

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and syllabi relating to the Bachelor of Engineering degree course vide this Office Circular No. UG/231 of 2008, dated 10th June, 2008 and the Principals of the affiliated Collages in Engineering are hereby informed that the recommendation made by the Ad-hoc Board of Studies in Electronics Engineering at its meeting held on 4th August, 2008 has been accepted by the Academic Council at its meeting held on 8th August, 2008 vide item No.4.31 and that, in accordance therewith, the revised syllabus for the Second Year (Sem. III & IV) leading to the B.E. degree course in Electronics Engineering is modified as per Appendix and that the same has been brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032
4th September, 2008

PRIN.K.VENKATARAMANI
REGISTRAR

To,

The Principals of the affiliated colleges in Engineering.

A.C./4. 31/8.08.2008

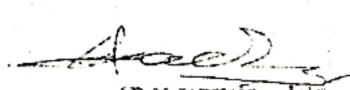
No.UG/408 - A of 2008,

MUMBAI-400 032

4th September, 2008

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Technology.
- 2) The Chairman, Ad-hoc Board of Studies in Electronics Engineering .
- 3) The Controller of Examinations,
- 4) The Co-Ordinator, University Computerization Centre,


(D. N. JADHAV)
ASSTT. REGISTRAR
(U.G./P.G.Section.)

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, Registrar and the Assistant Registrar, Administrative sub-center, Ramnagiri for information.

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director, University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar, Special Cell, the Deputy Registrar, the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred in the above Circular and that, no separate Action Taken Report will be sent in this connection. the Assistant Registrar, Constituent Colleges Unit (2 copies), BUCT (1 copy), the Deputy Account, Unit (1 copy), the In-charge Director, Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

sk/4/09/2008

UNIVERSITY OF MUMBAI



Modified Revised Syllabus
for the Second Year
(Sem III & IV)
of the
B.E. Degree Course in
Electronics Engineering

(With effect from the academic year 2008-2009)

University of Mumbai

Revised Syllabus of Electronics Engineering June 2008

Semester III

	L	P	TU	TH	TW	PR	OR	TOTAL
Engineering Mathematics	4	--	1	100	25	---	---	125
Basic of Electronic Circuits	4	2	---	100	25	50	25	200
Digital System Design I	4	2	---	100	25	50	25	200
Electrical Network Analysis and Synthesis	4	2	---	100	25	---	---	125
Control System	4	2	---	100	25	---	25	150
Presentation and Communication Techniques	2	---	02	---	50	---		50
	22	08	03	500	175	100	75	850

Semester IV

		L	P	TU	TH	TW	PR	OR	TOTAL
1.	Advanced Engineering Mathematics	4	---	---	100	---	---	---	100
2.	Electronic Circuit Analysis and Design	4	2	---	100	25	50	25	200
3.	Digital System Design II	4	2	---	100	25	50	25	200
4.	Basics of Analog and Digital Communication Systems	4	2	---	100	25	---	25	150
5.	Electronic and Electrical Measuring Instruments and Machine	4	2	---	100	25	---	25	150
6.	Electronic Workshop-I	---	4	---	---	25	---	25	50
		20	12		500	125	100	125	850

S.E. ELECTRONICS - SEMESTER –III

ENGINEERING MATHEMATICS

Period per week	Lecture	4	
	Practical	--	
	Tutorial	1	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	---	---
	Oral Examination	---	---
	Term Work	---	25
	TOTAL	---	125

Detailed Syllabus		Lectures/Week
1	Laplace Transform 1.1 Existence of Laplace Transform, Properties of L.T, 1st and 2nd shifting theorem, Change of scale Properties, Unit step function, Heaviside, Dirac delta and Periodic function and their L.T 1.2 Inverse L. T. with partial fraction and Convolution theorem 1.3 Applications to solve initial and boundary value problems involving O.D.E.	06 05 02
2	Fourier series Dirichlet's conditions, Fourier series of periodic function with period 2π and $2l$. F.S for even and odd functions. Half range sine and cosine and Parseval's identity.	07
3	3.1 Complex form of Fourier series 3.2. Fourier integral and Fourier Transform with properties in detail	02 03
4	Matrices 4.1 Types of matrices, Adjoint, inverse and rank of a matrix. Normal form of a matrix 4.2. System of Homogeneous and non homogeneous equations and their consistency.	06

5	Complex variables	
	5.1. Analytic function-R equation in Cartesian and polar form. Analytic function by Milne-Thompson method, Harmonic function.	06
	5.2. Conformal mapping, Bilinear mapping and standard transforms.	04
6	Z- transform & vector analysis	
	6.1 Properties, change of scale, shifting, inverse of z transform.	04
	6.2 Initial value and final value.	03
	6.3 Vector integration, scalar potential work down Greens theorem, Divergence theorem, Stokes theorem (without proof).	08

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 20 marks.
2. Only 5 questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature(for example Q2 a) from 2.1 then b) will be from 4.1 or 5.1 other than 2.1.
5. In question paper weightage of each chapter will be proportional to number of respective lecture hours mentioned in the syllabus.

Recommended Books:

1. P.N.Wartikar/J.N Wartikar, Text book Applied Mathematics, Vol.I & II, Pune Vidyarthi Griha Prakashan
2. Matrices by Shantinayakan
3. Vector Analysis by Murray R. Stiegel, Schaum series
4. Higher Engg. Mathematics. Dr. B.S. Grewal, Khanna Publication
5. Higher Engg. Mathematics by B.V. Ramana Tata McGraw-Hill Publishing company Limited.
6. Advanced Engg. Mathematics by C.Ray wylie & Louis, C. Barrott Tata McGraw-Hill Publishing company Limited
7. Advanced Engg. Mathematics 8th Ed Erwin kreysizg. John Wiley & Sons, Inc.

S.E. (ELECTRONICS) SEMESTER III

~~Basic~~

BASIC OF ELECTRONIC CIRCUITS ~~Design~~

BASIC

Period per week	Lecture	4	
	Practical	2	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	3	50
	Oral Examination	---	25
	Term Work	---	25
	TOTAL	---	200

Detailed Syllabus		Lectures/Week
1.	Semiconductor Materials and Diodes Review of Semiconductor Materials and Properties, The PN Junction, Introduction to Semiconductor Diode Theory. Diode Circuits: DC Analysis and Models, AC Equivalent Circuits. Other Diode Types – Solar Cell, Photodiode, Light-Emitting Diode, Schottky Barrier Diode, Pin Diode, Zener Diode, Zener as voltage Regulator, Temperature Effects, Understanding Manufacturer's Specifications.	06
2.	Diode Circuits Design of Rectifier Circuits:- Full Wave Rectification with 'C', 'L-C' & 'pi' Filter, Ripple-Voltage and Diode Current, Voltage Doubler & Multiplier Circuit, Zener Diode Circuits, Clipper and Clamper Circuits, Multiple-Diode Circuits. Photodiode and LED Circuits.	08
3.	The Bipolar Junction Transistor Basic Bipolar Junction Transistor, PNP & NPN Transistor Structures Device Symbols:, Current-Voltage Characteristics, Transistor Biasing – Single Base Resistor Biasing, Voltage Divider Biasing and Bias Stability, DC Analysis of Transistor Circuits in Common Emitter Common Base and Common Collector configurations, Forward-active Mode Operation Load Line considerations, Non ideal Transistor Leakage Currents and Breakdown, Integrated Circuit Biasing, Multistage Circuits. Transistor Applications – As a Switch,	08

4.	Basic BJT Amplifiers The BJT Linear Amplifier, Graphical Analysis and AC Equivalent Circuit, Small Signal Hybrid - π , ($g_m r_{\pi}$) Equivalent Circuit of the Bipolar Transistor, Hybrid - π ($g_m r_{\pi}$) Equivalent Circuit Including the Early Effect, Expanded Hybrid - π Equivalent Circuit, Other Small - Signal Parameters And Equivalent Circuits, Basic Transistor Amplifier Configurations i.e. Common Emitter Common Base and Common Collector (Emitter Follower. AC Load Line Analysis, The Three Basic Amplifier configurations: Summary and Comparison, Design of Single Stage BJT Amplifier. Multistage Amplifiers, Band-Width and Power Considerations, Thermal Considerations in Transistor Amplifiers, Manufacturers' Specifications.	12
5.	The Field Effect Transistor Junction Field-Effect Transistor, MOS Field-Effect Transistor, MOSFET, Self Biasing Mid-Point Biasing, Biasing for Zero Drain Current-Drift Potential Divider Biasing and DC Circuit Analysis, Basic MOSFET Applications: Switch, Digital Logic Gate and Amplifier. Temperature effects in MOSFETs, Input Protection in MOSFET. The Power FET (VMOS).	12
6.	Basic FET Amplifiers Basic JFET Amplifier Configurations :- Common Source Amplifier, The Source Follower(Common Drain) Amplifier. The Common Gate Configurations. Summary of the Three Basic Amplifier Configurations.AC Circuit analyses of Common Source Amplifier, The Source Follower(Common Drain) Amplifier, The Common Gate Amplifier Configurations. Design of Single Stage JFET Amplifier. MOSFET amplifier Biasing and DC Circuit Analysis.Ac analysis of Single Stage MOSFET amplifier. Single - Stage Integrated Circuit MOSFET Amplifiers, Multistage Amplifiers.	10

Text Books:

1. Donald A. Neamen, Electronic Circuit Analysis and Design, Second edition, McGraw Hill International
2. Robert L Boylestad Louis Nashelsky, Electronic Devices and Circuit theory, sixth edition, Pentice Lay India.
3. Martin Roden . Gordon Carpenter, William Wieserman, Electronic Design, Fourth edition, Shroff Publishers,
4. Microelectronics Circuits (Analysis and Design).By Mohammad Rashid, Cengage Learning

Reference Books:

1. Electronics Devices and circuits Theodore F. Bogart, Jr. Jeffrey S. Beasley, Guillermo Rico.
2. Donald Schilling & Charles Belove, Electronic Circuits Discrete and Integrated, Third edition, McGraw Hill

Termwork:

The termwork shall consist of atleast six laboratory experiments covering the whole of syllabus, duly recorded and graded as well as atleast four computer simulations using EDA tools like PSPICE duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS**Laboratory / Simulation**

1. Application of diodes as a (positive / negative and both), a clamper (positive /negative)
2. FWR with different types of Filters and finding its ripple factor.
3. Voltage Regulation using Zener diode.
4. Design and Analysis of BJT Amplifier with fixed bias, Collector bias, Potential divider bias. Determinations of its DC operating point
5. input and output characteristic of BJT in CB,CC,CE configuration and its parameters.
6. BJT as a Voltage Amplifier. Determination of its performance parameters (A_V , A_i , R_i , R_o)
7. FET as a Voltage Amplifier and determination of its performance parameters.
8. Output characteristics and Transfer Characteristics of JFET, Finding its Parameters, mutual conductance and amplification factor.

S.E. (ELECTRONICS) SEMESTER III

DIGITAL SYSTEMS DESIGN I

Period per week	Lecture	4	
	Practical	2	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	3	50
	Oral Examination	---	25
	Term Work	---	25
	TOTAL	---	200

Detailed Syllabus		Lectures/Week
1.	Introduction and Digital Codes: Analog Vs Digital Systems Digital Devices, Binary codes, Gray codes, Character codes, Codes for detecting and correcting errors	06
2.	Logic Circuits: Boolean Algebra, theorems, combinational circuit analysis, combinational circuit synthesis, minimization, Karnaugh Map, Sum of Products, Product of Sums form, and their minimization, Programmed minimization-Quine Mc-Cluskey minimization algorithm, timing hazards-Static, Dynamic Hazards	14
3	Combinational MSI, LSI Devices: Combinational design using SSI, MSI devices, Decoders (74x139,74x138), Encoders (74x148), Tri state buffers (74x244,74x245), Multiplexers (74x151), Parity circuits(74180), Comparators(7485), Adders (7483) , Subtractors, BCD adders - subtractors , ALU (74181), Combinational Multipliers, Combinational PLDs ,	10
4	Logic families: Basics of TTL, CMOS, ECL Circuits for basic logic operations just Circuits and working of them in all above families. No Characteristics of families.	10

5.	Sequential Logic Practices: Basic Elements, Latches and Flip flops, S-R, D.T, J-K latches and Flip flops, Flip Flop conversions, Applications of Latches and Flip-Flop in switch debouncing, bus holder circuits, Flip-flop Timing Considerations and Metastability.	08
6	Counters –Asynchronous, Synchronous counters, Up down counters, Mod counters, Ring counters. Shift Registers, Universal Shift register.	08

Text Books

1. RP Jain: Modern Digital Design, forth edition, Tata McGraw Hill.
2. Morris Mano, Digital Design , Pearson Education ,Asia,2002

Reference Books

1. John F. Wakerley, Digital Design Principles and Practices, third edition updated, Pearson Education, Singapore, 2002.
2. John M. Yarbrough, Digital Logic :Applications and Design, Thomson Brooks/Cole , 2004

Term Work

The term work shall consist of at least eight laboratory experiments covering the whole of syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

The experiments must include:

1. Verification of basic gates (1 Experiment)
2. Applications like comparators/ parity generators / adders / Subtractors etc using gates or MSI devices (2 Experiments)
3. Use of Decoders, Encoders, Multiplexers (2 Experiments)
4. Flip Flop Conversion (1 Experiment)
5. Applications using of Synchronous / Asynchronous counters, Shift Registers (2 Experiments)

S.E. (ELECTRONICS) SEMESTER III
ELECTRICAL NETWORK ANALYSIS AND SYNTHESIS

Period per week	Lecture	04	
	Practical	02	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	---	---
	Oral Examination	---	---
	Term Work	---	25
	TOTAL	---	125

Detailed Syllabus		Lectures/Week
1	Circuit analysis (ac and dc): Kirchoff's law, Loop variable analysis, Node variable analysis, Source transformations, Reference directions for current and voltage, Active element conventions, dot convention for coupled circuits. Linearity, Superposition, Thevenin's and Norton's, Maximum power for ac source and dependent source.	12
2	Linear graphs: Introductory definitions, The incidence matrix A, the loop matrix B, relationship between sub matrix of A and B. Cut-sets and cut-set matrix, Fundamental cut-sets and fundamental tie-sets, Planar graphs, A and B matrices, Loop, node, node pair equations, duality.	08
3	Laplace transforms: Properties of Laplace transforms, basic theorems. Laplace transform of gate function, impulse function and periodic functions, convolution integral, inverse Laplace transform, application of Laplace transforms to solution of Network problems.	08
4.	Transient and frequency analysis: Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for d.c. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform methods of solutions. Transfer function. Concept of poles and zeros. Concept of frequency response of a system	10

5.	Two port networks: Concept of two port networks, Driving point and Transfer functions., open circuit and short circuit parameters, transmission and inverse transmission parameters, hybrid parameters, inter-relationship of different parameters, interconnection of two port networks, T and pi representation, terminated two port networks	08
6.	Fundamentals of network synthesis: Realizability concept, Hurwitz property, positive realness, properties of positive real functions, testing positive real functions, Synthesis of R-L, R-C and L-C driving point functions – Foster and Cauer forms.	08

Textbooks:

1. Franklin F. Kuo, "Network analysis and synthesis", PHI.
2. M. E. Vanvalkenberg, "Network analysis", PHI, third edition.
3. William Hayt and Jack Kemmerly, "Engineering Circuit analysis", TMH.

Reference Books:

1. Circuits and Networks – Analysis and Synthesis: A. Sudhakar and S.P Shyam Mohan.
2. D. Roy Choudhury: Networks and Systems, New Age International Pubs.

Termwork:

The Termwork shall consist of at least four experiments and four assignments covering the whole syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

1. Verification of superposition theorem using ac/dc source.
2. Verification of Thevenin's theorem using dependent/independent source.
3. Verification of maximum power transfer theorem using ac/dc source.
4. Verification of source transformation.
5. Charging and discharging of a capacitor.
6. Measurement of h parameters.

S.E. (ELECTRONICS) SEMESTER III

CONTROL SYSTEM ENGINEERING

Period per week	Lecture	04	
	Practical	02	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	2	---
	Oral Examination	---	25
	Term Work	---	25
	TOTAL	---	150

Detailed Syllabus		Lectures/Week
1	Introduction to control system analysis Introduction, examples of control systems, open loop control systems, closed loop control systems. Transfer function. Types of feed back & feed back control system characteristics – noise rejection, gain, sensitivity, stability.	06
2	Mathematical modeling of systems Importance of a mathematical model, Block diagrams, signal flow graphs, Mason's gain formula and its application to block diagram reduction. State space method, solving time-invariant system, transfer matrix.	09
3	Transient & steady state - Response Analysis 3.1 Impulse response function, First order system, second order system, time domain specifications of systems, analysis of transient-response using Second order model. 3.2. Classification of control systems according to "Type" of systems, Steady – state errors, static error constants, Steady – state analysis of different types of systems using step, ramp and parabolic input signals.	12
4	Stability Analysis Introduction to concept of stability. Stability analysis using Routh's stability criterion, Absolute stability, Relative stability. Root-Locus plots, summary of general rules for	09

	constructing Root- Locus, Root-locus analysis of control systems. Compensation techniques-Log. lead, log-lead.	
5	Frequency-Response Analysis Introduction, Frequency domain specifications, resonance peak and peak resonating frequency, relationship between time and frequency domain specification of systems. Bode plots, Polar plots, Log-magnitude Vs phase plots, Nyquist stability criterion, stability analysis, Relative stability, gain margin, phase margin, stability analysis of system using Bode plots. Closed-Loop Frequency Response-Constant gain and phase loci, Nichol's chart and their use in stability study of systems.	09
6	Control components & Controller DC and AC servomotors, servoamplifier, potentiometer, synchro transmitters, synchro receivers, synchro control transformer, stepper motors. Discontinuous controller modes, continuous controller modes, composite controllers.	09

Textbooks:

1. J Nagrath, M Gopal, Control system Engineering, Tata McGraw Hill
2. K. Ogata, Modern Control Engineering, Pearson education, third edition.
3. Benjamin C. Kuo, Automatic Control Systems, Pearson education, seventh edition.

Reference Books:

1. Madan Gopal, Control Systems Principles and Design, Tata McGraw Hill, seventh edition, 1997.
3. Nise, control system Engineering, John wiley & sons, 3rd edition
4. Curtis Johnson, Process Control Instrumentation Technology, Pearson education, fourth edition.

Termwork:

The Termwork shall consist of at least ten experiments and three assignments based on the whole syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

Laboratory / Simulations

1. Transient response of 1st order & 2nd order system
2. Frequency response of 1st order & 2nd order system

3. Steady state error analysis of different types of systems
4. D.C. servomotor
5. A.C. servomotor
6. Synchro Transmitter and Receiver
7. Potentiometer

Simulation

1. Block diagram reduction
2. Time response analysis
3. Frequency response analysis
4. Stability analysis

S.E. (ELECTRONICS) SEMESTER III

PRESENTATION AND COMMUNICATION TECHNIQUES

Period per week	Lecture	2	
	Practical	--	
	Tutorial	2	
		Hours	Marks
Evaluation System	Theory Examination		
	Practical	---	---
	Oral Examination	----	
	Term Work	---	50
	Total	---	50

Detailed Syllabus		Lectures/Week
1.	Communication in a business organization: Internal and external communication, Types of meetings, strategies for conducting successful business meetings, documentation (notice, agenda, minutes, resolution) of meetings. Introduction to modern communication techniques (e-mail, internet, video-conferencing, etc.) Legal and ethical issues in communication (Intellectual property rights: patents, TRIPS, Geographical indications)	06
2	Advanced technical writing: Report writing: Definition and importance of reports, qualities of reports, language and style in reports, types of reports, formats (letter, memo, project-reports). Methods of compiling data for preparing report. A computer-aided presentation of a technical project report based on survey-based or reference based topic. The topics are to be assigned to a group of 8-10 students. The written report should not exceed 20 printed pages. Technical paper-writing Writing business proposals.	08
3	Interpersonal skills: Introduction to emotional intelligence, motivation, Negotiation and conflict resolution, Assertiveness, team-building, decision-making, time-management, persuasion	03

1. CONCEPT AND AREAS IN GUIDANCE

- (a) Principles, Meaning, Scope and Types of Guidance for Individuals and Groups.
- (b) Areas of Guidance: Personal, Educational, Vocational and Avocational. Meaning and its implications.
- (c) Agencies of Guidance: International, National, State and Local.

2. THEORIES AND ITS IMPLICATIONS

- (a) Holland's Model of Interest and its application in selection of career.
- (b) Gardner's Theory of Multiple Intelligence and its application at different levels

3. GUIDANCE FOR POPULATION WITH SPECIAL NEEDS

- (a) Mentally Challenged Learners: Slow Learners, Mentally challenged and Gifted.
- (b) Disadvantaged Groups: Social, Economical and Educational.
- (c) Women (Marginalised, Domestic Helper, Commercial sex worker ar. I Professional)
- (d) Senior Citizens (Emotional, Social and Physical)
- (e) Learning Disabilities.

4. VOCATIONAL GUIDANCE

- (a) Nature and scope of Vocational guidance.
- (b) Factors effecting vocational choice.
- (c) Approaches to Career guidance.
- (d) Vocationalisation of Secondary education.
- (e) Employment trends
- (f) Career development and Burnout

5. WORK AND MENTAL HEALTH

- (a) Meaning of Work
- (b) Relation between Work and Leisure.
- (c) Meaning and Characteristics of Mental Health
- (d) Need of Mental Health
- (e) Role of Guidance Personnel in Developing Mental Health.

6. COUNSELLING

- (a) Concepts: Principles, Meaning, Goals, Types and Stages of Counselling.
- (b) Counselling. Processes and Skills
- (c) Counselling related to various Fields: Psychotherapy, Psychiatry, Psychology and Advice
- (d) Family Counselling
- (e) HIV / AIDS Counselling

7. THEORIES OF COUNSELLING

- (a) Cognitive Theories: Albert Ellis and Aaron Beck
- (b) Behaviour Theories: Wolpe and Melchenbaum
- (c) Client-Centred Theory
- (d) Psychoanalytical Theory
- (e) Eclectic Theory

Additional Readings

1. Lewicki, Saunders & Minton: Essentials of negotiation, McGraw Hill
2. Hartman Lemay, Presentation Success, Thomson Learning
3. Kitty O. Locker, Stephen Kyo Kaczmarek: Business Communication, Building Critical skills, McGraw Hill
4. Vikas Gupta: COMPDEX Computer Course kit, IDG Books Pvt. Ltd.
5. Heller & Handle, The Essential Manager's manual, Dorling Kindersley
6. The Sunday times "Creating Success Series" 1. Develop your assertiveness 2. Make every minute count 3. Successful Presentation skills 4. How to motivate people? 5. Team building
7. Daniel Goleman, Emotional Intelligence.

S.E. (ELECTRONICS) SEMESTER IV
ADVANCED ENGINEERING MATHEMATICS

Period per week	Lecture	4	
	Practical	--	
	Tutorial		
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	---	---
	Oral Examination	----	---
	Term Work	---	---
	Total	---	100

Detailed Syllabus		Lectures/Week
1	Random variables:	
	1.1 Discrete and continuous random variable, Probability mass and density function for random variables.	02
	1.2 Expected value, Variance, Moments and moment generating functions	03
	1.3 Relation between Raw and central moments.	02
2	Probability distributions:	
	2..1. Binomial, Poisson and Normal distribution	06
	2..2. Introduction to distribution such as 't' and ' χ^2 ', central limit theorems and problems based on this theorem.	04
3	Sampling theory:	
	3.1 Large and small samples, Test of significance for both samples.	05
	3.2 paired 't' test	01
	3.3 Application for χ^2 distribution	02
4	Discrete Structure	
	4.1 Relation and function (Equivalence relation, Injective, surjective and bijective functions)	04
	4.2. Poset, Lattice (Bounded, complemented and distributive lattice)	04
	4.3. Algebraic structure: Group, Ring, Field	04
5	Matrices	
	5.1. Cayley Hamilton theorem, eigen values and eigen vectors (without proof)	04
	5.2. Similar matrices, orthogonally similar matrices, reduction to the diagonal form.	04

6	Complex variables	
	6.1 Cauchy's theorem and Cauchy's integral formula	03
	6.2 Taylor's and Laurent's formula, Singularities and poles.	04
	6.3 Residue theorem.	03

Theory Examination:

1. Question paper will comprise of total 7 questions. each of 20 marks.
2. Only 5 questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature(for example Q2 a) from 2.1 then b) will be from 4.1 or 5.1 other than 2.1.
5. In question paper weightage of each chapter will be proportional to number of respective lecture hours mentioned in the syllabus.

Recommended Books:

1. P.N.Wartikar/J.N Wartikar, Text book Applied Mathematics.Pune Vidyarthi Griha Prakashan
2. Theory of complex variable by Shantinakaran
3. Engineering Mathematics by S.S.Sastri
4. Fundamental of Mathematics Statistics By S.C.Gupta and V.K Kapoor
4. Probability and Statistics Schum series
5. Discrete Mathematics By Kolman,Busby,Sharon Rus
6. Function of discrete Mathematics by K.D.Joshi

S.E. (ELECTRONICS) SEMESTER IV
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN

Period per week	Lecture	4	
	Practical	2	
	Tutorial	---	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical	3	50
	Oral Examination	----	25
	Term Work	---	25
	Total	---	200

Detailed Syllabus		Lectures/Week
1	Frequency Response of Amplifiers High frequency parameters of BJT Amplifier Frequency Response, System Transfer Functions, S – Domain Analysis, First – Order Functions, Bode Plots, Short-Circuit and Open-Circuit Time Constants, high Frequency Response of BJT, FET and MOSFET amplifier analysis.	09
2	OSCILLATORS- Analysis and Design of phase shift, Quadrature, Wien bridge, Hartley, Colpitt and Crystal Oscillator.	09
3	Power Amplifiers Power Amplifiers, Power Transistors – Power BJTs, Power MOSFETs, , Design of Class- A, Class- AB Push Pull Class- B Transformer Coupled Push Pull Amplifier, Complementary Class B Power Amplifier, Heat Sinks, Design of heat sinks. for power Amplifier Devices	09
4	Differential Amplifiers BJT, FET & MOSFET Differential Amplifier Analysis and Design, Design of CMOS, Differential Amplifier with Active Load (Ref:- Donald Neamen).	09
5.	Multistage Amplifiers Design Two Stage BJT, JFET and MOSFET Amplifiers and Design of CASCODE Amplifiers. Design of BJT-JFET hybrid amplifier.	12

6.	Feedback and Stability Introduction to Basic Feedback Concepts. Ideal Close-Loop Gain, Gain Sensitivity Bandwidth Extension, Noise Sensitivity, Reduction of Nonlinear Distortion, Ideal Feedback Topologies. Analysis of Series –Shunt, Series-Series, Shunt-Shunt Shunt – Series Amplifiers, Loop Gain, Stability of the Feedback Circuit, The Stability Problem, Bode Plots Of One – Pole, Two – Pole, and Three – Pole Amplifiers, Nyquist Stability Criterion, Phase and Gain Margins, Frequency Compensation Basic Theory, Closed Loop Frequency Response, Miller Compensation.	08
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Text Books:

1. Microelectronics Circuits (Analysis and Design) By Mohammad Rashid, Cengage Learning
2. Donald A. Neamen, Electronic Circuit Analysis and Design, Second edition, McGraw Hill International edition 2001
3. Martin Roden , Gordon Carpenter, William Wieserman, Electronic Design, Fourth edition, Shroff Publishers, 2002

Reference Books:

1. Donald Schilling & Charles Belove, Electronic Circuits Discrete and Integrated. Third edition. McGraw Hill International edition. 1989
2. Adel Sedra & Kenneth Smith. Microelectronic Circuits. Fourth edition, Oxford University Press, 1998

Termwork:

The term work shall consist of atleast six laboratory experiments covering the whole of syllabus, duly recorded and graded as well as at-least four computer simulations using EDA tools like PSPICE duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

Laboratory / Simulations

1. To Study frequency Response of Cascode Amplifier
2. To study RC phase shift Oscillator and Calculate threshold & practical frequency.
3. To Study Current Series negative feedback amplifier and plot gain with

feedback & without feedback.

4. To study Wein Bridge Oscillator
5. To study Class AB and B Pushpull Amplifier.
6. To study Hartley Oscillator. Calculate theoretical & practical frequency.
7. To study Colpitts Oscillator. Calculate theoretical & practical frequency.
8. To study frequency response of two stage RC coupled Amplifier.

S.E. (ELECTRONICS) SEMESTER IV
DIGITAL SYSTEMS DESIGN II

Period per week	Lecture	4	
	Practical	2	
	Tutorial	--	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	3	50
	Oral Examination	---	25
	Term Work	---	25
	TOTAL	---	200

Detailed Syllabus		Lectures/Week
1.	Hardware Description Languages Introduction to Hardware Description Language, Core features of VHDL, data types, concurrent and sequential statements, data flow, behavioral, structural architectures, Subprograms, modularity, design reuse concepts	08
2.	Application of HDL in combinational circuits Implementation of Combinational Circuits in VHDL, Use of Component Instantiation and Structural Architecture Using VHDL and PLDs Combinational circuit design examples – barrel shifter, simple floating – point encoder, cascading comparator.	08
3	Sequential logic design Synchronous State Machines: Mealy and Moore Machines, Clocked synchronous state machine analysis, Clocked synchronous state machine design, designing state machines using state diagrams, State Reduction techniques, State Assignment Rules, State machine synthesis using transition lists	14
4	Applications of sequential circuits MSI counters and applications, MSI Shift registers and their	10

	applications Implementation of Counters and Shift registers in VHDL VHDL sequential circuit design features. Implementation of FSM in VHDL	
5.	Memory, CPLDs and FPGAs Types of memory devices, Read-Only Memory (ROM), Read / write memory, Static RAM, Dynamic RAM, Introduction to Xilinx XC9500 CPLD family and Xilinx XC 4000 FPGA family.	08
6	Introduction to Asynchronous design Fundamental and pulse mode Asynchronous sequential machine, Analysis of Asynchronous Sequential Circuits: Transition Table, Flow Table, Race Conditions Stability Considerations, Analysis of simple circuits like latches is expected	08

Text Books

1. Douglas L Perry, VHDL Programming by Examples, Fourth Edition, Tata McGraw hill Publications, 2002.
2. Morris Mano, Digital Design , Pearson Education ,Asia,2002
3. John M. Yarbrough, Digital Logic :Applications and Design, Thomson Brooks/Cole , 2004

Reference Books

1. John F. Wakerley, Digital Design Principles and Practices, third edition updated, Pearson Education, Singapore, 2002.
2. Stephen Brown & Zvonko Vranesic, Fundamentals of Digital Logic with VHDL Design, first edition, McGraw Hill International edition, 2000.

SUGGESTED LIST OF EXPERIMENTS

The experiments must include:

1. Implementation of combinational circuits in VHDL (min 2 Experiment)
2. Applications using MSI counters / shift registers (min 2 Experiments)
3. Implementation of sequential circuits in VHDL (min 2 Experiments)
4. Implementation of Synchronous Sequential Circuit Design examples in hardware as well as using VHDL (min 2 Experiments)
5. A demonstration (at least) of programming FPGA / CPLD should be done

Term Work

The term work shall consist of at least eight laboratory experiments covering the whole of syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

S.E. (ELECTRONICS) SEMESTER IV

Electronic and Electrical Measuring Instruments and Machine

Period per week	Lecture	4	
	Practical	2	
	Tutorial	---	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical	---	---
	Oral Examination	----	25
	Term Work	---	25
	Total	---	150

Detailed Syllabus		Lectures/Week
1	Electronic and Digital Voltmeters: Principles of operation, advantages over conventional type analog voltmeters, basic voltmeter, peak reading, average reading true RMS reading, sampling type, FET voltmeters, sensitivity considerations & calculations. Methods of analog-to-digital and digital-to-analog conversion, principles of operation and typical specifications of a digital voltmeter, description of various types of DVMs with block diagrams, Resolution and Sensitivity of a digital meter, digital displays for meters.	08
2.	Frequency meters, phase meters and signal generators: Analog-schematic & operational details, limitations. Digital Frequency meters, Phase measurement by voltage addition method, balanced modulation type, phase meters using flip-flops, digital meters, advantages & limitations of each type. Requirement of a good laboratory type signal generator, A.F. signal generators, Beat frequency oscillator & its advantages.	09
3.	Oscilloscopes: Block diagram study of C.R.O., Description of panel layout & implementation of controls. Requirement of time base, triggered time base, delayed time base, external triggering etc. Lissajous patterns, use of these in phase & frequency measurements. Frequency time base, Wobbler scope & its applications, Dual trace, multi trace, Double beam, Sampling; Storage, Digital read-out oscilloscopes. Use of CRO in square wave testing of amplifiers, tracing of diode & transistor characteristics.	09

4	Basic measuring instruments: Essentials of indicating instruments – deflecting, controlling and damping torque. Construction and working principles of moving iron and moving coil ammeters and voltmeters, electro-dynamometer watt-meters, induction type energy meters, power factor meters, instrument transformers.	12
5	Measurement of R, L and C: Measurement of low, medium, high resistances: Ohmmeter, Kelvin's double bridge, Wheatstone's bridge, Megger. Measurement of inductance: Maxwell's, Hay's and Anderson's bridge. Measurement of capacitance: Schering bridge.	08
6	6.1 DC Motors : Back e.m.f., voltage equation, characteristics of series, shunt and compound motors, torque equations, speed control of dc shunt/series motors, three point and four point starter and applications of dc motors. 6.2 Three phase induction motors: Construction and principle of operation, slip, rotor frequency, torque equation, torque-speed characteristics, starting methods of induction motors. 6.3 Stepper motors: Construction, working principle and applications of variable reluctance, permanent magnet and hybrid stepper motors.	04 03 03

Text books:

- 1) Cooper W. D. & Helfrick A.D., Electronics Instrumentation & Measurement Techniques, third edition Prentice Hall of India, 1985
- 2) Kalsi H.S., Electronic Instrumentation, first edition, Tata McGraw Hill, 1997.
- 3) Electrical and electronic measuring instruments: A.K.Sawhney.

Reference Books:

- 1) Electrical Measurements and measuring instruments: Golding and Widdis.
- 2) Electric Machines: Nagrath and Kothari.

Termwork:

The Termwork shall consist of at least eight experiments and three assignments covering the whole syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

- 1 Study of dual integrating DVM.
- 2
 - a) Measurement of frequency using intensity modulation.
 - b) Design and implementation of digital phase meter.
 - c) Design and implementation of digital frequency meter.
- 3
 - a) Measurement of frequency using Lissajous patterns.
 - b) Measurement of phase difference using X Y mode of CRO.
 - c) Application of CRO for component testing.
- 4
 - a) Calibration of single phase energy meter.
 - b) Conversion of galvanometer into ammeter/voltmeter.
- 5
 - a) Measurement of unknown resistance using Kelvin's double bridge.
 - b) Measurement of unknown capacitance using Schering's bridge.
 - c) Measurement of unknown inductance using Anderson's bridge.
- 6
 - a) Speed control of dc shunt motor using armature and field control.
 - b) Starting of three phase induction motor using auto transformer starter.

S.E. (ELECTRONICS) SEMESTER IV

BASIC OF ANALOG AND DIGITAL COMMUNICATION SYSTEM

Period per week	Lecture	4	
	Practical	2	
	Tutorial	---	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical	---	---
	Oral Examination	----	25
	Term Work	---	25
	Total	---	150

Detailed Syllabus		Lectures/Week
1.	Elements of Communication System : Basic block diagram of communication system, Modulation and Demodulation concept, channels Noise in Communication System, Signal-to-Noise ratio, noise factor and Noise Figure, equivalent Noise Temperature Electromagnetic Waves Propagation : Propagation terms and Definitions.	06
2.	Amplitude Modulation : Principles of DSB Full Carrier AM, envelope detector, practical diode detector. Different types of AM : DSB-SC, SSB-SC, VSB, ISB	12
3.	Angle modulation Principles of Frequency Modulation and Phase Modulation. FM Modulators, types of FM: NBFM and WBFM, FM Transmitter, noise triangle, pre-emphasis and de-emphasis circuits. FM Detection : frequency discriminator and phase discriminator	12
4	Radio Receivers Receiver Characteristics, TRF Receivers, and Super heterodyne Receivers : choice of IF, AGC, AFC In AM and FM receivers.	07
5.	Analog Pulse Modulation Sampling Theorem for Low pass signals, Aliasing error, Sampling techniques, Principles, generation, Demodulation & Spectrum Of PAM, PWM, PPM	07

6.	Digital Pulse Modulation Comparison of digital signal transmission over analog signal transmission, significance of regenerative repeaters . Pulse- coded modulation (PCM) : sampling ,quantizing , encoding technique, PCM bandwidth, Necessity of companding, PCM Waveform formats: Uni-polar and polar NRZ , RZ , AMI Delta modulation (DM) , Adaptive Delta Modulation(ADM). Multiplexing: TDM, FDM- Principles & applications.	12
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Text Books:

1. Wayne Tomasi "Electronics communication system" Pearson education, Third edition 2001.
2. Kennedy and Davis "Electronics communication system", Tata Mcgraw Hill
3. R.P. Sing and S.D. Sapre, "Communication systems Analog and Digital", Tata Mcgraw Hill
4. Taub and schilling "principles of communication systems", Tata Mcgraw Hill

Reference Books:

1. Roy Black. "Electronics communication system", Cengage learning, second edition.
2. B.P. Lathi "Modern Digital and analog Communication system" Third edition, OXFORD
3. Robert J. Schoenbeck "Electronics communications modulation and transmission".
4. Lean W couch "Digital and Analog communication system", Pearson education, Sixth edition.

Term Work:

The term work shall consists of at least eight Laboratory experiments covering the whole of syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage of ten marks.

SUGGESTED LIST OF EXPERIMENTS

1. Amplitude Modulation And Demodulation
2. DSB-SC & SSB-SC Modulation ,demodulation
3. Frequency Modulation and Demodulation
4. Study of Superhetrodyne Receiver characteristics
5. Sampling and Reconstruction of sampled signals
6. Pulse Modulation (PAM, PWM, PPM)
7. Delta Modulation
8. Time Division Multiplexing of PCM signals
9. Line codes (NRZ ,RZ ,AMI-RZ)
10. Simulation on AM,FM / Multiplexing

S.E. (ELECTRONICS) SEMESTER IV

Electronics Workshop-I

Period per week	Lecture		
	Practical	4	
	Tutorial		
		Hours	Marks
Evaluation System	Theory Examination	---	---
	Practical	---	---
	Oral Examination	----	25
	Term Work	---	25
	Total	---	50

Detailed Syllabus

This syllabus is designed to encourage students to design and implement innovative ideas. The syllabus will give them in depth practical knowledge from design to the final verification stage. Documentation of any project is an important part of the project and students are expected to document their work properly in standard IEEE format.

Every group of students should select different projects. Number of students should not be less than TWO and not more than THREE in one group.

1. Study of Soldering Techniques and PCB Design

Students are expected to select any experiment* that they have already performed in earlier semester. Soldering and testing is to be done for the selected experiment. Perform simulation of the same experiment by using CAD tools. Schematic as well as PCB design is to be carried out using CAD tools.

2. Design, Simulation and Implementation of Analog Project

Students are expected to design any* analog application of their choice. Perform simulation using software tools. PCB design, fabrication of PCB, testing and implementation should be done. Documentation of the project is to be done in standard IEEE format using Latex/WinTex. Project report should include abstract in maximum 100 words, keywords, introduction, design, simulation, implementation, results, conclusion and references.

3. Digital Project

Students are expected to design any* digital application of their choice.

Perform simulation using software tools for hardware description. Design should be synthesized using FPGA/CPLD. Documentation of the project is to be done in standard IEEE format using Latex/WinTex. Project report should include abstract in maximum 100 words, keywords, introduction, design, simulation, implementation, results, conclusion and references.

*** To be approved by the subject in-charge**

References:-

1. Roberts G. W. and Sedra A.S., "SPICE", 2nd ed, USA
2. Rashid M.H. "SPICE for circuits and electronics using pSpice", Prentice Hall
3. Tuinenger P.W., "SPICE: A Guide to circuit simulation and analysis using pSpice", Prentice Hall
4. Bosshart, "Printed Circuit Boards: Design and Technology", Tata McGraw Hill
5. Orcad/PCBII , "User's Guide".
6. www.xilinx.com

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