium.

#### **List of Experiments**

- 1. Reflex Klystron Oscillator Characteristics
- 2. Frequency, Wavelength and VSWR Measurements
- 3. GUNN Diode Characteristics
- 4. Impedance Measurement of Unknown Load
- 5. S-Matrix of E and H Plane Tees
- 6. S-Matrix of Magic Tee
- 7. S-Matrix of Circulator
- 8. S-Matrix of Directional Coupler
- 9. Radiation Pattern of Horn Antenna
- 10. Fiber Optic Communication
- 11. Study of Radiation Pattern for Helix Antenna/ Ground Plane
- 12. Study of Radiation Pattern for Cut Parabola/ Zeppelin

# EC406 : VLSI LAB (VLSI (P)) (For B.Tech ECE - VII Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course outcomes:**

- Student will be able to design and simulate digital logic circuits using VHDL language and simulator tools..
- Student will be able to understand Layout Design Rules.
- Student could draw Layout of any combinational circuit (complex CMOS logic gate)learning about data paths.

#### List of Experiments :

# Simulate and Synthesize the following with VHDL as programming language and standard simulator

- 1. Priority Encoder using data-flow style
- 2. 4-bit comparator using signal assignment statement
- 3. 2x4 decoder using bahavioural style coding
- 4. 4-bit up-counter design
- 5. D-FF generation
- 6. Design AND-OR-INVERT circuit
- 7. 4-bit shift register using structural style
- 8. Full adder circuit using structural style
- 9. Arithmetic unit using VHDL PACKAGE construct
- 10. 16x1 MUX using 4x1 MUX as package
- 11. BCD to seven segment decoder
- 12. Square wave generator

# **EDA Tool Programs:**

It is expected that every student who learns synthesis on Cadence should conduct at least five from the following experiments.

- 1. Layout, physical verification, placement and route for complex design, static timing analysis, IR drop analysis and cross talk analysis of the following
  - a. Basic logic gates
  - b. CMOS inverter
  - c. CMOS NOR/NAND gates
  - d. CMOS XOR and MUX gates
  - e. CMOS 1 Bit full adder
  - f. Static / dynamic logic circuit
  - g. Latch
  - h. Pass transistor

#### EC408: MOBILE COMMUNICATIONS (MCN) (ForB.Tech VIII Semester ECE)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

# **Course outcomes:**

#### Students will be able to

CO1: Understand the fundamental concepts of cellular communication.

CO2: Understand the Radio propagation.

CO3: Understand various methodologies to improve cellular capacity

CO4: Design transmission and switching systems to meet out the required blocking probability and able to analyze the mobility Management.

CO5: Understand the GSM mobile communication standard.

CO6: Understand how to increase the Network functionality.

#### Unit-I

**Introduction:** Basic Cellular System, Operation of Cellular system, Hexagonal cells, Frequency reuse of channels, Co-channel interference reduction. Cell splitting

#### Unit-II

**Cell Coverage:** Incident, Reflection & Elevation angle, Point to point modes, path loss formula, path loss from point to point prediction model, Mobile to Mobile propagation

# Unit-III

Cell site Antennas & Mobile Antennas: Antenna at cell site and mobile antennas.

**Frequency Management & Channel Assignment**: Frequency management, Frequency-spectrum utilization, Set-up channels, Channel assignment to cell site & mobile units, Fixed & non-fixed channel assignment.

# **Unit-IV**

**Hand offs :** Why hand off(H.O), Types of H.O, Delaying H.O, Queuing H.O., Initiation of H.O, Forced H.O, Intersystem H.O, Power difference H.O, Mobile assisted H.O, Soft H.O **Switching & Traffic:** Space & Time switching, Analog switching equipment for cellular mobile system, Cellular digital switching equipment, MTSO inter connections.

#### Unit-V

**Introduction to Digital Mobile Telephony:** Introduction to digital technology, ARQ techniques, Stop and wait ARQ, Selective reference mission with ARQ. Multiple access schemes.

**Digital Cellular System**: Global system for mobilecommunication (GSM), GSM architecture, layer modeling, Transmission, GSM channels & channel modes, Radio resources management, Mobility management, Communication management, Network management.

# **Unit-VI**

**Intelligent Cell Concept & Applications**: Intelligent cell concept, Power-delivery intelligent cells, Processing grain intelligent cells. Applications of intelligent cell concept.

**Intelligent Network for Wireless Communication**: Advanced intelligent network (AIN) &Its architecture. SS7 protocol model, AIN for mobile communication.

# **Text Books:**

- 1. Lee William C.Y, *Mobile Communications Engineering Theory and Applications*, McGraw Hill, 2<sup>nd</sup> Edition, October, 1997.
- 2. Lee William.C.Y, *Mobile Cellular Telecommunications Analog and Digital System*, Mc Graw Hill, 2<sup>nd</sup> Edition, 1995.

# **Reference Books:**

- 1. T.S.Rappaport, *Wireless communications*, Pearson Ed, 2<sup>nd</sup> Edition, 2003.
- 2. Pandya Raj, *Mobile and Personal Communication Services and Systems*, PHI, 2<sup>nd</sup> Edition, March, 2004.
- 3. Jochen Schiller H, *Mobile Communications*, Pearson Ed, 2<sup>nd</sup> Edition, 2008. **NOTE:**

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC409: COMPUTER NETWORKS (CN) (For B.Tech ECE VIII Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

# Course Outcomes: After the completion of the course the students will be able to

CO1 Acquire the knowledge about the layered structure of various reference models.

CO2 Understand protocols and standards implemented in different layers.

CO3 Understand various security issues that improve the efficiency of computer networks.

CO4 Understand the conceptual model of advanced communication networks.

#### Unit-I

Introduction to Data Communication Networks: Network Services and Architecture.

**Reference models:** ISO OSI Reference model, TCP/IP Reference model. Broad band ISDN and ATM networks.

**Physical Layer:** Transmission media, Data modems, RS-232 Interfaces, Switching and Multiplexing(FDM,TDM & WDM).

# Unit -II

**Data Link Layer:** Design issues, Error detection and correction, Stop-and-wait, Go-Back-N and Selective Repeat ARQ, HDLC protocol, Aloha protocol, CSMA protocols.

**Introduction to IEEE standards:** MAC sub layer (specifications and frame structure), & Physical layer for IEEE 802.3 (CSMA/CD) standard, IEEE 802.4 (Token bus) standard, IEEE802.5 (Tokenring) standard, Introduction to Wireless LANs, Networking and internetworking devices.

# Unit -III

**Network Layer:** Virtual circuit and datagram approach in subnets, Shortest path routing, Flooding, Hierarchical routing, Broadcast routing, multicast routing and distant vector routing algorithms, Congestion control algorithms.IPV4, IPV6 Addresses, Internet Protocol IPV4, IPV6.

# Unit -IV

**Transport Layer:** Transport services, addressing, upward and downward multiplexing, TCP and UDP.

Session Layer:-Encryption-DES Algorithm, Public key cryptography-RSA Algorithm.

# Unit -V

**Application Layer: HTTP-** Transaction, Request messages, Response message, Headers. **WWW:** Introduction to Browser architecture, Types of documents.

# Unit -VI

**DNS:** Introduction to name spaces, DNS in the internet, Resolution, DNS messages. **VOIP:** Basics of SIP.

#### **Text Books:**

1. Andrew S. Tanenbaum, Computer Networks, Third edition, PHI, 2001.

2. Behrouz.A. Forouzan, Data communications and Networking, Second edition, TMH, 2003.

#### **Reference Books:**

1. William Stallings, Data and Computer Communications, 3rd edition, Pearson, 2007.

2. Gerd Keiser, Local Area Networks, second edition, TMH, 2002.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC410: EMBEDDED SYSTEMS LAB (ES (P)) (For B.Tech. ECE -VIII Semester)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
0	0	3	2

#### **Course Outcomes:**

- Student will be able to perform programming on ARM and Intel ATOM processors.
- Student will be able to interface and control real time peripherals.

#### List of Experiments:

#### **AT89S52 Interface Programming**

- 1. Module Interfacing
- 2. Port interfacing

#### **Intel ATOM Programming**

- 3. Linux function and system calls
- 4. Peripheral interfacing
- 5. Display Interfacing
- 6. Motor Interfacing
- 7. GSM port interfacing

#### **ARM Processor Programming**

- 8. LED sequence Interfacing
- 9. Motor Interfacing
- 10. Peripheral Interfacing
- 11. Display Interfacing
- 12. ARM 9 Application

# **B. TECH – ELECTRONICS AND COMMUNICATION ENGINEERING**

ELECTIVES			
INTERDISCIPLINARY ELECTIVE			
Course No.	Course Title		
IDE301	Optimization Techniques		
IDE302	Remote Sensing and GIS		
IDE303	New and Renewable Energy Systems		
IDE304	Artificial Intelligence and Expert Systems		
IDE305	Nanotechnology		
IDE306	Introduction to Information Systems		
IDE307	Mechatronics		
IDE308	Control and Automation		
IDE309	Web Development Programming		
IDE310	Environmental and Water Resources Engineering		
IDE313	Internet of Things		
GLOBAL	ELECTIVE		
GE401	Introduction to Psychology		
GE402	Research Methodology		
GE403	Entrepreneurship Development		
GE404	Intellectual Property Right and Patent Filing		
GE405	Constitution of India		
GE406	Ethical Hacking		
GE407	Information Security and Cyber Laws		
GE408	Foreign Languages		
PROFESSIONAL ELECTIVE-I			
EC 412	Real Time Operating Systems		
EC 413	DSP Processors and Architectures		
EC 414	Radar Engineering		
EC 415	Software Defined Radio		
EC 416	Neural Networks and Fuzzy Logic		
PROFESSIONA	L ELECTIVE-II		
EC 417	CPLD and FPGA Architectures		
EC 418	Low Power VLSI Design		
EC 419	Telecommunication Switching Systems		
EC 420	Satellite Communications		
EC 421	Advanced Microprocessors		
PROFESSIONA	L ELECTIVE-III		
EC 422	Wireless Communications and Networks		
EC 423	Speech Signal Processing		
EC 424	Analog VLSI Design		
EC 425	Biomedical Instrumentation		
EC 426	Optical Networks		

# **IDE 301: OPTIMIZATION TECHNIQUES (OT)** (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme : 2013

Internal assessment : 30 End Exam Marks : 70 End Exam Duration : 3 Hrs

L	T/D	P	С
3	-	-	3

# **Course outcomes :**

Students will be able to

- Develop mathematical models from the verbal description of the real system.
- Understand the importance of mathematical modeling in solving practical problems in industry.
- Suggest proper deployment of scarce resources and provide optimum solution.

# Unit: 1

**Introduction:** Definition, Nature and Significance of Operations Research, Models in Operations Research, Application Areas of Operations Research in Management.

Linear Programming: Model Formulation, Graphical solution of L.P.P, Slack, Surplus and Artificial variables, Simplex method, Big M method, Degeneracy in L.P.P, Dual linear programming problem, Solution of the Primal problem from the solution of the Dual Problem.

# Unit: 2

**Transportation Problems:** Balanced and unbalanced Transportation problems, Initial basic feasible solution using N-W corner rule, least cost entry method and Vogel"s approximation method, Optimal Solution, Degeneracy in Transportation Problem.

Assignment Problems: The Assignment Algorithm (Hungarian Assignment method), Balanced and Unbalanced Assignment Problems, Travelling Salesman Problem as an Assignment Problem.

# Unit: 3

**Game Theory :** Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principal of Dominance, Solution for Mixed Strategy Games (Game without Saddle Point),

**Queuing Theory:**Introduction, single channel - poission arrivals - exponential service times with infinite population, Multi channel - poisson arrivals - Exponential service times with infinite population.

# Unit: 4

Project Management: Phases of project management, guidelines for network construction, critical path, forward and backward pass, floats and their significance, crashing for optimum duration. Sequencing Models :Introduction, General assumptions, processing n jobs through 2 machines, processing "n" jobs through m machines, Processing 2 jobs through m machines.

# Unit: 5

Dynamic Programming: General Concept of Dynamic Programming, Problems related to general allocation and capital investment decisions.

# Unit: 6

Inventory Control: Definition, Costs associated with inventory, Basic EOQ model, Inventory control systems – P System, Q System, ABC analysis, VED analysis

Simulation: Introduction, Advantages of Simulation, Generation of Random numbers, Simulation Languages, Monte Carlo Simulation, Application of Simulation to queuing theory, inventory control

### **TEXT BOOKS:**

1.Hamdy, A. Taha, Operations Research-An Introduction, Prentice Hall of India Pvt. Ltd., 2.S.D. Sharma, Operations Research, Kedarnath, Ramnath& Co., Meerut,

2.S.D. Sharma, Operations Research, Kedarnath, Ramnath& Co., Meerut,

3.R. Paneer Selvam, Operations Research , PHI Learning Pvt. Ltd., New Delhi.

### **REFERENCE BOOKS:**

- 1. Hillier / Libernam, Introduction to Operations Research , Tata McGraw Hill Edition
- 2. J.K. Sharma, Operations Research-Problems and Solutions, Macmillan India Ltd.
- 3. Billy E Gillett, Introduction to Operations Research A Computer Oriented Algorithmic Approach, Tata McGraw Hill Edition.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### IDE 302: REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM (RS&GIS) (Interdisciplinary Elective for B. Tech – VI Semester)

Scheme: 2013Internal Assessment : 30End Exam Marks: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

The student will be able to:

- Explain the principles and applications of Remote Sensing and various types of platforms used in Remote Sensing.
- Explain the applications of GIS.
- Explain GIS data types and Input techniques.

#### Unit: 1

#### **Introduction To Remote Sensing:**

**Concept and Scope of Remote Sensing:**Definitions, Process and Characteristics of Remote Sensing System, Advantages and limitations.

**Concept of Electromagnetic Radiation (EMR):**Wavelength-frequency-energy relationship of EMR, EMR Spectrum and its properties, EMR wavelength regions and their applications, Interaction of EMR with matter, Spectral signatures.

**Energy Interaction in the atmosphere and with Earth Surface Features:**Scattering, absorption, transmission, atmospheric windows Spectral Reflectance Curve, Concept of signatures.

#### Unit: 2

#### **Platforms and Sensors:**

**Introduction:**Sensor materials, Sensor System - Framing and Scanning System, Whiskbroom scanners, Push-broom scanners, Side Looking scanner.

**Types and Characteristics of Sensor:**Imaging and non-imaging sensors, Active and passive sensors, Resolution of Sensors - Spectral, Spatial, Radiometric & Temporal, Scale, Mapping unit, Multi-band concepts and False Colour Composites.

**Remote Sensor Platforms and Satellite Orbits:**Ground, Airborne and Space borne Platforms, Orbital Characteristics – Coverage, Passes, Pointing Accuracy, Geostationary, Sun synchronous, shuttle orbit.

**Space Imaging Satellites:**Early history of space imaging; Multispectral and Hyperspectral sensors, Radar, Lidar; Specification of some popular satellites – IRS, Landsat and SPOT series; High resolution satellites – IKONOS, Cartosat, Quickbird, OrbView, GeoEye, Pléiades, WorldView; Other latest earth resource satellites.

# Unit: 3

# **Remote Sensing Applications:**

Scope of Remote Sensing Applications - Potentials and Limitations.

Applications in land use and land cover analysis.

Resource evaluation - Soils, minerals forest and agriculture.

Water Resource Applications- Mapping, monitoring of surface water bodies, tanks, lakes/ reservoirs. Environmental applications.

Unit: 4

# **Geographic Information System:**

**Basic Concepts**: Definition of GIS, Components of GIS, Variables - points, lines, polygon, Functionality of GIS, Areas of GIS application, Advantage and Limitation of GIS.

# Unit: 5

**GIS Data:**Spatial and Attribute Data, Information Organization and Data Structures - Raster and Vector data structures, Data file and database

**Creating GIS Database**: GIS Software's, file organization and formats, Geo-database, Rectification, Digitization and Map Composition.

# Unit: 6

**GIS Data Input & Editing:**Nature and Source of data, Method of spatial and Attribute data capture - Primary and Secondary, digitization and scanning method, Techniques and procedure for digitizing, Errors of Digitization and rectification, Re-projection, Transformation and Generalization, Edge matching and Rubber sheeting, Topology.

# **TEXT BOOKS:**

- 1. M. Anji Reddy; Text Book of Remote Sensing and Geographic Information System, BS Publication.
- 2. Lo C.P. & Yeung A.K.W., (2004). Concepts and Techniques of GIS, Prentice-Hall of India, New Delhi.

# **REFERENCE BOOKS:**

- 1. B.Bhatta; Remote sensing and Geographic Information System, Oxford Publications.
- 2. Siddiqui, M.A.; 2006, Introduction to Geographical Information System, ShardaPustakBhavan, Allahabad.
- 3. Curran, Paul J; 1985, Principles of Remote Sensing, Longman, London.
- 4. NRSA, IRS, Data User Handbook, Hyderabad

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### IDE 303: NEW AND RENEWABLE ENERGY SYSTEMS(NRES) (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal Assessment: 30End Exam Marks: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course outcomes:**

The student will be able

- To analyze the various renewable energy sources like wind, solar, biomass, Ocean energy, Fuel cells and MHD systems
- To exposure on biomass gasification and combustion, Theory of flat plate collectors, photo voltaic, thermal applications and limitations of solar energy are also provided.

#### Unit: 1

**Introduction and Energy Conservation:** Classification of energy sources-Importance of renewable energy sources and energy chain-Principles of energy conservation –Energy conservation opportunities

**Fundamentals of Solar Energy:** Extra terrestrial and terrestrial radiation- Solar constant and solar radiation geometry-Solar time and day length-Estimation of monthly average daily total radiation on horizontal surface and tilted surface-Measurements of radiation data.

# Unit: 2

**Solar Collecting Devices :** Flat plate collector- Losses associated with collector-Method of determination of top loss, side loss and bottom loss coefficient -Performance parameters affecting the collector performance-Efficiency of flat plate collector-selective surfaces- Air collectors-Classification of concentrating collector-Tracking of CPC collector

**Solar Thermal Systems:** Methods of storing solar energy-Solar water heating-Solar refrigeration system – Solar thermal power generation-Solar distillation-Solar space heating.

#### Unit: 3

**Solar Voltaic Systems & Emerging Technology:** Basic principle of PV cell-Arrangements of PV cell-classification of PV cell-Principle of magneto hydro dynamics-thermo electric and thermionic conversion, Introduction to Fuel cell.

#### Unit: 4

**Wind Energy:** Origin of wind-Application of wind power –Betz limit-Components of Horizontal axis wind turbine-Types of blades- Classification of vertical axis turbine.

# Unit: 5

**Biomass Energy:** Photosynthesis process- Biomass conversion technologies- Biogas production - Types of digester- Factors affecting the digester performance

**Geothermal Energy:** Types of geothermal energy resources-Energy conversion through geothermal energy resources-Environmental consideration.

Unit: 6

**Ocean Thermal Energy Conversion**: Principle of OTEC- Anderson and Claude cycles **Tidal energy:** Introduction- tidal energy conversion methods,

Wave energy: Introduction, conversion methods

# **TEXT BOOK**:

1. B.H.Khan ,Non-conventional Energy Sources, TMH Publishers, New Delhi.2003.

### **REFERENCE BOOKS**:

- 1. G.D Rai ,Non-conventional Energy Sources, Khanna Publishers, New Delhi.1989
- 2. S.Rao and Paulekar, Energy Technology, Khanna Publishers, New Delhi.2000
- 3. W.R.Murphy&G.Mckay , Energy Management, Butterworth & Co. Publishers, New Delhi.2001
- 4. B.Sreenivasa Reddy &K.HemachandraReddy, Thermal data hand book, IK International Publishers, Bangaloore 2007

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# IDE 304: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS(AIES) (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme : 2013

**Internal Assessment : 30** 

End Exam Marks : 70 End Exam Duration : 3 Hrs

#### **Course Outcomes:**

Student will be able to:

- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems and other machine learning models.
- Gain on working of an expert system.

#### Unit: 1

**Introduction:** What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence.

#### Unit: 2

**Intelligent Agents:** Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

#### Unit: 3

**Solving Problems by Searching:** Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies.

#### Unit: 4

Informed (Heuristic) Search Strategies- Greedy best-first search, A\* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions.

#### Unit: 5

**Beyond Classical Search:** Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Searching with Partial Observations.

#### Unit: 6

**Introduction to Expert System**: What are Expert Systems, Features of Expert system, Features of good expert system, Role of human in Expert system, Expert system organization, Difference between expert system and conventional program, Basic activities of expert system and the areas in which they solve problems, Prospector system features, working.

# **TEXT BOOKS:**

- 1. Stuart Russell and Peter Norvig, "Artifcial Intelligence: A Modern Approach" Third Edition, 2010. Pearson Education.
- 2. Donald A.Water man," A Guide to expert systems", Addison Wesley publishing company.

#### **REFERENCE BOOKS:**

- 1. Judea Pearl, "Probabilistic Reasoning in Intelligent Systems", Morgan Kaufmann, 1988.
- 2. Tom Mitchell, "Machine Learning", McGraw Hill, 1997.

L	T/D	Р	С
3	0	0	3

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# IDE305:NANOTECHNOLOGY (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal Assessment : 30End Exam MarksEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes**

Students will be able

- CO1: Acquire some of the fundamental principles behind nanotechnology and nanomaterials and their vital role in novel sensing properties and applications.
- CO2: Understand the fabrication, characterization, and manipulation of nanomaterials, nanosensors, and introduction to sensors used in science and technology.
- CO3: Understand about metal nanoparticle based sensors and nanowire based sensors.
- CO4: Understand about sensors based on nanostructures of metal oxides and mass sensitive nanosensors

#### Unit: 1

**Introduction to Nanotechnology:** Definition of nanotechnology; main features of nanomaterials; types of nanostructures (0D, 1D, and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties of nanomaterials.**Methods for characterizing the nanomaterials:** Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application.

#### Unit: 2

**Introduction to Sensors' Science and Technology:** Definition of sensors; main elements of sensors; similarities between living organisms and artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range, selectivity, linearity, resolution, response time, hysteresis, and life cycle.

#### Unit: 3

**Metal nanoparticle-based Sensors:** Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physical approach (laser ablation) and chemical approaches (Brust method, seed-mediated growth, etc.).Quantum Dot Sensors. Definition of quantum dot; fabrication techniques of quantum dots; Macroscopic and microscopic photoluminescence measurements; applications of quantum dots as multimodal contrast agents in bioimaging; and application of quantum dots as biosensors.

#### Unit: 4

**Nanowire-based Sensors**: Definition of nanowires; features of nanowires; fabrication of individual nanowire by top-down approaches and bottom-up approaches; and fabrication of nanowire arrays (fluidic channel, blown bubble film, contact printing, spray coating, etc.).Carbon Nanotubes-based Sensors: Definition of carbon nanotube; features of carbon nanotubes; synthesis of carbon nanotubes; fabrication and working principles of sensors based on individual carbon nanotubes.

# Unit: 5

Sensors Based on Nanostructures of Metal Oxide: Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism of metal-oxide gas sensors; and porous metal-oxide structures for improved sensing applications.

# Unit: 6

Mass-Sensitive Nanosensors: Working principle of sensors based on polymeric nanostructures; sensing mechanism and applications of nanomaterial-based of chemiresistors and field effect transistors of (semi-)conductive polymers, w/o inorganic materials.

Arrays of Nanomaterial-based Sensors: A representative example for the imitation of human

senses by means of nanotechnology and nanosensors: electronic skin based on nanotechnology. **TEXT BOOKS:** 

- 1. Jiří Janata, Principles of Chemical Sensors, Springer, 2d Edition (1989).
- 2. Roger George Jackson, Novel Sensors and Sensing, CRC Press (2004).

# **REFERENCE BOOKS:**

- 1. Florinel-Gabriel Banica, Chemical Sensors and Biosensors: Fundamentals and Applications, John Wiley and Sons (2012).
- 2. Ramsden Jeremy, Nanotechnology, an Introduction. Elsevier (2011).

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### IDE306: INTRODUCTION TO INFORMATION SYSTEMS (IIS) (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal Assessment: 30End Exam Marks: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
2	2		3

#### **Course Outcomes:**

Student will be able to:

- learn the concepts of computer organization, operating systems, compiler design including its phases and components and become acquainted with the life cycle of software project and its various phases
- use SQL, to create Database objects

#### Unit: 1

**Fundamentals of Computers & Computer Architecture:** Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance Memory, Input/output devices, BUS, addressing modes

System Software: Assemblers, Loaders and linkers, Compilers and interpreters.

#### Unit: 2

**Operating System:** Introduction, Process Management, CPU scheduling, Memory Management Schemes, Page replacement algorithms.

**Software Engineering:** Introduction to software engineering, Life cycle of a Software Project, Software Development Models.

#### Unit: 3

**Coding Standards and Best Practices:** Introduction to C Programming, Basics of C Language, Data Types in C, Functions, arrays, pointers, structures.

**Sorting and Searching Techniques:** Searching Algorithms – Linear Search, Binary Search, Sorting Algorithms – Bubble Sort, Selecting Sort and Insertion Sort.

#### Unit: 4

**Relational Database Management System:** Introduction to DBMS, the database technology, data models. Database Users.

**Entity Relationship** (**E-R**) **Modeling:** Introduction, Notations, Modeling E-R Diagrams, Case Study1,2& 3, Merits and Demerits of E-R modeling.

# Unit: 5

**Normalization:** Introduction, Need for Normalization, Process Normalization, Types of Normal Forms (1 NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.

# Unit: 6

**Structured Query languages (SQL):** History of SQL, Data Types, Data Definition Language Statements (DDL), Data Manipulation Language (DML), Data Control Language (DCL), writing simple queries.

#### **TEXT BOOKS:**

1. Campus Connect Foundation Program – Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. – 1, INFOSYS.

- 2. Campus Connect Foundation Program Relational Database management System, Client Server Concepts, Introduction to Web Technologies Vol. 2, INFOSYS
- 3. Campus Connect Foundation Program Object Oriented Concepts System Development Methodology, User Interface Design Vol. 3, INFOSYS
- 4. YashwantKanetkar, Let us ""C"" bpb Publications 8th ed., 2007.

# **REFERENCE BOOKS:**

- 1. Andrew S. Tanenbaum, Structured Computer Organization, PHI, 3rd ed., 1991
- 2. Silberschatz and Galvin, Operating System Concepts, 4th ed., Addision-Wesley, 1995
- 3. Wilbert O. Galitz, Essential Guide to User Interface Design, John Wiley, 1997
- 4. Alex Berson, Client server Architecture, Mc Grew Hill International, 1994
- 5. Henry F Korth, Abraham Silberschatz, *Database System Concept*, 2nd Edition, McGraw-HillInternational editions, 1991
- 6. Roser S. Pressman, *Software Engineering-A Practitioners approach*, McGraw Hill, 5th ed., 2001

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# IDE 307: MECHATRONICS (MT) (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme : 2013

Internal assessment: 30End Exam Marks: 70

**End Exam Duration : 3 Hrs** 

L	T/D	Р	С
3	-	-	3

#### **Course Outcomes:**

• At the end of the course students able to learn & achieve in-depth knowledge in the fundamentals, design, analysis and operation of mechatronic systems.

#### Unit: 1

**Introduction:** Definition of Mechatronics, Mechatronics in manufacturing, Products, and design. Comparison between Traditional and Mechatronics approach.

#### Unit: 2

Review of fundamentals of electronics. Data conversion devices, sensors, microsensors, transducers, signal processing devices, relays, contactors and timers. Microprocessors controllers and PLCs.

#### Unit: 3

**Drives:** stepper motors, servo drives. Ball screws, linear motion bearings, cams, systems controlled by camshafts, electronic cams, indexing mechanisms, tool magazines, transfer systems.

#### Unit: 4

**Hydraulic systems:** flow, pressure and direction control valves, actuators, and supporting elements, hydraulic power packs, pumps. Design of hydraulic circuits.

# Unit: 5

**Pneumatics:** production, distribution and conditioning of compressed air, system components and graphic representations, design of systems. Description.

# Unit: 6

Description of PID controllers. CNC machines and part programming. Industrial Robotics.

# **TEXT BOOKS:**

- 1. HMT ltd. Mechatronics, Tata Mcgraw-Hill, New Delhi, 1988.
- 2. G.W. Kurtz, J.K. Schueller, P.W. Claar . II, Machine design for mobile and industrial applications, SAE, 1994.
- 3. T.O. Boucher, Computer automation in manufacturing an Introduction, Chappman and Hall, 1996.

# **REFERENCE BOOKS:**

- 1. R. Iserman, Mechatronic Systems: Fundamentals, Springer, 1st Edition, 2005
- 2. Musa Jouaneh, Fundamentals of Mechatronics, 1st Edition, Cengage Learning, 2012.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# **IDE308: CONTROL& AUTOMATION (CA)** (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal assessment: 30End Exam Marks: 70End Exam Duration: 3 Hrs

L	T/D		P C
3	-	-	3

# **Course Outcomes:**

- Represent the mathematical model of a system
- Determine the response of different order systems for various step inputs
- Analyze the stability of the system.
- Demonstrate an ability to program Programmable Logic Controllers using ladder logic and other programming standards
- Describe the advantages, use and applications of Programmable Logic Controllers (PLC"s).

# Unit: 1

**Modeling of Linear Control Systems:** open-loop and closed-loop systems, control system components, Advantages, disadvantages & Applications of automated control system. Servo motors, position control systems, Transfer functions, equations of electrical and mechanical systems.

# Unit: 2

**Block Diagrams:** block diagram representation and manipulation, signal flow graphs-mason's gain formula to determine overall system gain.

Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback.

# Unit: 3

**Time Response:** Types of input, transient response of second order system for step input, timeresponse specifications, steady state error and error constants, proportional, derivative and integral controls.

Concept of Stability: Stability of systems-Routh Hurwitz criterion.

**Compensation (Without Design):** The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensators.

# Unit: 4

**Root Locus:** Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques. Bode Plot

# Unit: 5

**PLC Basics:** PLC system, I/O modules and interfacing, CPU processor, programming Equipment, programming formats, construction of PLC ladder diagrams, Devices connected to I/O modules.

**PLC Programming:** Input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation.

# Unit: 6

**Digital logic gates**: Programming with logic gates, programming in the Boolean algebra system, conversion examples.

**PLC Functions:** Timer functions & Industrial applications, counters, counter function industrial applications, Arithmetic functions, Number comparison functions, number conversion functions.

# **TEXT BOOKS:**

- 1. Nagrath and Gopal, "Control systems Engineering", New Age International Publications.2003
- 2. B.C.Kuo, "Automatic Control Systems", Oxford.2003
- 3. K. Ogata, "Modern control Engineering", Pearson 2003
- 4. Naresh K.Sinha, "Control Systems", New Age International Publishers.1998
- 5. B.S.Manke, "Linear Control Systems".1996
- 6. John W. Webb & Ronald A. Reiss, "Programmable Logic Controllers- Principles and Applications" Fifth Edition, PHI

# **REFERENCE BOOKS:**

- 1. Madan Gopal, "Control Systems", TMH. 2003
- 2. Dorf, Bishop, "Modern Conrtol systems", Addison Wesley1998
- 3. (Shaum"sout line series), "Feedback control systems", TMH1986
- 4. R.C.Shukla, "Control Systems", Dhanpat Rai.
- 5. Ashok Kumar, "Control Systems", TMH.
- 6. JR. Hackworth & F.D. Hackworth Jr., "Programmable Logic Controllers- Programming Method and Applications", Pearson. 2004

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# IDE 309:WEB DEVELOPMENT PROGRAMMING (WDP) (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme : 2013

Internal Assessment : 30 End Exam Marks : 70 End Exam Duration : 3 Hrs

#### **Course Outcomes**:

Student will be able to:

- Develop the skill & knowledge of Web page design.
- Understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other Information technology sectors.

#### Unit: 1

**Introduction To The Web:** Understanding The Internet And World Wide Web, History Of The Web, Protocols Governing The Web, Creating Websites For Individuals And The Corporate World, Web Applications, Writing Web Projects, Identification Of Objects, Target Users, Web Team.

#### Unit: 2

**Planning and process development:**Planning And Process Development, Web Architecture, Major Issues In Web Solution Development, Web Servers, Web Browsers, Internet Standards, TCP/IP Protocol Suite, IP Addresses, Cyber Laws.

#### Unit: 3

**Hypertext Transfer Protocol:** Introduction, Web Servers And Clients, Resources, URL And Its Anatomy, Message Format, Persistent And Non Persistent Connections, Web Caching, Proxy.

# Unit: 4

**Hypertext Markup Language (HTML):** History Of HTML And W3C, Html and Its Flavors, Html Basics, Elements Attributes And Tags, Basic Tags, Advanced Tags, Frames, Images, Meta Tag, Planning Of Web Page, Model And Structure For A Website, Designing Web Pages, Multimedia Content Frames.

#### Unit: 5

**Cascading Style Sheet(CSS):** Introduction, Advantages, Adding CSS, Browser Compatibility, CSS and Page Layout, Selectors.

#### Unit: 6

**Hosting And Promoting Websites:** Structure of Websites, Web Development Tools, Web Files Using Microsoft Word, Microsoft Front Page, Adobe Dreamweaver, GIF Animator, Hosting Websites, Getting A Domain Name, Redirectors On The Web, Server Software, Submitting For Search Engines, Visitor Analysis And Statistics, Website Promoting Methods.

#### **TEXT BOOKS:**

1.UtamK.Roy, "Web Technologies", Oxford Higher Education. 2.K.L.James, "The Internet- A User Guide", 2<sup>nd</sup> Edition, PHI Publications.

L	T/D	Р	С
2	2	-	3

# **REFERENCE BOOKS:**

Kognet Learning Solutions inc., "HTML5 in Simple Steps". Dreamtech press.
Steven M.Schafer, "HTML,XHTML and CSS Bible 5<sup>th</sup> Edition", Wiley India.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# IDE 310:ENVIRONMENTALAnd WATER RESOURCES ENGINEERING (Inter disciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal Assessment : 30End Exam Marks:70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	-	-	3

#### **Course Outcomes :**

Students shall be able to identify the source of waste water and solid waste, identifying the physical, chemical and biological properties of waste water, India's water budget, Irrigation methods, fundamentals of Hydro power development.

#### Unit:1

**Water Supply System :**Need for protected water supply system – Objectives of Water supply system –Routine water analysis for physical, chemical and bacteriological characteristics and their significance – Standards for drinking water – Water borne diseases and their control.

#### Unit: 2

**Sanitation:** Aim and objectives of sanitation – Conservancy and water carriage systems – Classification of sewerage systems – Separate, combined and partially combined systems – disposal of domestic waste water.

#### Unit: 3

**Urban Solid Waste Management:** Types, sources, quantity and composition of urban solid waste – Collection, transportation, recovery & reuse – Disposal methods such as composting, incineration, sanitary land fill.

# Unit: 4

**Hydrology:** Hydrologic cycle – Global water budget – India"s water budget – Practical applications of Hydrology – Climate and weather seasons of India – Floods – Flood management.

#### Unit: 5

**Water Resources Development:** Planning for WRD – Purposes of WRD project multipurpose project – Functional requirements – Financial analysis of a project – Irrigation methods – Ground water – Geological formations – other sources of ground water – Water wells.

#### Unit: 6

**Water Power Engineering:** Sources of energy – Classification – Types of power planning for water power development – History – Advantages – Comparison – Layout of hydro power plant – Economics of Hydro power development.

# **TEXT BOOKS:**

2. Santosh Kumar Garg [1992], Environmental Engineering Vol.1, Khanna Publications.

3. P. Jaya Rami Reddy, A Text book of Hydrology (3rd Edition, 2011), Laxmi Publications, New Delhi.

3. Dr. P.N. Modi [2014], Irrigation and water Resources Engineering, Standard Book House

# **REFERENCE BOOKS:**

1. S.K.Hussain [1994], Water supply and sanitary Engineering, Oxford & IBH.

2. H.M. Raghunath [2009], Groundwater, Wiley Eastern Ltd

3. K.Subramanya, *Engineering Hydrology*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.

4. M.M. Dandekar and K.N. Sharma [2010], *A Text Book of Water Power Engineering*, Vikas Publications.

5.R.K.Sharma and T.K.Sharma [2003], *A Text book of Water Power Engineering including Dams, Engg. Hydro & Fluid Power Engg.*, S. Chand Company Ltd., New Delhi–110 055

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

# GE401: INTRODUCTION TO PSYCHOLOGY (IPY) (Global Elective for B. Tech. – VII Semester)

Scheme: 2013Internal assessment: 100

#### **Course Outcomes:**

Be able to articulate the general history of psychology by explaining depth and breadth of the field from the field from the perspective of a future educator or researcher.

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### Unit – I

•

Introduction: Defining Psychology & Behavior-Branches and fields of Psychology,Utility of Psychology

Methods of Psychology: Introspection Method, Naturalistic observation, Experimental Method-Differential Method, Clinical Method, Psycho Physical Methods

#### Unit – II

Physiological Basis of Behavior: The Neuron-Central Nervous system, Brain and localization of Brain functions, Spinal chord Influence of Nervous system on human behaviour, Endocrine system and it<sup>\*</sup>'s impact, The role of heredity and environment in the development of personality

#### Unit – III

Instincts, Emotions Senses and Sensitivity: Instincts and Reflex actions-Emotion & it's characteristics-Physiology of Emotions-Sensation and Sensitivity

#### Unit – IV

Thinking, Reasoning and Problem solving : Nature of thinking-Elements of thoughts, Tools of Thinking, Rigidity, Types of thinking, Reasoning & types, Problem solving and it's methods

#### Unit – V

Motivation and Behavior & Attention & Learning: Biological and socio psychological Needs, Drives and Incentives, Motives and Types of Motives, Types & Effect of attention, Types of Learning, Problem Solving, Mechanism of Memorization

#### Unit – VI

Intelligence, Aptitude, Personality : Nature of Intelligence-Concept of Metal age and IQ-Constantly of IQ-IQ Classification, Aptitude Ability & Achievement, Measurement of Aptitude, Features and Characteristics of Personality, Personality Assessment, Walters social Learning Theory

# **TEXT BOOKS:**

1. S.K. Mangal, "General Psychology", Sterling Publishers Private Limited

# **REFERENCE BOOK:**

1. Saundra K.Ciccarelli&Gkenn E.Meyer, "Psychology", Dorliing Kindersley (I) Pvt Limited

### NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

# (Global Elective for B. Tech. – VII Semester)

#### Scheme : 2013 Internal assessment : 100

L	T/D	Р	С
2	-	-	2

#### **Course Outcomes:**

- Able to understand overview of research process, state research problem and conduct a preliminary literature review of the concepts comprising the research questions.
- Student able to study the features and uses & evaluation of data.
- Able to understand the organization structure and style of report writing.
- Able to understand that precautions which are to be taken while writing research report.

# Unit – I

**Research Methodology:** Introduction –Meaning-Objectives & Motivation of Research-Types & Significance of Research-Research Methods (Vs) Methodology.

Researching process-Technique involved in defining a problem- Definition of a

Hypothesis Role of Hypothesis-Types of Hypothesis-Criteria of Good Hypothesis.

#### Unit – II

**Research Design and Sampling Design:** Need for Research Design-Features of good Design-Concepts Related to Research Design-Different research designs-Basics Principles of Experimental Designs-Steps in sampling design-Characteristics of good sample design-Various types of sample designs-Complex Random sampling designs

#### Unit-III

**Measurement and Scaling Techniques:** Errors in Measurement, Tests of Sound Measurement, Scaling and Scale Construction Techniques, Forecasting Techniques, Time Series Analysis, Interpolation and Extrapolation.

# Unit – IV

# **Data Collection and Processing:**

Primary Data: Data Collection through observation method & Interview Method-Data Collection through Questionnaires & schedules- Comparison of data collection methods- -Collection of Secondary data.

**Processing:** Measures of Central Tendency-Measures of Dispersion-Measures of Asymmetry - Measures of Relationship-Simple Regression Analysis-Chi-square Test for comparing valiance

#### Unit – V

**Correlation and Regression Analysis:** Method of Least Squares, Regression Vs. Correlation, Correlation Vs Determination, Types of Correlation and Their Specific Applications.

**Sampling Fundamentals:** Central Limit Theorem-Sampling Theory-Concept of standard error-Estimating population Mean-Sample size & Determination

#### Unit – VI

**Interpretation of Data and Report Writing:** Meaning-Technique & precautions of Interpretation Significance of Report writing, Steps- Layout of a Research report, -Types of Reports-Mechanics of writing a Research Report- Precautions of Report Writing.

#### **TEXT BOOKS:**

1. C.R. Kothari, "*Research Methodology (Methods & Techniques)*", New Age International Publishers.

# **REFERENCE BOOKS:**

1. R. Cauvery, V. K. Sudha Nayak, M. Girija, "*Research Methodology*", S. Chand Publications.

# NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

**END EXAM:** There is no End Examination for this subject.

# GE403: ENTREPRENEURSHIP DEVELOPMENT (ED) (Global Elective for B. Tech. – VII Semester)

# Scheme : 2013 Internal assessment : 100

# 2

L	T/I	P	C
2	-	-	2

# **Course Outcomes:**

Up on successful completion of the course, the student will be able to

CO1: Understand the personal as well as external resources with a view to successfully launching

and subsequently managing the enterprises.

CO2: Understand entrepreneurial culture, competencies needed for setting up small enterprises.

# Unit - I

Introduction: Concept of an entrepreneur; Definition of an entrepreneur; Types of entrepreneurs; Characteristics of an entrepreneur.

Entrepreneurship: Definitions; Theories of entrepreneurship; Key elements of entrepreneurship; Six important segments of entrepreneurship environment; Advantages of entrepreneurship; Barriers to entrepreneurship; Role of entrepreneurship in economic development.

# Unit – II

Rural Entrepreneurship: Meaning; Need; Retrospection of rural industrialization in India; Problems of rural entrepreneurship; Development plan for rural entrepreneurship.

Small Enterprises : Definition of SSI; Types, Characteristics of SSI; Role of SSI in economic development; Problems faced by SSI.

# Unit – III

Project Planning: Project Identification; Project Selection; Project Report – Contents & Formulation; Methods of Project Appraisal.

# Unit – IV

Ownership Structures: Sole Proprietorship; Partnership; Company; Co-operative; Selection of appropriate ownership structure.

# Unit – V

Institutional Finance: Commercial banks; Other Financial Institutions – IDBI, IFCI, ICICI, IRBI, SFC, SIDC, SIDBI & EXIM Bank.

# Unit – VI

Institutional Support: Need; Support to Small Entrepreneurs – NSIC, SIDO, SSIB, SSIDC, SISI, DICs

#### **TEXT BOOKS:**

1. Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, "*Principles of Entrepreneurship*", Everest Publishing HousePub.

# **REFERENCE BOOKS:**

1. S.S. Khanka, "Entrepreneurial Development", S. Chand & Company Ltd. Pub.

# NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

**END EXAM:** There is no End Examination for this subject.

# GE404: INTELLECTUAL PROPERTY & PATENT FILING (IPPF) (Global Elective for B. Tech. – VII Semester)

Scheme : 2013

Internal assessment : 100

L	T/D	Р	С
2	-	-	2

#### **Course Outcomes:**

- Be able to acquire fundamental competencies with regard to intellectual property rights.
- Be able to manage the intellectual property rights.

#### Unit – I

Basics of IPR: Introduction to intellectual property right (IPR) -Need for IPR in India-Systems-Benefits of IPR-Various Types of IPR-Violation of IPR

# Unit – II

Patents: Introduction to Patents-Various kinds of Patents-Patenting Process-Patent and kind of inventions protected by patent- Patent documents- How to protect your inventions? -Granting of patent Rights of a patent -How extensive is patent protection-Searching a patent -Drafting of a patent

#### Unit – III

Copy Right: What is copyright?- What is covered by copyright?- Fair use of copyrighted works (e.g., for classroom use)-Contributory copyright infringement -Rights covered by copyright?- Critical differences between patent and copyright protection-Copyright infringement distinguished from plagiarism- Remedies against Infringement

# Unit – IV

Method of Designing Registrations: Designing Registrations-How Chart for Registration-Trade Mark-Geographical Indications Integrated Circuits-Trade Secrets

#### Unit – V

IPR Policy: IP in various sectors like Government and Nation-R &D organizations-IT, Media,Entertainment.

#### Unit – VI

Management of Intellectual Property Rights-Trademarks, Geographical Indications and Domain Names-Chemical Engineering & Services Sector-Industries & Small Scale Industry

# **TEXT BOOKS:**

- 1. *"Intellectual Property Rights: Key to New Wealth"*, National Research Development Corporation
- 2. Prabuddha Ganguli, "Intellectual Property Rights", TMH
## **REFERENCE BOOKS:**

1. P. Narayanan; "Law of Copyright and Industrial Designs"; Eastern law House, Delhi, 2010

## NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

### **GE405: CONSTITUTION OF INDIA (CI)** (Global Elective for B. Tech. – VII Semester)

Scheme : 2013

Internal assessment : 100

L	T/D	Р	С
2	-	-	2

#### **Course Outcomes:**

• Be able to know how constitution governs the allocation of power in society and the way in which the Indian constitution was made.

#### Unit – I

Historical back ground, Significance of Constitution, Making of the constitution, Role of the constituent Assembly, Salient features, the Preamble, Citizenship, procedure for amendment of Constitution Fundamental rights-Derivative principles of state policy-Elections in India.

#### Unit – II

Union Executive: Structures of Union Government & Functions, President, Vice President, Prime Minister, Cabinet Parliament-Supreme Court of India

#### Unit – III

State Executive: Structures and Functions, Governor, Chief Minister, Cabinet, State Legislature, High Courts & Sub ordinate courts

#### Unit – IV

Central, State Relations, President''s Rule, Constitutional Amendments [42, 44, 74, 76, 86 & 91]-Constitutional functionaries, Working of Parliamentary system in India

#### Unit – V

Nature, Meaning & Definition, Indian Social Structure, Language in India-Political Parties & Presume groups, Right of Women-S.C"s, S.T"s & other weaker sections.

#### Unit – VI

Judiciary: Structure, Organisation of Judiciary, independence of the Judiciary, role and functions of Supreme Court, Judicial Review.

#### **TEXT BOOKS:**

- 1. Durga Das Basu, "Introduction to the Constitution of India", Wedwe & Company
- 2. Macivel, Page, "An Introduction Analysis", Society
- 3. M.V. Pylee, "Indian Constitution", S. Chand Publications
- 4. Subhash C Kashyao : "Our Constitution", National Bank, Trust, India.

## **REFERENCE BOOKS:**

- 1. Durga Das Basu, "Introduction to the Constitution of India", Wedwe & Company
- 2. Macivel, Page, "An Introduction Analysis", Society

## NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

**END EXAM:** There is no End Examination for this subject.

### GE 406: ETHICAL HACKING (EH) (Global Elective for B. Tech. – VII Semester)

Scheme : 2013 Internal assessment : 100

#### **Course Outcomes:**

- Students will be able to provide security to their own systems.
- Students will learn how to crack the system passwords.
- Students will able to perform penetration tests.
- Students will able to develop an ongoing security strategy.

#### UNIT I:

**Introduction To Ethical Hacking :**Basic Terminology, Defining Hacker, Defining Malicious User, Recognizing How Malicious User Beget Ethical Hacker, Ethical Hacking Vs Auditing, Policy Considerations, Compliance And Regulatory Concerns, Understanding The Need To Hack Your Own Systems, Understanding The Dangers Your Systems Face, Non Ethical Attacks, Network Infrastructure Attacks, Operating System Attacks, Application And Other Specialized Attacks.

#### UNIT II:

**Attacks And Ethical Hacking Commandments:** Non Ethical Attacks, Network Infrastructure Attacks, Operating System Attacks, Applications And Other Specialized Attacks, Working Ethically, Respecting Privacy, Not Crashing Your Systems, Using The Ethical Hacking Process, Formulating Your Plan, Selecting Tools, Executing The Plan, Evaluating Results.

#### **UNIT III:**

**Cracking The Hackers Mindset And Ethical Hacking Plan :**Think Like Bad Guys, Who Breaks Into Computer Systems, Why They Do It, Planning And Performing Attacks, Maintaining Anonymity, Establishing Your Goals, Determining Which System Hack, Creating Testing Standards, Timing, Running Specific Tasks, Blind Vs Knowledge Assessments, Picking Your Location, Respond The Vulnerabilities, Selecting Security Assessment Tools.

#### **UNIT IV:**

**Hacking Methodology :** Setting The Stage For Testing, Gathering Public Information, Mapping The Networks, Scanning Systems, Determining What's Running On Open Ports, Assessing Vulnerabilities.

#### UNIT V:

**Passwords:** Understanding Password Vulnerabilities, Organizational Password Vulnerabilities, Technical Password Vulnerabilities, Cracking Passwords, Cracking The Passwords The Old Fashioned Way, Cracking The Passwords With High-Tech Tools, Cracking Password Protected Files, Understanding Other Ways To Crack Passwords, General Password Cracking Countermeasures.

#### **UNIT VI:**

L	T/D	Р	С
2	-	-	2

Mobile Devices: Cracking Laptop Passwords, Cracking Phones And Tablets, Cracking ios Passwords.

# **Text Books:**

1. Kevin Beaver, "Hacking for dummies", 4<sup>th</sup> Edition, Wiley India Pvt.Ltd.

## **Reference Books:**

1. Rafay Baloch "A Beginners guide to ethical hacking", www.hacking-book.com.

# NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

**END EXAM:** There is no End Examination for this subject.

## GE 407: INFORMATION SECURITY AND CYBER LAWS (ISCL) (Global Elective for B. Tech. – VII Semester)

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Scheme : 2013 Internal Assessment : 100

#### **Course Outcomes:**

- Students will understand different threats related to information systems.
- Students will learn about firewall and VPN techniques.
- Students will analyze the security aspects of Databases, OS and Email.
- Students will be aware of the cyber laws, patents and copyright terms.

#### Unit: I

**Information Systems in Global Context:** Basics and importance of Information Systems, Changing Nature of Information Systems, Global Information Systems: Role of Internet and Web Services.

**Threats to Information Systems:** New Technologies Open Door to the Threats, Information-Level Threats versus Network-Level Threats, Threats and Attacks, Classifications of Threats and Assessing Damages, Protecting Information Systems Security.

#### Unit: II

**Building Blocks of Information Security:** Principles of Information Systems Security, Three Pillars of Information Security.

**Intrusion Detection for Securing the Networks:** Intrusion Monitoring and Detection, Intrusion Detection for Information Systems Security.

#### Unit: III

**Firewalls for Network Protection:** Firewalls, Demilitarized Zone (DMZ), Need and Protection provided by Firewalls, Proxy Servers, Topologies for Different Types of Firewalls.

Virtual Private Networks for Security: VPN, Need and Role of a VPN for an Enterprise, Working of VPN, VPN Architecture.

#### Unit: IV

**Security of Electronic Mail Systems:** Today's Email Usage Scenario, Email System Mechanism, Security Threats posed by Emails, Protection from Threats, Governance for Emails Systems.

**Security of Databases:** Database Security Issues, Federated Databases: Need and Security Issues, Securing the Mobile Databases, Securing Connectivity with Enterprise Databases, Data Integrity as a parameter for security, Database Security Policy.

#### Unit: V

**Security of Operating Systems:** Operating Systems role in Information Systems Application, Operating System Types, Functions and Tasks, Network Operating Systems and Security, Host Security and OS Hardening, Patched Operating System, OS hardening fundamentals.

Security Models, Frameworks, Standards and Methodologies: Terminology, Methodologies for Information Systems Security.

# Unit: VI

**Introduction To Cyber Laws:** Introduction to Indian Cyber Law, Objective and Scope of the IT Act, 2000, Intellectual Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License

## **Text Books:**

- 1. Nina God bole, "Information Systems Security: Security Management, Metrics, Frameworks and Best Practices", Wiley India Pvt.Ltd., 2013.
- 2. Surya Prakash Tripati, Ritendra Goel, Praveen Kumar Shukla "*Introduction To Information Security And Cyber Laws*", Wiley India Pvt.Ltd., 2014.

### **Reference Books:**

1. Michael E. Whitman and Hebert J Mattord, "*Principles of Information Security*", 4th edition Ed. Cengage Learning 2011

## NOTE:

**INTERNAL ASSESSMENT:** Two Internal Examinations will be conducted for 50 Marks each. The Question paper consists of SIX questions. The FIRST question is compulsory. It consists of 10 questions of two marks each. Four questions to be answered from the remaining five questions and each question carries 7.5 marks.

END EXAM: There is no End Examination for this subject.

#### EC412: REAL TIME OPERATING SYSTEMS(RTOS) (For B.Tech. ECE - VII Semester) (Professional Elective-I)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

- Student will be able to gain Knowledge on differentiation between OS and RTOS.
- Student will be able to get key idea on UNIX.
- Student will be able to acquire Knowledge on applications of RTOS.

#### Unit-I

**Introduction to OS and RTOS :** Architecture of OS (Monolithic, Microkernel, Layered, Exokernel and Hybrid kernel structures), Operating system objectives and functions, Virtual Computers, Interaction of O. S. & hardware architecture, Evolution of operating systems, Batch, multi programming. Multitasking, Multiuser, parallel, distributed & real –time O.S.

#### Unit-II

**Process Management of OS/RTOS :**Uniprocessor Scheduling: Types of scheduling, scheduling algorithms: FCFS, SJF, Priority, Round Robin, UNIX Multi-level feedback queue scheduling, Thread Scheduling, Multiprocessor Scheduling concept, Real Time Scheduling concepts.

#### **Unit-III**

**Process Synchronization:** Concurrency: Principles of Concurrency, Mutual Exclusion H/W Support, software approaches, Semaphores and Mutex, Message Passing, Monitors, Classical Problems of Synchronization: Readers-Writers Problem, Producer Consumer Problem, Dining Philosopher problem. Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategies.

#### Unit-IV

**Memory & I/O Management:**Memory Management requirements, Memory partitioning: Fixed, dynamic, partitioning, Buddy System Memory allocation Strategies (First Fit, Best Fit, Worst Fit, Next Fit), Fragmentation, Swapping, Segmentation, Paging, Virtual Memory, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, clock), Thrashing, Working Set Model.

#### Unit-V

**Memory & I/O Management:** I/O Management and Disk Scheduling: I/O Devices, Organization of I/O functions, Operating System Design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, C-SCAN, SSTF), Disk Caches.

#### **Unit-VI**

**RTOS Application Domains :**Comparison and study of RTOS: Vxworks and  $\mu$ COS – Case studies: RTOS for Image Processing – Embedded RTOS for voice over IP – RTOS for fault Tolerant Applications – RTOS for Control Systems.

## **Text Books:**

- 1. Wayne Wolf, *Computers as Components: Principles of Embedded Computing System Design*, 2/e, Kindle Publishers, 2005.
- 2. Andrew Tanenbaum, Modern Operating Systems, 3/e, Pearson Edition, 2007.

## **Reference Books:**

- 1. Jean J Labrosse, *Embedded Systems Building Blocks Complete and Ready-to-use Modules in C*, 2/e, 1999.
- 2. C.M. Krishna and G.Shin, Real Time Systems, McGraw-Hill International Edition, 1997.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC413: DSP PROCESSORS AND ARCHITECTURES (DSPPA) (For B.Tech ECE VII Semester) (Professional Elective-I)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

- Student will be able to use DSP processors for real time systems.
- Student will be able Design and implement signal processing modules in DSP processors.

#### Unit - I

Architectures for Programmable Digital Signal-Processors: Introduction, Basic Architectural Features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Features for External Interfacing.

#### Unit - II

**Programmable Digital Signal Processors:** Introduction, Commercial digital Signal-processing Devices, Data Addressing Modes of TMS32OC54xx., Memory Space of TMS32OC54xx Processors, Program Control.

Detail Study of TMS320C54X & 54xx Instructions and Programming, On-Chip peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54xx Processor.

## Unit - III

**Implementation of Basic DSP Algorithms:**Introduction, The Q-notation, FIR Filters, IIR Filters, Interpolation and Decimation Filters (one example in each case).

#### Unit - IV

**Implementation of FFT Algorithms:** Introduction, An FFT Algorithm for DFT Computation, Overflow and Scaling, Bit-Reversed Index Generation & Implementation on the TMS32OC54xx.

#### Unit - V

**Interfacing Memory and Parallel I/O Peripherals to DSP Devices:** Introduction, Memory Space Organization, External Bus Interfacing Signals. Memory Interface, Parallel I/O Interface, Programmed I/O, Interrupts and I / O Direct Memory Access (DMA).

#### Unit - VI

**Interfacing and Applications of DSP Processor:**Introduction, Synchronous Serial Interface, A CODEC Interface Circuit. DSP Based Bio-telemetry Receiver, A Speech Processing System, An Image Processing System.

#### **Text Books :**

- 1. B Venkataramani and M Bhaskar, Digital Signal Processors, TMH, 2002.
- 2. Avatar Singh and S. Srinivasan, Digital Signal Processing, Thomson Learning, 2004.

## **Reference Books:**

- 1. Ifeachor E. C., Jervis B. W, *Digital Signal Processing : A practical approach*, Pearson-Education, PHI, 2002.
- 2. Sen M. Kuo & Woon-Seng S. Gan, *Digital Signal Processors, Architectures, Implementations, and Applications, Prentice Hall, 2004*
- 3. Peter Pirsch, Architectures for Digital Signal Processing, John Weily, 2007.

### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC414: RADAR ENGINEERING (RE) (For B.Tech ECE VII Semester) (Professional Elective-I)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

- Student will be able to know about the all radar systems, design of radar systems and requirements of radar systems
- Student will be able to characterize the performance of radar systems.

## Unit-I

**Introduction to Radar:** Description of basic radar system and its elements, Radar equation, Radar block diagram and operation, Radar frequencies, Application of radar. **Displays:** A-Scope, B-Scope and PPI radar displays.

## Unit-II

**The Radar Equation:** Predictions of range performance, Minimum detectable signal, Receivernoise and Signal to noise ratio. Probability of detection and false alarm, Radar cross-section of target. Transmitter power, Pulse repetition frequency and range ambiguities.

## Unit-III

CW and FMCW Radar: Doppler effect, CW radar, FM CW radar, Multiple frequency CW radar.

#### Unit –IV

**MTI and Pulse Doppler Radar:** Description of operation, MTI radar with power amplifier transmitter, MTI radar with power oscillator transmitter, Delay line cancelers, Blind speeds, multiple or staggered PRFs, MTI radar using range gated Doppler filters, Limitations to MTI performance, Non-coherent MTI, Pulse Doppler radar.

#### Unit-V

**Tracking Radar:** Tracking with radar, Sequential lobbing, Conical scan, Monopulse amplitude Comparison and phase comparison tracking radars, Tracking in range, Acquisition, Comparison of tracking radars.

#### Unit-VI

**Radar Antennas:** Antenna parameters, Parabolic reflector antennas, Cassigrain antennas. **Radar Receivers:** Radar receiver, Noise figure, Low noise front ends, Duplexers and receiver protectors.

## **Text Books:**

1. Skolnik, Introduction to Radar Systems, 2<sup>nd</sup> Edition, TMH, 2004

2. Skolnik, Introduction to Radar Systems, 3<sup>rd</sup> Edition, TMH, 2008

### **Reference Books:**

1.Kulkarni M, Microwave and Radar Engineering, 4<sup>th</sup> Edition, Umesh Pub, 2010.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC415: SOFTWARE DEFINED RADIO (SDR) (For B.Tech ECE VII Semester) (Professional Elective-I)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

- Student will be able to conceptualize the SDR and its implementation.
- Student will be able to Design SDR for a specific application.
- Student will be able to identify the challenges in the maintenance of SDR.
- Student will be able to analyze the transmitter and receiver architectures.

## Unit-I

**Introduction:** Software Defined Radio – A Traditional Hardware Radio Architecture – Signal Processing Hardware History – Software Defined Radio Project Complexity.

## UNIT-II

A Basic Software Defined Radio Architecture:-Introduction – 2G Radio Architectures- Hybrid Radio Architecture- Basic Software Defined Radio Block Diagram- System Level Functioning Partitioning-Digital Frequency Conversion Partitioning.

**RF System Design** – Introduction- Noise and Channel Capacity- Link Budget- Receiver Requirements- Multicarrier Power Amplifiers- Signal Processing Capacity Tradeoff.

## Unit-III

**Analog-To-Digital And Digital-To-Analog Conversion:** Introduction – Digital Conversion Fundamentals- Sample Rate- Band pass Sampling- Oversampling- Anti-alias Filtering – Quantization – ADC Techniques-Successive Approximation- Figure of Merit-DACs- DAC Noise Budget- ADC Noise Budget.

## **Unit-IV**

**Digital Frequency Up and Down Converters:** Introduction- Frequency Converter Fundamentals-Digital NCO- Digital Mixers- Digital Filters- Halfband Filters- CIC Filters-Decimation, Interpolation, and Multirate Processing-DUCs - Cascading Digital Converters and Digital Frequency Converters.

#### Unit-V

**Signal Processing Hardware Components:** Introduction- SDR Requirements for Processing Power- DSPs- DSP Devices- DSP Compilers- Reconfigurable Processors- Adaptive Computing Machine- FPGAs

**Software Architecture and Components** – Introduction- Major Software Architecture Choices – Hardware – Specific Software Architecture- Software Standards for Software

# Unit-VI

**Smart Antennas Using Software Radio :** Smart Antennas Using Software Radio- Introduction-3G smart Antenna Requirements Phased Antenna Array Theory- Applying Software Radio Principles to Antenna Systems Smart Antenna Architectures- Optimum Combining/ Adaptive Arrays- DOA Arrays- Beam Forming for CDMA- Downlink Beam Forming

## **Text Books:**

- 1. Paul Burns, "Software Defined Radio for 3G", Artech House, 2002.
- 2. Tony J Rouphael, "RF and DSP for SDR", Elsevier Newnes Press, 2008

## **Reference Books:**

- 1. JoukoVanakka, "Digital Synthesizers and Transmitter for Software Radio", Springer, 2005.
- 2. P Kenington, "*RF and Baseband Techniques for Software Defined Radio*", Artech House, 2005.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC416: NEURAL NETWORKS AND FUZZY LOGIC (NNFL) (For B.Tech ECE VII Semester) (Professional Elective-I)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

## **Course Outcomes:**

- Student will be able to acquire the knowledge about the different Artificial neural networks.
- Student will be able to design Artificial Neural Networks for different applications
- Student will be able to get the knowledge about the basics of fuzzy logic, systems and memories

## Unit-I

**Artificial Neural Networks: Biological neuron model** Artificial neuron, Mc Culloah-Pitts neuron model, Characteristics, activation functions, Architectures(single layer and multi layer) and applications of ANNs. Training: supervised and unsupervised, Different learning rules.

**Perceptrons:** Perceptron representation, Ex – OR problem, Linear separability, Learning, Training algorithm, Advanced algorithm(Back propagation) and applications.

## Unit-II

**Counter Propagation Networks:** Introduction, Network structure, Normal operation, Weight selection, Training Kohenen and Grossberg layers, Full counter propagation network, applications.

Hopfield Networks: Recurrent network configurations, Applications

## Unit-III

**Statistical Methods:** Training, application, Boltzman training, Back propagation and Cauchy's training.

#### **Unit-IV**

**Bidirectional Associative Memories (BAM):** BAM structure, Retrieving a stored association, Encoding association, Memory capability, Types of BAM: Continuous, Adaptive, Competitive. **Adaptive Resonance Theory**: ART architecture, Implementation, Training example, Characteristics.

## Unit-V

**Introduction To Fuzzy Systems:** Classical (Crisp) sets, Notation, Basic concepts, Fuzzy sets, basic concepts, Properties of fuzzy sets, Fuzzy operations: Compliment, Union, Intersection.

**Fuzzy Relations:** Binary relations review, Equivalence and similarity relations, Compatibility relations, Orderings and Morphisms.

Fuzzy Measures: Belief and plausibility measures, Probability, Possibility and necessity measures.

## **Unit-IV**

Adaptive Fuzzy Systems: Neural and fuzzy machine intelligence, Fuzzyness as multi-variance, Fuzzyness in probabilistic world, randomness Vs ambiguity, Sets as points in cube.

**Fuzzy Associative Memories (FAM):** Fuzzy systems as between cube mappings, Fuzzy and neural function estimators, Neural Vs fuzzy representation of structured knowledge, FAMs as mappings, Fuzzy Hebb FAMS: Bidirectional FAM theorem, Superimposing FAM rules, FAM system architecture.

## **Text Books:**

- 1. Laurence Fausett, *Fundamentals of Neural Networks, Architectures, Algorithms and Applications*, Pearson Ed, 2004.
- 2. George I. Klir and Tina A. Folger, Fuzzy Sets, Uncertainty and Information, PHI, 1998.
- 3. Bart Kosko, Neural Networks and Fuzzy Systems, PHI, 1992.
- 4. Philip D. Wasserman, Neural Computing, Theory and Practice, Van Nostrand Reinhold.

#### **Reference Books:**

1. Jacek M. Zurada, Introduction to Artificial Neural Systems, Jaico Publishing House, 1992.

2. Timothy Ross, Fuzzy Logic with Engineering Applications, TMH, 2000.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC417: CPLD AND FPGA ARCHITECTURES (FPGA) (For B.Tech ECE VIII Semester) (Professional Elective-II)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

## **Course Outcomes:**

- Student will be able to design their projects utilizing various FPGAs and CPLDs
- Student will be able to expose to industry standard FPGAs like XILINX, ALTERA etc..
- Student will be able to understand the configuration of FPGA and familiar with the device chips of ALTERA & XILINX.

## Unit-I

**Introduction to Programmable Logic Devices (PLD):** Programmable logic, Programmable read only memory (PROM), programmable logic array (PLA), Programmable array logic (PAL). Sequential programmable logic devices (SPLDS), Programmable gate arrays (PGAS), CPLD.

## Unit-II

**Introduction to FPGA:** Programmable logic FPGA, Configuration logic blocks, Function Generator, ROM implementation, RAM implementation, time skew buffers, FPGA Design tools, Network-on-chip, Adaptive System-on-chip, AES ASIC Implementation, Advanced FPGA Design

### **Unit-III**

**FPGA logic cell for XILINX, ALTERA and ACTEL ACT:** Technology trends, AC/DC IO Cells, Clock and power inputs, FPGA interconnect: Routing resources, Elmore's constant, RC delay and parasitic capacitance FPGA design flow, Low level design entry.

## **Unit-IV**

**FPGA physical design**: CAD tools, Power dissipation, FPGA Partitioning, Partitioning methods. **Floor planning**: Goals and objectives, I/O, Power and clock planning, Floor Planning tools.

#### Unit-V

**Placement and Routing:** Goals and objectives, Placement algorithms, Min-cut based placement, simulated annealing, Routing, introduction, Global routing, Goals and objectives, Global routing methods, Back-annotation, Detailed Routing, Goals and objectives, Channel density, Segmented channel routing, Maze routing, Clock and power routing, Circuit extraction and DRC.

#### **Unit-VI**

**Verification and Testing:** Verification, Logic simulation, Design validation, Timing verification, Testing Concepts, Failures, Mechanism and faults, Fault coverage, ATPG methods, Design for testability, Scan Path Design, Boundary Scan design, BIST Design guidelines, Design of a Testing machine.

## **Text Books:**

- 1. Pak and Chan, SamihaMourad, *Digital Design using Field Programmable Gate Arrays*,1<sup>st</sup>Edition Pearson Education, 2009.
- 2. Michael John Sebastian Smith, *Application specific Integrated Circuits*, 3<sup>rd</sup> Edition, Pearson Education Asia, 2001.

## **Reference Books:**

- 1. S. Trimberger, Edr, *Field Programmable Gate Array Technology*, 1<sup>st</sup> Edition Kluwer Academic Publications, 1994.
- 2. John V.Oldfield, Richard C Dore, *Field Programmable Gate Arrays*, 1<sup>st</sup>Edition, Wiley Publications, 1999.
- 3. S. Brown, R. Francis, J. Rose, Z.Vransic, *Field Programmable Gate array*, 1<sup>st</sup> Edition, Kluwer Publications, 1992.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

### EC418: LOW POWER VLSI DESIGN (LVD) (For B.Tech. ECE VIII Semester) (Professional Elective-II)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

- Students will be able to grasp various power components and their minimization.
- Students will be able to know power minimization in adiabatic circuits
- Students can write software for low power consumption in DSPs atc.

#### **UNIT-I:**

**Introduction to low power VLSI:** Sources of power dissipation, designing for low power, classification of power dissipations. Silicon on Insulator (SOI), FinFET, High level techniques for VLSI for power reduction, Gate induced drain leakage, Short channel effect.

## UNIT-II:

**Power dissipation in CMOS:** short circuit dissipation, Dynamic dissipation load capacitance. VLSI design limits- fundamental limits, material limits, device limits, circuit limits, Modeling of signals, Signal Probability Calculations, Power Estimation at the Circuit Level.

## **UNIT-III:**

**Low Voltage CMOS Circuits:** Introduction, Circuit Design Style, Leakage Currents in Deep Sub-micrometer Transistors, Deep Sub-micrometer Device Design Issues, Key to Minimizing SCE, Low Voltage Circuit Design Techniques, Multiple Supply Voltages.

#### **UNIT-IV:**

**Low Power SRAM:** Introduction, organization of a Static RAM, MOS Static RAM Memory Cell, Banked Organization of SRAMs, Reducing Voltage Swings on Bit Lines, reducing Power in the write Driver Circuits, Reducing Power in Sense amplifier Circuits, Method for Achieving Low Core Voltages from a Single Supply.

#### UNIT-V:

**Energy Recovery Techniques:** Energy Recovery Circuit Design, designs with Partially Reversible logic, Supply Clock Generation.

#### **UNIT-VI:**

#### Software for Low Power:

Introduction, Sources of Software Power Dissipation, Software power Estimation, Software Power Optimizations, Automated Low Power Code Generation, Co-design for Low Power, Summary.

## **Text Books:**

1. Kaushik Roy and Sharat Prasad, *Low-Power CMOS VLSI Circuit Design*, Wiley Inter-science Publications, 2000.

## **Reference Books:**

- 1. Christian Piguet, *Low Power CMOS Circuits Technology, Logic Design and CAD Tools*, 1<sup>st</sup> Indian Reprint, CRC Press, 2010.
- 2. J. Rabaey, Low Power Design Essentials, 1<sup>st</sup> Edition, Springer Publications, 2010.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC419: TELECOMMUNICATION SWITCHING SYSTEMS (TCSS) (For B.Tech ECE VIII Semester) (Professional Elective-II)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

- Student will be able to learn the fundamental functions of a telecom switching office, various multiplexing techniques.
- Student will be able to know about the various networks like SONET / SDH, ISDN
- Student will be able to acquired knowledge about switching systems.
- Student will be ability to analyze the characteristics of the telephone systems.

## Unit-I

**Telecommunication Switching Systems:** Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching. Electronic space division switching, Time division switching, Combination switching.

## Unit-II

**Telephone Networks:**Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

**Signaling Techniques:** In channel signaling, common channel signaling. Networktraffic load and parameters, grade of service and blocking probability.

## Unit-III

**Data Communication Networks:**Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

## **Unit-IV**

Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

#### Unit-V

**Integrated Services Digital Network (ISDN) :** Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

#### Unit-VI

DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS.

SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

## **Text Books:**

- 1. ThyagarajanViswanath, *Tele Communication Switching System and Networks*, PHI, 2nd edition, 2010.
- 2. Wayne Tomasi, Advanced electronic communications systems, PHI, 6<sup>th</sup> edition 2004.

### **References:**

- 1. J. Bellamy, *Digital Telephony* -John Wiley, 2nd edition, 2001.
- 2. Achyut. S.Godbole, Data Communications & Networks, TMH, 2nd edition, 2004.
- 3. H. Taub & D. Schilling, Principles of Communication Systems, TMH, 2nd Edition, 2003.
- 4. B.A. Forouzan, Data Communication & Networking, TMH, 3rd Edition, 2004.
- 5. J E Flood, *Telecommunication switching, Traffic and Networks*, Pearson Education, 2002.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC420: SATELLITE COMMUNICATIONS (SCM) (For B.Tech ECE VIII Semester) (Professional Elective-II)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

• The Student will be able to know various concepts of Satellite Communications & Services.

#### Unit-I

Over View of Satellite Systems: Introduction, frequency allocation, INTEL Sat.

## Unit-II

**ORBITS:** Introduction, Kepler laws, definitions, orbital element, apogee and perigee heights, orbit perturbations, inclined orbits, calendars, universal time, side real time, orbital plane, local mean time and sun synchronous orbits, Geostationary orbit: Introduction, antenna, look angles, polar mix antenna, limits of visibility, earth eclipse of satellite, sun transit outage, leandiag orbits.

## **Unit-III**

**Propagation Impairments And Space Link:** Introduction, atmospheric loss, ionospheric effects, rain attenuation, other impairments. SPACE LINK: Introduction, EIRP, transmission losses, link power budget, system noise, CNR, uplink, down link, effects of rain, combined CNR.

#### **Unit-IV**

**Space Segment:** Introduction, power supply units, altitude control, station keeping, thermal control, TT&C, transponders, antenna subsystem.

#### **Unit-V**

**Interference and Satellite Access**: Introduction, interference between satellite circuits, satellite access, single access, preassigned FDMA, SCPC (spade system), TDMA, pre-assigned TDMA, demand assigned TDMA, down link analysis, and comparison of uplink power requirements for TDMA& FDMA, on board signal processing satellite switched TDMA.

## Unit-VI

**DBS, Satellite Mobile and Specialized Services**: Introduction, orbital spacing, power ratio, frequency and polarization, transponder capacity, bit rates for digital TV, satellite mobile services, USAT, Radar Sat, GPS, orb communication and iridium.

#### **Text Book:**

1. Dennis Roddy, Satellite Communications, 4th Edition, McGraw-Hill International Edition, 2006.

2. Sapna Katiyar, *Satellite Communications*, 3<sup>rd</sup> Edition, S.K. Kataria & Sons, 2013.

## **References Books:**

- 1. Timothy Pratt, Charles Bostian and Jeremy Allnutt , *Satellite Communications*, 2nd Edition, John Wiley & Sons, 2003.
- 2. W. L. Pitchand, H. L. Suyderhoud, R. A. Nelson, *Satellite Communication Systems Engineering*, 2nd Ed., Pearson Education, 2007.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

### EC421: ADVANCED MICROPROCESSORS (AMPR) (For B.Tech ECE VIII Semester) (Professional Elective-II)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

# **Course Outcomes:** At the end of the Syllabus, Students will be able to

- CO 1: Understand the architectures of microprocessors from 80186 to Pentium.
- **CO 2:** Understand the Memory Management and Paging Mechanism of 80386 to Pentium processors.
- CO 3: Understand the Cache level and salient features of 80486 and Pentium Processors.
- **CO 4:** Understand the hyper threading mechanism of Pentium IV processor.
- CO 5: Understand the advanced peripherals and their interface with processors.

## Unit-I

The 80186 & 80286 Microprocessors: 80186: Block Diagram, Pin definitions 80286: Block diagram, pin definitions, Real address mode, Protected mode, New and enhanced instructions.

## Unit-II

**The 80386 Microprocessors:** Architecture, Pins and signals, Register Organization, Operating modes, Memory organization, Registers, New addressing modes.

#### **Unit-III**

The 80386 Memory Management: Memory management, Paging Mechanism.

The 80486 Microprocessors: Block diagram & Pin definitions. Cache level description.

#### **Unit-IV**

**Pentium Processor:** Salient features of Pentium, Architecture, branch prediction, MMX architecture.

**Pentium Pro and Pentium II processor**: Salient features of Pentium pro and Pentium II Processor.

#### Unit-V:

**Pentium IV Microprocessor:** Salient features of PIV, Block diagram, Hyper threading in Pentium.

#### Unit-VI:

Advanced Peripherals: CRT Controller 8275, Floppy disc controller 8272, Keyboard and display controller 8279.

#### **Text Books:**

1. Barry B. Brey, *The Intel Microprocessor* 8086/8088, 80186/80188, 80286, 80386, 80486, *Pentium and Pentium Pro Processor Architecture, Programming and Interfacing*, 8<sup>th</sup> Edition, Princeton Hall India,2009.

## **Reference Book :**

1. A.K.Ray & K M Bhuruchandi, *Advanced Microprocessors & Peripherals*, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2010.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC422: WIRELESS COMMUNICATIONS AND NETWORKS (WCN) (For B.Tech ECE VIII Semester) (Professional Elective-III)

Scheme: 2013Internal Assessment: 30End Exam: 70End Exam Duration: 3 Hrs

L	T/D	Р	С
3	0	0	3

**Course outcomes:** Upon successful completion of this course the student will be able

CO1: Analyze Mobile Radio propagation models

**CO2:** Understand parameters of wireless multipath channels.

**CO3:** Analyze equalization and diversity concepts in Wireless Communications.

CO4: Understand major concepts involved in WLANs, WANs and switching techniques.

**CO5:** Understand the architecture and specifications of Mobile IP, WAP, IEEE 802.11 and Bluetooth standards.

## Unit-I

**Mobile Radio Propagation: Large-Scale Path Loss:** Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering.

## Unit-II

**Mobile Radio Propagation: Small –Scale Fading:** Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel-Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum, Sliding Correlator, Channel Sounding, Frequency Domain Channels Sounding.

## Unit-III

**Parameters of Wireless Multipath Channels:** Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Rayleigh & Ricean Distributions.

Fading effects Due to Doppler Spread-Fast fading, slow fading, Statistical Models for multipath Fading Channels-Clarke"s model for flat fading, spectral shape due to Doppler spread in Clarke"s model.

## Unit -IV

**Equalization and Diversity:** Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization, Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Diversity Techniques-Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

#### Unit-V

**Wireless Networks:** Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks MANs, and WANs, Switching Techniques, Circuit Switching, Packet Switching, Asynchronous Transfer Mode

#### Unit-VI

**Mobile IP and IEEE 802.11 protocol :** Mobile IP ,Wireless LAN Technology -Infrared LANs, Spread Spectrum LANs, Narrowband Microwave LANs, Wi-Fi and the IEEE 802.11 Wireless LAN Standard, IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control .

### Text books:

1. T.S. Rappaport, Wireless Communications - Principles & Practice, PHI, 2nd Ed., 2002.

2. William Stallings, Wireless communications & Networks, Pearson Education, 2nd Ed., 2002.

### **References:**

1 Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2<sup>nd</sup> Ed., 2005

2. William C.Y. Lee, Mobile Cellular Tele Communication, McGraw-Hill, 2<sup>nd</sup> Ed., 1995.

#### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

### EC423: SPEECH SIGNAL PROCESSING (SSP) (For B.Tech. ECE - VIII Semester) (Professional Elective-III)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

CO1: Understand the mechanism of human speech production and the articulation mode of different classes of speech sounds and their models.

CO2: Analyze Speech Signals in the time domain terms of a source-filter production model.

CO3: Understand the digital representation of speech waveforms using modulation schemes.

CO4: Apply Short Time Fourier Analysis for speech synthesis.

CO5: Understand the characteristics of Homomorphic Speech Processing.

CO6: Analyze the Linear Predictive Coding of Speech and their applications.

## Unit I

**Digital Models for the Speech Signal.** The process of speech production, Acoustic theory of speech production, Lossless tube models, and digital models for speech signals

## Unit II

**Time domain models for speech processing:** Time dependent processing of speech, short time energy and average magnitude, zero crossing rate, pitch period estimation, short time auto-correlation function, median smoothing and speech processing

## Unit III

**Digital representation of speech waveform**, Quantization, instantaneous and adaptive delta modulation, DPCM, comparison of systems.

## Unit IV

Short time Fourier Analysis: Basic model for short time analysis and synthesis of speech, implementation of filter bank summation method using FFT, pitch detection, analysis-by-synthesis. Analysis – synthesis systems.

## Unit V

Homomorphic speech processing: complex cepstum approach, pitch detection, Format detection, homomorphic vocoder.

## Unit VI

**Linear Predictive coding of speech**: Principles of linear predictive analysis, solution of LPC Equation; Prediction error signal, frequency domain representation of LPC analysis; Relation between the various speech parameters, synthesis of speech from LP parameters and applications. **Speech Coding:** Sub–band coding, transform coding, channel Vocoder, Formant Vocoder, ceptral Vocoder, LP Vocoders. Vector quantizer coders. Man-machine communication, speaker recognition system, speech recognition systems.

## **Text Books :**

- 1. L.R.Rabiner& R.W. Schafer, *Digital processing of Speech Signals*, PHI, 2005.
- 2. Paramichalis, Practical Approach to Speech Coding, PHI, 2006.

## **Reference Books:**

- 1. Owens, Signal Processing of Speech, 2003.
- 2. Dellar&Proakis, Digital Speech Processin, 2007.
- 3. Philipos C. Loizou Speech Enhancement Theory and Practice, second edu CRC press 2013

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

## EC424: ANALOG VLSI DESIGN (AVLSI) (For B.Tech. ECE - VIII Semester) (Professional Elective-III)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Outcomes:**

- Student will be able to design current mirrors and high impedance current mirrors.
- Student will be able to design Differential OP-AMP,S&H Circuits
- Student will be able to design analog multipliers and able to analyze their operation.

## Unit-I

**Basic current mirrors and single stage amplifiers:** Simple CMOS current mirror, common source, Common gate amplifier with current mirror active load, Source follower with current mirror to supply bias current, High output impedance current mirrors and bipolar gain stages,.

## Unit-II

Frequency response of Amplifiers: Advanced current mirrors, Frequency response of single ended amplifiers.

## Unit-III

**Operational amplifier design and compensation:** Two stage CMOS operational amplifier, feedback and operational amplifier compensation, Folded-cascode operational amplifier, Current mirror operational amplifier, Fully differential operational amplifier, common mode feedback circuits, Current feedback operational amplifier.

#### **Unit-IV**

Sample and hold and switched capacitor circuits:BiMOS sample and hold circuits, Switched capacitor circuits, Basic operation and analysis first order and biquad filters,Switched capacitor gain circuit, Correlated double sampling techniques.

#### Unit-V

**Data converters:** Ideal D/A and A/ D converters, Quantization noise, Performance limitations. Nyquist rate D/A converters, Decoder based converters, Binary scaled converters, Hybrid Converters, Nyquist rate A/ D converters, Successive approximation, Cyclic flash type, Two step interpolating, Folding and pipeline, A/D converters.

#### Unit-VI

**Over sampling converters and filters:** Over sampling with and without noise hopping, Digital decimation filter, High order modulators, Band pass over sampling converters, Practical Considerations, Continuous time filters.

#### **Text Books:**

- 1. BehzadRazavi, Design of Analog CMOS Integrated Circuits, Tata McGrah Hill. 2002.
- 2. David Johns, Ken Martin, Analog Integrated Circuit Design, John Wiley & sons. 2004.

## **Reference Books:**

- 1. Paul.R. Gray & Robert G. Major, *Analysis and Design of Analog Integrated Circuits*, John Wiley & sons, 2004.
- 2. Jacob Baker.R.et.al., *CMOS Circuit Design, IEEE Press*, Prentice Hall, India, 2000.

## NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

#### EC 425: BIOMEDICAL INSTRUMENTATION (BMI) (For B.Tech. ECE - VIII Semester) (Professional Elective-III)

Scheme: 2013Internal Assessment : 30End Exam: 70End Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

#### **Course Outcomes:**

- Students will be able to have a clear knowledge about medical instruments.
- Students will be able to have knowledge of the principle operation and design and the background knowledge of biomedical instruments and specific applications of biomedical engineering

#### Unit-I

Components of Medical Instrumentation System, Bio – amplifier, Static and dynamic characteristics of medical instruments, Biosignals and characteristics, Problems encountered with measurements from human beings.

#### Unit-II

Organization of cell, Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuro-muscular junction. Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes, Biochemical Electrodes.

#### Unit-III

Mechanical function, Electrical Conduction system of the heart, Cardiac cycle, Relation between electrical and mechanical activities of the heart.

#### **Unit-IV**

Cardiac Instrumentation Blood pressure and Blood flow measurement, Specification of ECG machine, Einthoven triangle, Standard 12-leadconfigurations, Interpretation of ECG waveform with respect to electromechanical activity of the heart, Therapeutic equipment, Pacemaker, Defibrillator, Shortwave diathermy, Hemodialysis machine.

#### Unit-V

Neuro-Muscular Instrumentation Specification of EEG and EMG machines, Electrode placement for EEG and EMG recording, Interpretation of EEG and EMG. Respiratory Instrumentation Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

#### Unit-VI

Patient electrical safety, types of hazards, natural protective mechanism, leakage current, patient isolation, hazards in operation rooms, grounding conditions in hospital environment.

#### **Text books:**

- 1. Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, *Biomedical Instrumentation and Measurements*, PHI, 2nd Ed, 1980.
- 2. John G.Webster, Medical Instrumentation, Application and Design, John Wiley, 3rd Ed., 1998.

# **References:**

- 1. L.A. Geoddesand L.E. Baker, *Principles of Applied Biomedical Instrumentation*, John Wiley, 2<sup>nd</sup> Edition, 1975.
- 2. R.S. Khandpur, Hand-book of Biomedical Instrumentation, TMH, 2nd Ed., 2003.
- 3. Mackay, Stuart R, Biomedical Telemetry, John Wiley, Third Edition, 1968.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

### EC426: OPTICAL NETWORKS (ON) (For B.Tech. ECE - VIII Semester) (Professional Elective-III)

Scheme: 2013Internal Assessment : 30End ExamEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

## **Course Outcomes:**

- Students will be able to gain the knowledge about various optical elements used in optical networks
- Students will be able to gain the knowledge about the system model and various constraints involved in designing of optical networks.
- Students will be able to gain the knowledge about the Network Architectures of existing Optical Networks.

## Unit-I

## **Introduction:**

Services, Circuit Switching, Packet Switching, Optical Networks, Optical Layer, Transparency and All Optical Networks, Optical Packet Switching, Transmission Basics, Network Evolution.

## Unit-II

**Components:** Principle of operationofCouplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Tunable Lasers, Switches, Wavelength Converters

## Unit-III

**Networks:** SONET/SDH- Multiplexing, SONET/ SDH Layers, Frame Structure, Frame Structure, Physical Layer, Elements of a SONET/SDH Infrastructure.

## Unit-IV

**WDM Network Elements:** Optical Line Terminals, Optical Line Amplifiers, Optical Add/ Drop Multiplexers, Optical Cross Connects.

#### Unit-V

**WDM Network Design:** Cost Trade-offs, Light path Topology Design, and Routing and wavelength assignment problems, Dimensioning Wavelength Routing Networks, Network Survivability Basic Concepts.

Access Networks: Architecture Overview, Enhanced HFC, FTTC.

#### Unit-VI

Optical Switching: OTDM, Synchronization, Header Processing, Buffering, Burst Switching.

**Text Books:**
1. Ramaswami, Rajiv & Sivarajan, Kumar N. *Optical Networks a Practical perspective*, Morgan Kaufmann Publishers, 2nd Ed,.

# **Reference Books:**

1. Black Uyless, *Optical Networks Third Generation Transport Systems*, Pearson Educations, 1/e, 2002.

# NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one *compulsory* question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.

# **IDE313: INTERNET OF THINGS (IoT)** (Interdisciplinary Elective for B. Tech. – VI Semester)

Scheme: 2013Internal Assessment : 30End Exam MarksEnd Exam Duration : 3 Hrs

L	T/D	Р	С
3	0	0	3

### **Course Objectives**

- To understand the fundamentals of Internet of Things.
- To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.
- To apply the concept of Internet of Things in the real world scenario

#### **Course Outcomes**

Upon the completion of the course the student should be able to

- Design a portable IoT using Arduino/ equivalent boards and relevant protocols.
- Develop web services to access/control IoT devices.
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

#### Unit-1

**Introduction to IoT:** Definition & Characteristics of IoT-Physical design - Logical design – IoT Enabling Technologies-IoT Levels and Deployment Templates -IoT vs M2M.

### Unit-2

**IoT Design Methodology:**IoT systems management – Simple Network Management Protocol (SNMP)- Network Operator Requirement- IoT Design Methodology – Specifications Integration and Application Development

### Unit-3

Building IoT with Arduino: AVR Family with Arduino AT Mega 328- Interfaces - Arduino IDE

- Programming - Interfacing LED- Interfacing LED and Switch with Arduino

#### Unit-4

Wireless Technologies for IoT (Layer 1 & 2):WiFi (IEEE 802.11), Bluetooth/Bluetooth Smart, ZigBee/ZigBeeSmart, UWB (IEEE 802.15.4)

### Unit-5

**Building IoT with Raspberry Pi:**Basic Building blocks of IoT Device- Raspberry Pi – About the board – Raspberry Pi Interfaces – Programming Raspberry Pi with Python– Controlling LED, Interfacing LED and Switch with Raspberry Pi.

### Unit-6

**Case Studies and Advanced Topics:** Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT

#### **Text books/References:**

- 1. ArshdeepBahga, Vijay Madisetti, "Internet of Things A hands-on approach", Universities Press, 2015.
- 2. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
- 3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014.

### NOTE:

**Internal Assessment:** The question paper for sessional examination shall have one compulsory question carrying 6 marks and five other conventional (descriptive or analytical type) questions carrying 8 marks each. The compulsory question consists of objective type questions like the multiple choice, fill in the blanks etc. Apart from the compulsory question, the student has to answer any 3 from the remaining 5 conventional questions.

**End Exam:** The question paper for end examination shall consist of One Compulsory question consisting of objective type, fill in the blanks etc for 10 marks and for the remaining 60 marks student has to answer any four questions out of 6 questions for 15 marks each.