PROPOSED SYLLABUS FOR SECOND YEAR

ELECTRONICS
AND
ELECTRONICS & TELECOMMUNICATION

ENGINEERING

UNDER

S.R.T MARATHWADA UNIVERSITY,
NANDED

With Effect from July - 2009

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
TEACHING AND EXAMINATION SCHEME
Second Year (Electronics Engineering) and
Second Year (Electronics and Telecommunication Engineering)

(With effect from A.Y 2009-10)

S. No.	Name of the Subject	Teaching scheme (Hours/ Week)	Examination Scheme (Marks)				
			Paper	Test	Term Work	Prac tical	Total
	PART-I						
1	Engineering Mathematics-III	4	80	20	–	–	100
2	Electronic Devices and Circuits- I	4	80	20	–	–	100
3	Network and Lines	4	80	20	–	–	100
4	Digital Electronics	4	80	20	–	–	100
5	Numerical Analysis and computation	4	80	20	–	–	100
6	Electronic Measurements and Instrumentation	4	80	20	–	–	100
7	Electronic Devices and circuits Laboratory - I	2	–	–	25	25	50
8	Network & Measurement Laboratory	2	–	–	25	25	50
9	Digital Circuits Laboratory	2	–	–	25	25	50
10	Numerical computation Laboratory	2	–	–	25	25	50
Total of Part-I –>		**32**	**480**	**120**	**100**	**100**	**800**
	PART-II						
1	Engineering Mathematics-IV	4	80	20	–	–	100
2	Electronic Devices and Circuits- II	4	80	20	–	–	100
3	Analog Communication Systems	4	80	20	–	–	100
4	Object Oriented Programming with C++	4	80	20	–	–	100
5	Signals and systems	4	80	20	–	–	100
6	Communication Skills	2	40	10	–	–	50
7	Electronic Devices and circuits Laboratory - II	2	–	–	25	25	50
8	Analog Communication Laboratory	2	–	–	25	25	50
9	Computer Programming Laboratory	2	–	–	25	25	50
10	Communication Skills Laboratory	2	–	–	25	25	50
11	Electronic workshop	2	–	–	25	25	50
Total of Part-II –>		**32**	**440**	**110**	**125**	**125**	**800**

Note: Minimum two tests should be conducted for each theory subject and average of best two tests should be considered.

PART-I

1. Engineering Mathematics-III

Paper: 3 Hours, 80 Marks **Test: 20 marks**

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UNIT–I] Linear Differential equations of higher order – I: **[8 Hours]**

Introduction to L.D.E. with constant coefficients, General solution of f(D)y = X, shortcut methods, Solution of non homogeneous linear equations by method of variation of parameters and method of undetermined coefficients, Cauchy's homogeneous and Legendre' linear equations reducible to L.D.E with constant coefficients.

UNIT–II] Linear Differential equations of Higher order – II: **[6 Hours]**

Simultaneous L.D.E. with constant coefficient, Symmetrical simultaneous equations $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ by method of Grouping and method of Multipliers, applications of L.D.E. to electrical circuits.

UNIT–III] Vector Differential Calculus: **[7 Hours]**

Vector and Scalar functions, fields, derivatives, Gradient of Scalar field, Directional derivative and Geometrical meaning of gradient (Gradd □), Divergence and curl of a vector fields, Solenoidal and Irrotational vectors, Second order differential operator and vector identifies.

UNIT–IV] Vector Integral Calculus: **[7 Hours]**

Line integral: Line integral independent of path, Line Integral in parametric form; Circulation of a vector [Work done]; Green's Theorem [without proof], its verification and applications; Surface Integral, Stoke's Theorem [without proof] and its applications, Gauss Divergence Theorem [without proof] and its applications to Engineering problems.

UNIT–V] Statistics: **[6 Hours]**

Correlation: Scatter diagram, Types of correlations, Karl Pearson's coefficient of correlation, Regression: Lines of regressions, Lines of regression of bivariate data, Curve fitting: Fitting of curves by Least Square Method.

UNIT–VI] Probability: **[6 Hours]**

Introduction, Random variable, Discrete and continuous Probability Distributions, Bionomical Distribution, Poisson Distribution, Normal Distribution.

Text Books:

01. Advanced Engineering Mathematics by Erwin Kreyszing (Wiley Eastern Ltd.)
02. Advanced Engineering Mathematics by B. S. Grewal (40th Edition, Khanna Publication, Delhi)
03. Advanced Engineering Mathematics by Jain Iyengar (Narosa Publication)

Reference Books:

01. Applied Mathematics (Volumes I & II) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)
02. Engineering Mathematics by B. V. Raman (Tata McGraw Hill publication)
03. Engineering Mathematics by Thomas and Finney

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2. Electronic Devices and Circuits- I

Paper: 3 Hours, 80 Marks **Test: 20 marks**

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UNIT–I] Semiconductor Diode and Diode circuits: **[7 Hours]**

Conductivity modulation, Einstein equation, Continuity equation, Diffusion current and Law of Mass action, Hall Effect, Junction diode Switching time, Diode as a circuit element, load line concept; Analysis and design of capacitive filter, inductive filter, L-C & C-L-C Filters; Clamper circuits, clipper circuits, Voltage doublers.

UNIT–II] Transistor biasing: **[7 Hours]**

The early effect, Transistor as a switch, typical Transistor junction voltages, Transistor as an amplifier, Operating point, bias stability; Design of Fixed biasing, collector to base biasing and voltage divider biasing circuits; Stabilization against variation in V_{BE}, Ico and β for the self bias circuit, Bias compensation, Thermistor and Sensistor compensation, Thermal run away.

UNIT–III] Small Signal low frequency Transistor Model: **[6 Hours]**

Transistor hybrid model, h-parameters, Analysis of transistor amplifier circuits using h-parameters, Comparison of performance parameter with CB, CC and CE amplifier configurations; linear analysis, physical model of CB transistor; Cascaded transistor amplifier; Simplified Hybrid models-CB, CE, CC; Common emitter amplifier with an emitter resistance, emitter follower, Miller's theorem and it's dual, High input resistance transistor circuits, Design of single stage CE amplifier.

3 Network and Lines

Paper: 3 Hours, 80 Marks **Test: 20 marks**

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UNIT – I] Network Theorems: **[09 Hours]**

Network definitions, Mesh and node circuit analysis, Principle of duality, Conversion between star and delta Networks(T to pi), Superposition theorem, reciprocity theorem, The venin's theorem, Norton's theorem, compensation theorem, maximum power transfer theorem and tallenges theorem.

UNIT--II] Resonance, Impedance Transformation and Coupled Circuit: [09 Hours]

Resonance: Definition of Q factor; Series resonance: impedance and phase angle of a series resonance circuit, bandwidth of series resonance circuit; Parallel resonance: variation of impedance with frequency in parallel resonance circuits, Q factor of parallel resonance circuit, reactance curves in parallel resonance circuits.

Impedance Transformation and Coupled Circuit: Impedance transformation with tapped resonant circuit and L Section; Mutual inductance, coupled circuits, singly and doubly tuned air core transformers, dot conventions.

UNIT-- III] Filters: **[04 Hours]**

Neper and decibel, Properties of symmetrical networks, equations of filter networks; Low pass, high pass, band pass and band stop filters; constant k, m-derived, composite, and crystal filters; Attenuators: T, pi, lattice, bridged T and L type attenuators.

UNIT – IV] Transmission Line (TL) Parameters: **[08 Hours]**

TL, TL equation, Infinite line, Propagation constant, Attenuation constant, phase constant, group velocity, characteristic impedance; Open and short-circuited lines: reflected incident wave, standing waves in open and short circuit lines; Impedance of OC and SC lines, secondary line constant, impedance as a function of line length; line with any termination, distortion less and lossless lines.

UNIT—V] Low Frequency Lines and Radio Frequency Lines: **[10 Hours]**

Low Frequency Lines (Power Lines): Losses and efficiency in power lines, Effect of length, Calculation of inductance and capacitance; Radio Frequency Lines: Standing wave ratio, Reflection coefficient, Location of maxima and minima, Impedance circle diagram, Smith chart, Properties and applications of Smith chart, Impedance matching devices, Quarter wave and half wave transformers, Single and double stub matching, Stub matching problems using Smith chart.

UNIT—VI] Equalizers: **[04 Hours]**

Classification and types of Equalizers; Inverse networks, constant resistance; bridged T and Lattice equalizers; characteristics of equalizers.

Text Books:

01. Networks, lines and fields by John D Ryder (PHI Publication).
02. Network Analysis by Umesh Sinha (PHI Publication).

Reference books:

01. Circuits and Synthesis by Sudhakar and Shyammohan.
02. Network Analysis by Van Valkenburg (PHI Publication).

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4 Numerical Analysis and Computation

Paper: 3 Hours, 80 Marks **Test: 20 marks**

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UNIT-I] Mathematical Modeling, Numerical Methods and Errors: [04 Hours]

Simple mathematical model, Conservation law, Significant figures, Accuracy & precision, Error definitions, Round off errors, Truncation errors, Error Approximations, Total numerical errors.

UNIT-II] Roots of Equation: [06 Hours]

Bracketing Methods: Graphical methods, Bisections method, False position method; Open methods: simple one point iteration method, Newton- Raphson method, secant method, multiple roots, Case Study: Design of Electric circuit and General Engineering problems.

UNIT-III] Linear Algebraic Equations and systems: [10 Hours]

Introduction to vectors and metrics, Properties, Gauss elimination method, Pitfalls of elimination, Techniques for improving solutions, Gauss-Jordan and Guass-Seidal methods, Matrix inverse and LU decomposition method.

UNIT –IV] Curve fitting-Least Squares Regression: [06 Hours]

Linear regression, Polynomial regression, multiple linear regressions; Interpolation: Newton's divided difference-interpolating polynomials, Lagrange interpolation polynomials and Spline; linear, quadratic, and cubic Interpolation.

UNIT –V] Numerical Differentiation and Integration: [08 Hours]

Newton cotes integration formula: Trapezoidal rule, Simpson's rule and integration with unequal segments; Integrations of equations: Romberg integration, Gauss Quadrature integration; Numerical differentiation; Case studies: Cash flow analysis, determination of root mean square current by numerical integration.

UNIT-VI] Differential Equations: [06 Hours]

One step method: Euler's method, modification & improvement of Euler's method, Runge-Kutta methods, System of equation; Partial differential equations: Laplace's equations; Case Studies: Mathematical model for computer sales projection, simulating transient current for electrical circuit.

Text Books:

01. Numerical Methods for Engineers, 5th edition by Steven C. Chapra (McGraw Hill Book Company).
02. Introductory Methods of Numerical Analysis, 4th edition by S. S. Sastry (PHI Publication).
03. Numerical Methods for mathematics science and engineering, 2nd Edition by John H. Mathews (PHI Publication).

Reference Books:

01. Numerical Methods by P. Kandasamy, K. Thilagavathy and K. Gunavathi, (S.CHAND Publication).

PART-II

1. Engineering Mathematics – IV

Paper: 3 Hours, 80 Marks **Test: 20 marks**

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UNIT–I] Complex Analysis–I: **[07 Hours]**

Introduction of complex variable, limit, continuity and derivative; Analytic function, C-R equation in Cartesian and polar form; Harmonic functions, Orthogonal System; Construction of analytic function $f(z) = u + iv$ if u or v or $u \pm v$ are given

UNIT–II] Complex Analysis–II: **[08 Hours]**

Complex Integration: Line Integral of complex plane, Cauchy's Integral Theorem for simply and multiply connected regions, Cauchy's Integrated formula; Series of Complex terms: Convergence, Behavior radius of convergence of series, Taylor's and Laurent's series [without proof]; Singularities, Residues, Residues Theorem, Evaluation of real definite integrals, Conformal mappings: Translation, Magnification rotation and Bilinear Transformation.

UNIT-III] Laplace Transforms: **[07 Hours]**

Definition, Existence of L.T; Properties: Linearity, Change of scale, First shifting, Second shifting, Multiplication by t, Division by t., L.T. of derivative and Integral, Inverse L.T, Methods of obtaining inverse L.T., Convolution Theorem; L.T of special functions: Unit (Heaviside) step function, Unit Impulse function (Dirac delta function), Periodic functions

UNIT–IV] Application of L.T: **[04 Hours]**

Applications of L.T: Initial value problems, Simultaneous Linear equations and L.T. Method for the solution of partial differential equations.

UNIT–V] Linear Algebra-I: **[07 Hours]**

Vector spaces, Subspaces, Linear Independence of Vectors, Dimension and Basis, Effect of change of basis, Rank nullity of Linear Transformation, Matrix of Linear Transformation

UNIT–VI] Linear Algebra-II: **[07 Hours]**

Eigenvalue Problems: Eigen Values, Eigen Vectors, and their applications; Diagonalization, Orthogonalization.

Text Books:

01. Advanced Engineering Mathematics by Erwin Kreyszing (8th Edition, Wiley Eastern Ltd.) ISBN-9971-51-283-1
02. Advanced Engineering Mathematics by B. S. Grewal (40th Edition, Oct 2007, Khanna Publication, Delhi) ISBN-81-7409-195-5
03. Advance Engineering Mathematics by R. K. Jain and S. R. K. Iyengar (Third Edition, Narosa Publication) ISBN-978-81-7319-730-7.
04. Elementary Linear Algebra by Anton and Rorres.

Reference Books:

01. Applied Mathematics (Volumes I & II) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)
02. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill).
03. Engineering Mathematics by Thomas and Finney.