WITH EFFECT FROM THE ACADEMIC YEAR 2003-2004

SCHEME OF INSTRUCTION & EXAMINATION

B.E II YEAR (REGULAR)

(ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions Periods per Week L/T	D/P	Scheme of Examination Dura-tion in Hrs	Maximum Marks Univ. Exam	Sessionals
		THEORY					
1.	MAT 251	Mathematics - IV	**4**	**-**	**3**	**75**	**25**
2.	EC 251	Analog Electronic Circuits	**4**	**-**	**3**	**75**	**25**
3.	EC 252	Networks & Transmission Lines	**4**	**-**	**3**	**75**	**25**
4.	EC 253	Signal Analysis & Transform Techniques	**4**	**-**	**3**	**75**	**25**
5.	EC 254	Pulse, Digital & Switching Circuits	**4**	**-**	**3**	**75**	**25**
6.	EC 255	Probability & Random Process	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	EC 281	Analog Electronic Circuits Lab	**-**	**3**	**3**	**50**	**25**
2.	EC 282	Network & Transmission Lines Lab	**-**	**3**	**3**	**50**	**25**
3.	EE 292	Electrical Technology Lab	**-**	**3**	**3**	**50**	**25**
		TOTAL	**24**	**9**	**-**	**600**	**225**

MAT 251

MATHEMATICS - IV (Common for all Branches)

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT - I : ***Functions of Complex variables***

Limit and Continuity of function - Analytic function - Cauchy - Reimann equatio complex integration, Cauchy's theorem-Derivative of Analytic functions-Cauchy's inte formula and it's applications.

UNIT - II : ***Taylor's and Laurent's Series Expansions***

Zeroes and Singularities - Residues - Residue theorem - Evaluation of real Integrals using Residue theorem - Conformal Mapping - Bilinear transformation.

UNIT - III : ***Statistics***
Random Variables, distributions, density functions-conditional distributions-BaYe's theorem-mathematical expansion-expected values-moments and Moment generating functions.

UNIT - IV : ***Distributions***
Poisson, Normal, Gamma and Chi-Square distribution-fitting these curves to the data.

UNIT - V: *Curve fitting by method of least squares*
Correlations and Regression-lines of regression-Tests of Significance, Chi-Square, and T-Tests.

Suggested Reading:

1. R.V. Churchill, *Complex variables it's applications, Kogakusha CompanyLt* Tokyo, 1960.
2. I. Miller and J .E. Fireund, *Probabilities and Statistics for Engineers.*
3. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics,* S. *ChI & Co.,* New Delhi, 1989.
4. RK. Jain & SRK. Iyengar, *Advanced Engineering Mathematics,* NarosaPublic$ 2002.
5. Narayanan Pillay & Ramaniah, *Advanced Mathematics for Engineering Studt Volume - IIL* S. Chand & Co., New Delhi, 198

EC 251

ANALOG ELECTRONIC CIRCUITS

Instruction	4 Periods per week
Duration of University Examination.	3 Hours
University Examination	75 Marks

Sessional 25 Marks

UNIT – I

Small Signal Amplifiers : Classification of amplifiers, Mid-band analysis of single and multistage amplifiers. Low frequency and high frequency analysis of single and multistage RC coupled and transformer coupled amplifiers with BJT and FET.

UNIT – II

Large Signal Amplifiers : BJT and FET large signal audio amplifiers, Classes of operation, Harmonic distortion, power dissipation, efficiency calculations. Design considerations of transformer coupled and transform less push-pull audio power amplifiers under Class A. Class-B and Class-AB Class D operations.

UNIT – III

Feed Back Amplifiers : the feed back concept. General characteristics of negative feedback amplifier. Effect of negative feedback on input and output imedances. Voltage and current, series and shunt feedbacks. Stability considerations. Locat versus global feedback.
Oscilators : Positive feedback and conditions for sinusoidal oscillations. RC oscillators, LC ocscillators. Cystal Oscillators. Amplitude and frequency stability of oscillators.

UNIT – IV

R. F. Voltage Amplifiers : General consideration, analysis and design of single tuned, inductively coupled and double tuned types with BJTs and FETs. Selectivity, gain and bandwidth comparison of multistage single tuned amplifiers and double tuned amplifiers. The problem of stability in RF amplifiers, neutralization and unilaterisation. Staggered tuned amplifiers.
R. F. Power Amplifiers : Analysis and design of RF tuned Class-B and Class-C power amplifiers with BJTs and FETs.

UNIT – V

Regulators : Limitations of Zener Voltage Regulators. Voltage Regulators using DC Amplifiers – Series & Shunt regulators. Forward Convertors, Fly back converters, Switch Model Power Suppliers (SMPS) – Design Considerations for power output using soft ferrite transformers.

Suggested Reading :

1. Milman, J. and Grabel, A., Microelectronics, 2nd edition, McGraw Hill, ISE, 1987.
2. Ghausi. M. S., Electronic Circuits : Physical Principle, Analysis and Design, McGraw Hill.
3. P. M. Chirlian, Electronics Circuits : Physical Principle, Analysis and Design, McGraw Hill.
4. Shilling, L. D., Belove, C., Electronic Circuit-Ditrrete Integrate, 3rd edition, McGraw Hill, ISE, 1989.

Additional Reading :

1. S. Shali Vahanan, N. Suresh Kumar etc, Electronic Devices & Circuits, Tata McGraw Hill, 2003.
2. F. C. Fitchen, Transistors Circuit Analysis and Design , Affiliated East-West Press.

EC 252

NETWORKS AND TRANSIMISSION LINES

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Two port networks, Z, Y, h, g, ABCD parameters. Equivalence of two port networks. T-Pi transformation, inter connection of two ports, reciprocity theorem. Analysis of reciprocal networks; practical and ideal transformers.

UNIT – II

Asymmetrical networks, image and iterative impedance. Image transfer constant and iterative transfer constant. Symmetrical networks, characteristic impendence and propergation constant. Properties of L, T and Pi section types. Attenuators and their design. Impendence matching networks.

UNIT – III

Constant K-filters-low pass, high pass , band pass and band elimination filter design, m-derived and composite filter design. Notch filter, inverse networks and equalizers. Elements of network synthesis.

UNIT – IV

Properties of transmission lines: transmission line equations from source and load end. The finite and infinite lines. Velocity of propagation, input impedance. Open and short circuited lines, telephone cables, distortion less transmission, loading of cables, campbell's formula.

UNIT – V

Properties of transmission lines at UHF, reflection co-efficient, standing waves, distribution of voltages and currents on loss less line. Transmission lines as circuit elements. Characteristics of half wave, quarter wave and one eight wave lines. Construction and application of smith chart. Transmission line matching. Single and double stub matching.

Suggested Reading:

1. Ryder, J.D, Networks, Lines & Fields, Prentice Hall, 2nd Ed. 1991.
2. van Valkenburg, M.E. Network analysis, Prentice Hall of India, 3rd edition, 1996.
3. Umesh Sinha, Networks Analysis and Synthesis, Satyaprakasham, New Delhi.

EC 253

SIGNAL ANALYSIS AND TRANSFORM TECHNIQUES

Instruction	4 Periods per Week

Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I

Introduction : classification of signals and systems: vector representation of signals, axioms of vector space. Subspace. Linear independence of vectors. Basis and dimension. Inner product. Norm. inner product space, schwarts inequality. Ortho normal sets. Gramshmidt orthogonalization. Best approximation. Projection theorm bessels inequality.
Review of sequences. Convergence and limits. Complete spaces. Hilbert's space of energy and power signals. Parsevals relation. Complex exponential fourier series. Trigonometric fourier series. Application to electrical networks.

UNIT – II

Signal representation by continous exponential. The direct and inverse fourier transform. Existance and properties of fourier transfiorm. Continous spectrum. Bandwith of signals. Singularity functions. Fourier transfo9rms of periodic signals.

UNIT – III

Signal representation by generalised exponentials. The direct and inverse laplace transform. Region of conversions. Existance and properties of laplace transform. Laplace transforms of peroidic signals. Laplace transform solution for electric circuits. System impluse, response and definition of systems transfer function.

UNIT – IV

Sampling of continous time signals. Discrete time signals, discrete signals. The Z – transform and its properties. Region of conversions. Z-plane and S- plane correspondance. Inverse Z-transforms. Solutions of linear difference equations. Discrete system impluse. Response and the system transfer functions. Discrete system reliazation.

UNIT – V

Time and frequency convolution. Graphical interpretation. Convolution properties. Auto and cross correlation and their graphical interpretation. Properties of correlation integrals.

Suggested Reading:

1. carlson, G.E Signals and Linear System Analysis, Allied Publishers Ltd. 1993.
2. Lathi, BP, Signals and Systems, John Wiley & Sons, 1967.
3. Oflynn, M Linear Systems, John Wiley and Sons, 1987.
4. Ziemer RF, Signals and Systems: continous and Discrete: Maxwell Macmillan, 1990.
5. AV Openhein, ALS Wilsky, IT Young, signals and Systems, Prentice Hall, India.
6. Kenneth, Hoffman and Ray. Kunz, Linear Algebra, Prentice Hall Indai 1999.

EC 254

PULSE, DIGITAL AND SWITCHING CIRCUITS

Instruction	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT – I
Wave-shaping: RC, RL and RLC circuits, response to step, pulse, square, exponential and ramp inputs. Integrating and differentiating circuits, compensated attenuators. Switching operation of diodes, BJTs and FETs. Non-linear wave shaping using diodes and transistors. Clipping and clamping circuits, clamping circuit theorm.

UNIT – II
Multivibrators: Analysis and design of transistor multivibrators – Bistable, Monostable and astable circuits. Operation of regenerative comparator (Schmitt Trigger)
Negative Resistance circuits: review of negative resistance devices – tunnel diode UJT and SCR. Voltage controlled and current controlled negative resistance switching circuits. Types of UJTS, analysis and design of UJT relaxation oscillator. SCR triggering – turnon and turn off methods.

UNIT – III
Boolean Algebra: axiomatic definition of boolean algebra. Binary operation, postulates and theorms, switching functions, canonical forms and standard forms, simplification of switching function using theorms.
Minimization of switching functions: karnaugh map method, quine McCluskey tabular method, prime implicants and essential prime implicants.

UNIT – IV
Combinational logic design: single output and multi output combinational logic circuit design, AND-OR, OR-AND and NAND/NOR relaizations, Ex-OR, Ex-NOR and equivalance functions. Binary adders, subtractors, code converters, contact networks, static and hazard free design.
Symmetric networks: properties of symmetric functions, symmetric relay contact networks, identification and relization of symmetric functions.

UNIT – V
Sequential logic design: various types of flip flops and excitation tables. Classification on sequential circuits. Design of simple synchronous sequential circuits such as counters. Design of synchronous and asynchronous sequential machines.

Suggest Reading:
1. Zvi. Kohavi, Switching and Finite Automata Theory, Iind Edition, Tata McGraw Hill, 1992.
2. Mano. M. Digital Design 2nd Edition Prentice Hall of India, 1994.
3. Millman k and Taub H, Pulse Digital and Switching Waveforms, McGraw Hill, ISE 1986.
4. W.I. Fletcher, An Engineering Approach to Digital Design, Prentice Hall of India.

Reference Books:
1. H. Tony Nagle, BD Carrol, JD: An Introduction to Computer Logic, Prentice Hall, India.

MAT 261

PROBABILITY AND RANDOM PROCESSES

Instruction	4 Periods per week
Duration of University Examination	3 Hours

University Examination	75 Marks
Sessional	25 Marks

Unit- I

Probability theory: Axioms of Probability theory, Probability spaces, conditional probability, total probabability, Braye's theorem, independent events. Combined experiments, Bernoulli's trials, Asymptotic theorems, Laws of large numbers.

Unit –II

Random variables: Concept of a random variable, distribution and density functions, conditional distribution and density function : Function of one random variable distribution and density functions, means and variance, moments and characteristic functions. One function of two random variables, two functions of two random variables. Joint moments, joint characteristic functions, conditional distributions, conditional expected values, means-square estimation, orthogonality principle.

Unit –III

Sequence of Random Variables : Random vectors, Transformations, Independence, mean and covariance, correlation and covariance matrices. Conditional densities, characteristic and normality. Mean square estimation(of vectors) stoschatic convergance , central limit theorem (proof not expected).
Parameter estimation : General concepts, Bayesian estimation, Maximum likelihood Estimation, Cramer-Rao bound.
Hypothesis testing : Basic concept, test statistic. Examples of hypothesis testing.

Unit –IV

Random Processes: Definitions, Basic concepts and examples, first order statistics, second order statistics, correlation and covariance, white noise process, independent process, normal process. Stationarity-stinct and wide sense. Ergodicity. Properties of ACF and covariance functions. Spectral representation - Weiner - Kinchine theorem. Linear operations on random processes.

Unit – V

Gausian processes. Process with independent increments. Poisson processes. Markov processes, Low pass and band pass noise representations.
Estimation of a signal in the presence of noise : Matched filter- white noise and the case of coloured noise.

Suggested Reading :

1. Athanasios Papoulis : Probability, Random variables and Stochastic Processes, 3rd edition, McGraw Hill, ISE, 1991.
2. Henry Stark and John W. Woods : Probability and random process with applications to Signal Processing, 3rd edition, Pearson Education, India edition, 2002.
3. Bennet and Pearson, Probability and Random processes.

References:

1. Davenport : Probability and Random processes for Scientists and Engineers, McGraw Hill.
2. E . Wang: Introduction to Random Process, Springer Varlag Publication.

EC281

ANALOG ELECI'RONIC CIRCUITS LAB

Instruction	3 Periods per week
Duration of University Examination.	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Special note :

i. Sessional marks are to be awarded as per the following breakup.

a) 15 marks for the regular lab exercises

b) 10 marks for the Mini Project-cum-design exercise(s).

ii. A total of not less than 15 experiments must be carried out during the semester. (Wherever possible more than 1 lab experiment should be carri out in one lab session of 3 periods per week).

a) Regular Lab Experiments:

1. Design of Single stage RC-Coupled amplifier using BJT
2. Design of Single stage RC-Coupled amplifier using FET.
3. Design of Multistage RC-coupled amplifier.
4. Voltage series feedback amplifier
5. Voltage shunt feedback amplifier.
6. Design of RC phase shift oscillator.
7. Design of Hartley oscillator.
8. Design of Colpitts Oscillator.
9. Design of Class-A power amplifier.
10. Design of Class-B power amplifier
11. IF amplifier
12. Series voltage regulator.
13. Transformer coupled amplifier
14. Analysis and design of electronic circuits using PSPICE
15. Forward Converters (SMPS) -

b) Mini Project cum Design Exercise(s)

Design of :

i) An audio power amplifier with specified output and the associated power I supply that can take audio input from microphone and deliver the output to loudspeaker.

ii) Switch Mode Power Supply (SMPS)

General Note :

i) There should not be more than 2 students per batch while performing any of the lab experiments.

ii) Mini Project cum design exercise(s) :

a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.

b) This exercise carries sessionals marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

EC282

NETWORKS AND TRANSMISSION LINES LAB

Instruction	3 periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Special note:

i) Sessional marks are to awarded as per the following breakup.
   a). 5 marks for the regular lab exercises
   b). 10 marks for the Mini Project-cum-design exercises(s)

ii) A total of not less than 15 experiments must be carried out during the semester.(Wherever possible more than 1 lab experiment should be carried out in one lab session of 3 periods per week).

a) Regular Lab Experiments:

1. Verification of super position theorem.
2. Verification of Thevinians's theorems.
3. Verification of maximum power transfer theorem.
4. Verification of Telligen's theorem.
5. Measurement of two-port network parameters.
6. Measurement of image impedance and characteristic impedance.
7. Design & verification of Series Resonance.
8. Design & verification of Parallel Resonance
9. Design & verification of Constant-K low-pass filter.
10. Design & verification of Constant-K high-pass filter.
11. Design & verification of m-derived low-pass filter.
12. Design & verification of m-derived high-pass filter.
13. Design & verification of L – type matching network.
14. Transmission Line and Impedance matching.
15. analysis and design of circuits by PSPICE.

b) Mini Project cum Design Exercise (s)

Design of a filter for

i). Audio frequency applications using passive components
ii). High frequency applications.

General Note :

i) There should not be more than 2 students per batch while performing any of the lab experiments.

ii) Mini Project cum design exercise(s) :

a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
b) This exercise carries sessionals marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

EC 292

ELECTRICAL TECHNOLOGY LAB

Instruction	3 Periods per Week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

List of Experiments:

1. To determine the magnetization curve of a separately excited d.c. generator
2. To determine the load characteristics of a shunt generator.
3. To determine the load characteristics of a series generator.
4. To determine the performance characteristics of a shunt motor.
5. To determine the load characteristics of a d.c. series motor.
6. To determine the performance of a compound motor.
7. Speed control of d.c motor.
8. O.C and S.C tests on single phase transformer
9. Load test on single phase transformer.
10. To determine the performance of a three phase induction motor
11. Speed control methods of induction motors
12. Regulation of alternator by O.C and S.C test.

Curricula and Syllabi for the B.E. Programmes as approved by the University