

SYLLABI BOOK

For
Under Graduate Course in
Electronics & Communication
(w. e. f. April, 2016)



Department of Electronics & Communication Engineering
Faculty of Technology
Dharmsinh Desai University
Nadiad – 387 001, Gujarat, India.
<http://www.ddu.ac.in>

TEACHING SCHEME FOR THE COURSE
B.TECH. ELECTRONICS & COMMUNICATION (w. e. f. April, 2016)

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. I	AF111	Mathematics-I	3	1	-	60	40	-	-	100	4
		Environmental Science	3	0	0	60	40	-	-	100	3
	AF122	Basic Electrical & Electronics Engineering	4	0	2	60	40	25	25	150	5
	CT116	Elements Of Linux OS and C Programming –I	4	0	2	60	40	25	25	150	5
	AF115	Engineering Graphics	4	0	3	60	40	-	50	150	4.5
	AF114	Engineering Mechanics	4	0	2	60	40	25	25	150	3.5
	AF116	Workshop-I	-	-	3	-	-	-	50	50	1
TOTAL									750		

SEMESTER II

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. II	AF201	Mathematics-II	3	1	-	60	40	-	-	100	4
	AF212	Electronics Principles	4	0	2	60	40	25	25	150	5
		Engg. Economics & Principles of Management	3	0	0	60	40	-	-	100	3
	CT215	C Programming -II	4	0	2	60	40	25	25	150	4
	AF214	Mechanics of Solids	3	0	2	60	40	25	25	150	4
	AF215	Heat Power	3	0	2	60	40	25	25	150	4
	CT216	Electronics Workshops	-	-	3	-	-	-	50	50	1
TOTAL									750		

SEMESTER III

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. III	AF301	Mathematics-III	4	0	-	60	40	-	-	100	4
	CI308	Linear Electronics-I	4	-	2	60	40	25	25	150	5
	EC302	Electronic Instrumentation	4	-	2	60	40	25	25	150	5
	EL315	Introduction to Yoga	1	-	1	50	-	50	-	100	1.5
	EL304	Network Analysis	4	-	2	60	40	25	25	150	5
	EC316	Control Theory	4	-	2	60	40	25	25	150	5
TOTAL									800		

SEMESTER IV

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. IV	AF401	Mathematics-IV	3	1	-	60	40	-	-	100	4
	CL418	Linear Electronics-II	4	-	2	60	40	25	25	150	5
	EC404	Object Oriented Programming	4	-	2	60	40	25	25	150	5
	CI416	Electrical Machines & Power	4	-	2	60	40	25	25	150	5
	EL416	Personality development	2	-	-	50	-	-	-	50	2
	EC403	Digital Electronics	4	-	2	60	40	25	25	150	5
	EL405	Applied Mathematics	0	0	2	-	-	25	25	50	2
TOTAL									800		

SEMESTER V

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. V	EC511	Microcontroller & Applications	4	-	2	60	40	25	25	150	5
	EC512	Electronic Communication	4	-	2	60	40	25	25	150	5
	EC505	Electromagnetic Fields	4	1	-	60	40	-	-	100	5
	EC506	TERM PROJECT	-	-	2	-	-	25	25	50	1
	EC516	Project Management	4	-	-	60	40	-	-	100	4
	EC 507	Power Electronics	4	-	2	60	40	25	25	150	5
TOTAL										700	

SEMESTER VI

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VI	EC601	Advanced Microprocessors	4	-	2	60	40	25	25	150	5
	EC604	Communication Systems	4	-	2	60	40	25	25	150	5
	EC610	Microwave & Antennas	4	-	2	60	40	25	25	150	5
	EC607	TERM PROJECT	-	-	2	-	-	-	50	50	1
	EC611	Digital Signal Processing	4	-	2	60	40	25	25	150	5
	EC 612	Elective I	4	-	2	60	40	-	25	150	5
	EC 614	Audio-Video Engineering	0	0	2	-	-	25	25	50	1
TOTAL										850	

SEMESTER VII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VII	EC 720	Elective II	4	-	2	60	40	25	25	150	5
	EC702	Elective V	4	-	2	60	40	25	25	150	5
	EC719	Elective III	4	-	-	60	40	-	-	100	4
	EC707	TERM PROJECT	-	-	2	-	-	-	50	50	1
	EC717	Coding Theory & Compression Techniques	4	-	-	60	40	-	-	100	4
	EC718	Elective IV	4	-	2	60	40	25	25	150	5
TOTAL										700	

SEMESTER VIII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Seminar	Prac.	T.W.		
Sem. VIII	EC801	Project/Industrial Training	-	-	24	-	100	300	100	500	18

Elective I

**CMOS VLSI Design
Digital Switching Systems
Operating System**

Elective II

**Image Processing
Biomedical Instrumentation
Advanced Digital Signal Processing**

Elective III

**Wireless Communication
Optical Signal Processing
Radar and Navigation**

Elective IV

**Embedded Systems
High Performance Computer Architecture**

Elective V

**Data & Computer Communications
Introduction to Networks and Their Applications**

B.TECH. SEMESTER-I (EC/IC/CE/IT/CH/CL)

SUBJECT: MATHEMATICS-I (AF111) (Credits : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L hrs.	C	T hrs.	C	P hrs.	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T.W.	Total
3	3	1	1	--	4	60	40	--	--	100

[A] DIFFERENTIAL CALCULUS:

Equation of tangent & normal, angle between two curves, sub tangent, subnormal, length of tangent & length of normal, pedal equation, maximum & minimum of one variable, radius of curvature of plane curves in Cartesian, polar and parametric equations, radius of curvature at origin by Newton's method.

[B] SUCCESSIVE DIFFERENTIATION:

N^{th} derivatives, Leibnitz's theorem, Maclaurin's theorem, Taylor's theorem, Applications to obtain expansion of functions, Indeterminate forms.

[C] INTEGRAL CALCULUS:

Curve Tracing, applications for finding area, length of arc, volume and surface area of solids of revolutions, centre of gravity.

[D] REDUCTION FORMULA:

$$\int \sin^n x dx = -\frac{\sin^{n-1} x \cos x}{n-1} + \frac{n-2}{n-1} \int \sin^{n-2} x dx$$
$$\int \cos^n x dx = \frac{\cos^{n-1} x \sin x}{n-1} + \frac{n-2}{n-1} \int \cos^{n-2} x dx$$
$$\int \tan^n x dx = \frac{\tan^{n-1} x}{n-1} - \int \tan^{n-2} x dx$$
$$\int \cot^n x dx = -\frac{\cot^{n-1} x}{n-1} + \int \cot^{n-2} x dx$$

[E] BETA AND GAMMA FUNCTION:

Definition, properties, relation between Beta and Gamma functions, use in evaluation of definite integrals, Error and Elliptic functions.

[F] ORDINARY DIFFERENTIAL EQUATIONS:

Formulation of differential equations, general and particular solution, equation of first order and first degree of the type : variables, separable, homogeneous, non-homogeneous, linear equations, exact equation and reducible to these forms, Clairant's form, Application to geometrical and physical problem.

Text Books :

1. Engineering Mathematics-II
By : Shanti Narayan
Publication: S. Chand & Company Ltd
2. Higher Engineering Mathematics.
By : Dr. B. S. Grewal
Publication: Khanna publishers, Delhi

Ref. Books :

1. Engineering Mathematics-I
By : Shanti Narayan
Publisher: S. Chand & Company Ltd
2. Applied Mathematics
By : P.N. & J.N. Wartikar
3. Engineering Mathematics-I
By: I. B. Prasad

B.TECH. SEMESTER-I (EC/IC/CE/IT/CH/CL)**SUBJECT: ENVIRONMENTAL SCIENCE () (Credits : 3.0)****SYLLABUS & SCHEME**

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T.W.	Total
3	3	0	0	--	0	60	40	--	--	100

Unit : 1 The Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness.

Unit 2 : Natural Resources

Renewable and non renewable resources :

Natural resources associated problems.

- Forest resources : Use and over exploitation, deforestation case studies. Timber extraction , raining , dams and their effects on forests and tribal people.
- Water resources : Use and over utilization of surface and ground water, floods drought, conflicts over water dams benefits and problems.
- Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources : World food problems , changes caused by agriculture overgrazing , effects of modern agriculture, fertilizer pesticide problems, water logging , salinity , case studies.
- Energy resources : Growing energy needs, renewable and non renewable energy resources, case studies.
- Land resources : Land as a resource, land degradation man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems :

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

- Introduction, types , characteristic features, structure and function of the following ecosystem
 - Forest ecosystem
 - Grass land ecosystem
 - Desert ecosystem
 - Aquatic ecosystem (ponds, streams , lakes , rivers, oceans , estuaries)

Unit 4 : Biodiversity and its conservation

Introduction, definition: genetic. Species and ecosystem diversity, Biogeographically classification of India, Value of biodiversity : consumption use , productive use , social ethical, aesthetic, and option values, Biodiversity at global , national and local levels, India as a mega diversity nation, Hotspots of biodiversity, Threats to biodiversity : habitat loss, poaching wildlife, man wildlife conflicts , Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity .

Unit 5 : Environmental pollution :

Definition

Causes effects and control measures

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

Solid Waste Management : Causes , effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution , Pollution case studies, Disaster management :

Unit 6 : Social Issues and the Environment

From unsustainable to sustainable development , Urban problems related to energy, Water conservation, rain water harvesting , watershed management , Resettlement and rehabilitation of people ; its problems and

concerns ,case studies , Environmental ethics : Issues and possible problems, Climate change, global warming , acid rain ozone layer depletion, nuclear accidents and holocaust case studies, Wasteland reclamation, Consumption and waste products, Environment Protection Act, Air (Prevention and control of Pollution) Act, Water (Prevention and control of pollution) Act, Wildlife protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

Unit 7 : Population and the Environment

Population growth , variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV /AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, Case studies

Unit 8 : Field work

Visit to a local area to document environmental assets : river / forest / grassland /hill/mountain, Visit to a local polluted site – Urban / Rural / Industrial / Agricultural, Study of common plants , insects, birds. Study of simple eco systems-pond , river hill slopes etc. (Field work equal to 5 lecture hours)

Reference books

1. Agrawal. K.C. 2001 Environmental Biology, Nidi Public. Ltd. Bikaner.
2. Bharucha Erach :The biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad-380013, India, Email : mapin@icenet.net (R)
3. Brunner R.C. 1989 Hazardous Waste Incineration, Mcgraw Hill Inc. 480p.
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunnigham W.P. Cooper J.H.Gorhani E & Hepworth M.T.2001. Environmental Encyclopedia Jaico. Publ. House, Mumbai 1196p.
6. De.A.K. Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick H. P. 1993. Water in Crisis. Pacific Institute for studies in Dev. Environment Security Stockholm Env. Institute Oxford University Press 473p.
9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood V.H. & Watson R.T. 1995 Global Biodiversity Assessment Cambridge University, Press 1140p
11. Jadhav, H & Bhosale, V M 1995 Environmental Protection and Laws Himalaya Public House, Delhi 284p.
12. Mckinpey M. L. & School, R.M. 1996 Environmental Science Systems & Solutions, Web Enhanced Edition, 639p.
13. Mhanskar A. K. Matter Hazardous Techno-Science Publications (TB)
14. Miller T. G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971, fundamentals of Ecology, W.B. Saunders, Co. USA 574p.
16. Rao M. N. & Datta, A. K. 1987. Waste Water Treatment Oxford & IBH Publications Co. Pvt. Ltd. 345p.

B.TECH. SEMESTER-I (EC/IC/CE/IT/CH/CL)

SUBJECT: BASIC ELECTRICAL & ELECTRONICS ENGINEERING (AF 122) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] FUNDAMENTALS OF CURRENT ELECTRICITY AND DC CIRCUITS:

Introduction, Computation of Resistance at constant temperature, Temperature dependence of Resistance, Computation of Resistance at different temperatures, Ohm's law statement, Illustration and limitation, Kirchhoff's laws-statement and illustration, Resistance in parallel and current division technique, Method of solving a circuit by Kirchhoff's laws.

[B] MAGNETIC CIRCUITS:

Introduction, Definition of Magnetic quantities, Magnetic circuit, Leakage flux, Fringing effect, Comparison between magnetic and electric circuits.

[C] ELECTROMAGNETIC INDUCTION:

Introduction, Magnetic effect of electric current, Current carrying conductor in magnetic field, Law of electromagnetic induction, Induced emf, Self Inductance (L), Mutual Inductance (M), and Coupling coefficient between two magnetically coupled circuits (K).

[D] AC FUNDAMENTALS:

Introduction, Waveform terminology, Concept of 3-phase emf generation, Root mean square (RMS) or effective value, Average Value of AC, Phasor representation of alternating quantities, Analysis of AC circuit.

[E] SINGLE PHASE AC CIRCUITS:

Introduction, j operator, Complex algebra, Representation of alternating quantities in rectangular and polar forms, RL series circuit, RC series circuit, RLC series circuit, Admittance and its components, Simple method of solving parallel AC circuits, Resonance.

[F] ELECTRICAL MACHINES:

Working principles of DC generator, DC motor, Transformer, Three phase Induction Motor.

[G] DIODE THEORY:

Semiconductor theory, Conduction in crystals, Doping source, The unbiased diode, Forward bias, Reverse bias, Linear devices, The diode graph, Load lines, Diode approximations, DC resistance of a diode.

[H] DIODE CIRCUITS:

The sine wave, The transformer, The half wave rectifier, The full wave rectifier, The bridge rectifier, The capacitor input filter, Diode clipper circuits, Diode clamper circuit.

[I] SPECIAL PURPOSE DIODES:

The Zener diode, The Zener regulator, Optoelectronic devices.

Text Books:

1. Basic Electrical, Electronics and Computer Engineering, 2nd Edition
By: R.Muthusubramanian, S.Dslivshsn, K.A.Muraleedharan
Publisher: Tata McGraw Hill
2. Electronics Principles, 6th Edition
By: Albert Paul Malvino
Publisher: Tata McGraw Hill

Ref. Books:

1. Electrical Engineering, 23rd Edition
By: B. L. Theraja
Publisher: S. Chand & Company Ltd
2. Electrical Machines, 23rd Edition
By: B. L. Theraja
Publisher: S. Chand & Company Ltd

B.TECH. SEMESTER - I (EC/IT/CE/IC)

SUBJECT: ELEMENTS OF LINUX OS AND C PROGRAMMING –I (CT116) (Credits : 5.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)					
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1.25 hr.)	Practical	T.W.	Total	Credits
4	4	0	0	2	1	60	40	25	25	150	5

[A] BASICS OF OPERATING SYSTEM

[B] LINUX ARCHITECTURE

Kernel, shell and applications, Features of Linux, Basics of Command: Locating Commands, Types of Commands [Internal and External], Structure of Commands, Getting HELP: Commands like man, whatis, apropos

[C] LINUX USAGE

Logging in to a Linux System, Switching between virtual consoles and the graphical environment, Changing your password, The root user, Editing text files.

[D] GENERAL PURPOSE UTILITY

cal, date, echo, bc, script, who, uname

[E] THE FILE SYSTEM

Linux File Hierarchy Concepts, Some Important Directories, Current Working Directory, File and Directory Names, Absolute and Relative Pathnames, Changing Directories, Listing Directory Contents, Copying Files and Directories, Moving and Renaming Files and Directories, Creating and Removing Files, Creating and Removing Directories,

[F] THE FILE SYSTEM IN-DEPTH

Partitions and Filesystems, Inodes and Directories, cp and inodes, mv and inodes, rm and inodes, Hard Links, Symbolic (or soft) Links, The Seven Fundamental Filetypes, Checking Free Space, Mounting storage devices, Compressing and Archiving Files.

[G] USERS, GROUPS AND PERMISSIONS

Users, Groups, Permission Types, Examining Permissions, Interpreting Permissions, Changing File Ownership, Changing Permissions – Symbolic Method, Changing Permissions – Numeric Method, User and Group ID Numbers, /etc/passwd, /etc/shadow and /etc/group files, User Management tools, System Users and Groups, Default Permissions, Special Permissions for Executables, Special Permissions for Directories.

[H] FINDING AND PROCESSING FILES

locate, locate Examples, find, Basic find Examples, find and logical Operators, find and Permissions, find and Numeric Criteria, find and Access Times, Executing commands with find, find Execution Examples, The GNOME Search Tool.

[I] BASICS OF PROCESS

[J] TEXT EDITOR: VI

[K] SHELL PROGRAMMING

Scripting Basics, Creating Shell Scripts, Generating Output, Handling Input, Exit Status, Control Structures, Conditional Execution, File Tests, String Tests, for and sequences, continue and break, Using positional parameters, handling parameters with Spaces, Scripting at the command line, Shell Script debugging.

[L] OVERVIEW OF C

[M] CONSTANTS, VARIABLES AND DATA TYPES

Constants, Variables & Data types in C, Declaration & Initialization of a variable in C, Basic C programs, Defining symbolic constants in C.

[N] OPERATORS AND EXPRESSIONS

Operators in C, & The ternary Operator, Arithmetic Expressions & Precedence Rule, Type conversion in C, Mathematical Functions.

[O] MANAGING INPUT OUTPUT OPERATIONS

Reading / Writing of characters, Formatted Input operations, Formatted Output operations.

[P] DECISION MAKING AND BRANCHING

Decision making with If & If...else statements, If... else statements (Nested Ladder), The switch & *goto* statements.

[Q] DECISION MAKING AND LOOPING

The while statement, the break statement & the do... while loop, the for loop, Jump within loops - Programs.

Text Books:

1. Unix : Concepts and Applications by Sumitabha Das, 4th Ed., Tata McGraw Hill
2. Programming in ANSI C by Balaguruswamy, 5th Ed., Tata McGraw Hill

Ref. Books:

1. Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
2. Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education
3. Linux Programming By Example : The Fundamentals 1st Edition, Pearson Education

B.TECH. SEMESTER- I (EC/IC/CE/CH/CL)

SUBJECT: ENGINEERING GRAPHICS (AF 115) (Credits : 5.5)

SYLLABUS & SCHEME (w.e.f. 2008-2009)

TEACHING SCHEME - Hr/week						Examination Scheme (Marks)			
L Hrs	C	T hrs	C	P hrs	C	Theory (4 Hrs.)	Sessional (1.5 Hrs)	Prac/Oral	T.W.
4	4	0	0	3	1.5	60	36+4	-----	50

[A] PLANE GEOMETRY, ENGINEERING CURVES:

Construction of curves used in engineering such as Conics(Ellipse, Parabola, Hyperbola) Cycloidal curves - Cycloid, Epi-Cycloid, Hypo-Cycloid, Involutés, Archemedian spirals.

[B] SOLID GEOMETRY:

Projections of Points, Projections of Lines, construction for H.T. & V.T., Applications of projection of points and lines, Projections of regular planes such as square, rectangle, triangle, circle, pentagon, hexagon, rhombus, etc . Projections of Right & Regular Solids (Prisms, Pyramids, Cylinder and Cone).

[C] ORTHOGRAPHIC PROJECTIONS:

First angle projection method and third angle projection method.Dimensioning techniques and methods. Conversion of pictorial views into Orthographic Projections with dimensions.

[D] SECTIONAL ORTHOGRAPHIC PROJECTION:

Orthographic vies with section, types of sections – Full section, Half section, offset section, Local section, Partial section, Conventions adopted for sectional views, interpretation of orthographic views.

[E] ISOMETRIC PROJECTIONS:

Conversion of Orthographic views into Isometric Projections and views.

[F] MACHINE PARTS:

Sketches of various important machine parts with empirical dimensions: Types of threads, Bolts, various types of Nuts, Locking devices for Nuts, Rod connections like Cotter Joint & Knuckle Joint, Shaft Couplings like protected type shaft coupling and pin type flexible coupling, Bearings, Welded Joints, etc.

[G] COMPUTER GRAPHICS:

Introduction to Computer Graphics.

Text Books:

1. Engineering Drawing
By: N. D. Bhatt
2. Engineering Drawing Vol.1 & Vol. 2
By: P.J. Shah

Ref. Books:

1. Fundamentals of Engineering Drawing.
By: Luzadder
2. A Text Book of Geometrical Drawing
By: P. S. Gill
3. A Text Book of Machine Drawing
By: P. S. Gill

B.TECH. SEMESTER- I (EC/IC/CE/IT/CH/CL)

SUBJECT: ENGINEERING MECHANICS (AF 114) (Credits : 4.5)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
3	3	1	1	2	0.5	60	40	25	25	150

[A] STATICS:

Introduction, engineering and S.I.units, accuracy in engineering calculations, Vectors composition and resolution, concept of Rigid Body.

Resultant of a force system:

- i) Concurrent Co planner Force System
- ii) Non-concurrent Co planner Force System
 - (a) Parallel and
 - (b) non parallel

Using analytical as well as graphical methods.

- iii) Simple cases of concurrent force system in space.

Concept of internal force, free body diagram. Equilibrium of force system listed above.

Friction: Friction on an inclined plane, ladder friction, wedge friction, screw friction, belt and rope drive. Centre of gravity of lines, plane figures, volumes, bodies and Pappu's Theorem. Principle of Virtual Work and its application. Types of Beams, Types of Supports, Support Reaction for statically determinate beams.

[B] DYNAMICS:

Rectilinear motion, Circular motion, Projectiles, Relative velocity, Instantaneous centre in plane motion. Laws of Motion, Motion along an inclined plane, Principle of conservation of Momentum, Mass Moment of Inertia in Rotational Motion, Motion of connected bodies, Impulse and Momentum, Impact, work power and Energy, D'Alembert's principle, vibrations of SDOF systems. Motion along a smooth curve and super elevation.

Text Books:

1. Mechanics for Engineers - Statics
By: F. P. Beer and E. R. Johnston Jr.
2. Mechanics for Engineers - Dynamics
By: F. P. Beer and E. R. Johnston Jr.
3. Engineering Mechanics: Statics & Dynamics
By: A. K. Tayal

B.TECH. SEMESTER- I (EC/IC/CE/CH/CL)

SUBJECT: WORKSHOP - I (AF 116) (Credits : 1.5)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
-		-		3	1.5	-	-	-	50	50

[A] INSTRUCTION:

Kinds of wood, types of carpentry tools, carpentry joints, plumbing tools, pipe fittings, tin Smithy and soldering tools.

[B] DEMONSTRATIONS:

Operation of wood working machines.

TERM WORK:

Each candidate shall submit the following term work.

1. Practice job in carpentry ----- one job.
2. Simple carpentry joint ----- one job.
3. Threading of pipe and pipe fittings ----- one job.
4. Tin smithy and soldering ----- one job.

B.TECH. SEMESTER-II (EC/IC/CE/IT/CH/CL)

SUBJECT: MATHEMATICS – II (AF201) (Credits : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T.W.	Total
3	3	1	1	0	0	60	40	--	--	100

[A] PARTIAL DIFFERENTIATION & ITS APPLICATIONS :

Partial derivatives, Homogenous functions Euler's theorem, Total derivatives - Differentiation of implicit functions, Change of variables, errors and approximations, Maxima & Minima of functions of two variables, Lagrange's method of undetermined multipliers.

[B] MULTIPLE INTEGRALS & THEIR APPLICATIONS :

Double integrals, definition evaluation, change of order of integration, double integrals in polar co-ordinates, area enclosed by plane curves, Triple integrals, change of variables, volume of solids.

[C] INFINITE SERIES :

Introduction, Definitions, Convergence, divergence and Oscillation of a series, P-test, Comparison test, Ratio test, Root test, Higher ratio test, Rabbe's test, Log test, Alternating Series, Leibnitz's rule.

[D] COMPLEX NUMBER :

Definition, elementary operations, Argand's diagram, De- Moivre's theorem, and its applications To expand $\sin^n x, \cos^n x$ in powers of $\sin x, \cos x$ respectively, To expand $\sin^n x, \cos^n x$ and $\sin^m x, \cos^m x$ in a series of Sines or Cosines of multiples of x , Hyperbolic functions, Formulae of hyperbolic functions, Inverse hyperbolic functions, Logarithm of complex quantities. Separation of real and imaginary parts. $C + iS$ method.

[E] LAPLACE TRANSFORMS :

Introduction, Definition Transforms of elementary functions, properties of Laplace transforms, Inverse transforms, Note on partial fractions, Transforms of derivatives, Transforms of integrals. Multiplication and division by t , convolution theorem.

Text Book :

1. Higher Engineering Mathematics
By : Dr. B.S. Grewal
Publisher: Khanna publishers, Delhi

Ref. Books :

1. Applied Mathematics for Engineers and Physicists.
By : Pipes & Harvill
Publisher: Tata McGraw Hill
2. Applied Mathematics
By : P. N. & J. N. Wartikar

B.TECH. SEMESTER-I (ALL)**SUBJECT: ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT
() (Credits : 3.0)
SYLLABUS & SCHEME**

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T.W.	Total
3	3	0	0	0	0	60	40	--	--	100

ECONOMICS

[A] Basic Concepts and Definitions: Marshall, Robbins and Samuelsons' Definition of Economics. Positive and Normative Economics. Micro and Macro Economics. Utility, goods and services. Money and wealth. Consumer Surplus and producer's surplus.

[B] Demand Analysis and consumer behaviour: Demand Function, law of demand, elasticity of demand and its types, price, income and cross elasticity. Measures of demand elasticity Factors of production. Advertising elasticity. law of supply, equilibrium between demand & supply Elasticity.

[C] Markets, product pricing and factor pricing: Concept of perfect competition, monopoly and monopolistic competition (meaning and characteristics). Control of monopoly. Price discrimination and dumping. Concept of Duopoly and Oligopoly. Kinky demand curve (price leadership model with reference to oligopoly).

[D] Production, cost and revenue analysis: production and production function, short run and long run production function. Cost analysis, various concepts of cost. Total fixed cost, total variable cost, total cost, average fixed cost, average variable cost, average cost and marginal cost. Opportunity cost. Basic concepts of revenue. Relationship between average revenue and marginal revenue. Break even analysis; meaning, explanation.

[E] Money; meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy- meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR. Functions of central and commercial banks Inflation, Deflation, Stagflation, Monetary and cycles, new economic policy, Liberalization, Globalization, privatization, , fiscal policy of the government,.

MANAGEMENT

[F] Nature of Management : Concept of Management, Management and Administration, Importance of Management, Nature of Management, Management: Science or Art, Management as Profession, Professionalization of Management in India, Universality of Management, Applying Management Theory in Practice, Role of Management Principles, Effective Management

[G] Management Functions and skills : Management Function, Nature of Management Functions, Management Role, Functions at Various level of Management, Top Management, Functions of Board of Directors, Functions of Chief Executive, Middle Management, Supervisory Management, Functional Areas of Management, Management Skills, Top Management Skills, Middle Management Skills, Supervisory Management Skills

[H] Fundamental of Planning : Concept of Planning, Nature of Planning, Importance of Planning, Steps in Planning, Types of Planning, Corporate and Functional Planning, Strategic and Operational Planning, Long term and Short term Planning, Proactive and Reactive Planning, Formal and Informal Planning, Types of Plans, Barriers to Effective Planning, Making Planning Effective, Planning in Indian Organizations

[I] Fundamental of Organizing: Concept of Organization and Organizing, Organization Theory, Classical Organization Theory, Modern Organization Theory: Systems Approach, Modern Organization Theory: Contingency Approach, Factors Affecting Organization Structure, Environment, Strategy, Technology, Size of Organization , People

[J] Fundamental of Directing : Concept of Direction, Principles of Direction, Direction and Supervision, Effective Supervision, Order Giving, Technique of Direction, Directing and Human Factor, Managerial Models

[K] Motivation Theories : Concept of Motivation, Theories of Motivation, Maslow's Need Hierarchy, Herzberg's Motivation-hygiene Theory, McClelland's Needs Theory, McGregor's Theory X and Theory Y, Contingency Approach of Motivation, Motivational Pattern in Indian Organizations,

[L] Controlling: Concept of Controlling, Controlling and Other Functions, Steps in Controlling, Types of Control, Control Areas, Controlling and Management by Exception, Benefits of Management by Exception, Design of Effective Control System

Books For Economics**Text Books:**

1. Modern Economics by H.L. Ahuja.
2. Modern Economic Theory by K.K. Dewett.
3. Monetary Economics by M.L. Seth.

Reference Books:

1. Engineering Economics, R.Paneerselvam, PHIpublication
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins S.P. and Decenzo DavidA.
3. Economics: Principles of Economics, N Gregory Mankiw, CengageLearning
4. Modern Economic Theory, By Dr. K. K. Dewett& M. H. Navalur, S. ChandPublications
5. Introduction to Economics – Caiseneross
6. Managerial Economics – Jean

Books For Management

Reference Books:

1. Principles and Practice of Management By L M Prasad
2. Stoner James A F, Freeman R Edward & Gilbert Jr Daniel R " Management" New Delhi Prentice-Hall of India
3. Koontz Harold &Weihrich Heinz " Essential of Management" New Delhi Tata McGraw Hill
4. Burton Gene &Manab Thakur "Management Today" New Delhi Tata McGraw Hill
5. Robbins Stephen P & Coulter Mary "Management"New Delhi Prentice-Hall of India

B.TECH. SEMESTER- II (EC/IC/CE/IT/CH/CL)

SUBJECT: ELECTRONIC PRINCIPLES (AF 212) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)	Examination Scheme (Marks)
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L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] BIPOLAR TRANSISTOR:

Some basic ideas, Forward-reverse bias, The CE connection, Transistor characteristics, DC load lines, the transistor switch.

[B] TRANSISTOR BIASING CIRCUITS:

Base bias, Emitter-feedback bias, Collector-feedback, Voltage divider bias, Emitter bias, Moving ground around, PNP circuits.

[C] CE AMPLIFIERS:

Coupling and bypass capacitors, The superposition theorem for amplifiers, AC resistance of the emitter diode, AC beta, The grounded emitter amplifier, The AC model of a CE stage, Introduction to h - Parameters & Comparison with T & PI models.

[D] CC AND CB AMPLIFIERS:

The CC amplifier, the AC model of an Emitter Follower, Types of coupling, Direct coupling.

[E] CLASS A AND B POWER AMPLIFIER:

The AC load line of a CE amplifier, AC load lines of other amplifier, Class A operation.

[F] OSCILLATORS:

Theory of sinusoidal oscillation.

[G] FREQUENCY DOMAIN:

The Fourier series, the spectrum of a signal.

[H] FREQUENCY MIXING:

Nonlinearity, Medium-signal, operation with one sine wave, Medium signal operation with Two sine waves.

[I] AMPLITUDE MODULATION:

Basic idea, Percent modulation, AM spectrum, the envelope detector, the super heterodyne Receiver.

[J] DIGITAL CIRCUITS:

Number systems, Complements, Error detecting codes, Boolean algebra, Logic gate ICs, RTL & DTL logic circuits, and Simple Combinational circuits.

Text Books:

1. Electronic Principles, 7th Edition
By: Albert Malvino and David J. Bates
Publisher: Tata McGraw Hill
2. Electronic Principles , 3rd Edition
By: Albert Malvino
Publisher: Tata McGraw Hill
3. Digital Electronics, 1st Edition
By: Morris Mano
Publisher: Prentice Hall of India

Ref. Books:

1. Digital Electronics, 1st Edition
By: Anand Kumar
Publisher: Prentice Hall of India
2. Principles of Electronics, 9th Edition
By: V. K. Mehta and Rohit Mehta
Publisher: S. Chand & Company Ltd

B.TECH. SEMESTER - II (EC/CE/IT/IC)

SUBJECT: C PROGRAMMING– II (CT215) (Credits : 4.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1.25 hr.)	Practical	T.W.	Total
3	3	0	0	2	1	60	40	25	25	150

[A] ARRAYS

One-dimensional arrays, Multi-dimensional arrays, Dynamic arrays

[B] CHARACTER ARRAYS AND STRINGS

String variables, Arithmetic Operations on Characters, Comparison of Strings, String handling functions, Table of Strings

[C] USER-DEFINED FUNCTIONS

Need for user defined functions, A multi-function program, Elements of user defined function, Definition of functions, Return values and their types, Function calls, Function declarations, Functions with arguments, Function with multiple return values, Nesting of functions, Recursion, Passing arrays to functions

[D] STRUCTURES AND UNIONS

Introduction, Structures definition, Giving values to members, Structure initialization, Comparison of structure variables, Arrays of structures, Arrays within structure, Structure and function, Unions, Size of structures, Bit fields.

[E] POINTERS

Introduction, Understanding of pointers, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointers, Pointers expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers on pointers, Pointer as function argument, Functions returning pointer, Pointers to functions, Pointers and structures.

[F] FILE MANAGEMENT IN C

Introduction, Defining and opening a file, Closing a file, Input/output operations on files, Error handling during I/O operations, Random access to files, Command line arguments.

[G] DYNAMIC MEMORY ALLOCATION

Allocating memory, Releasing the used space, Altering size of a block

[H] THE PREPROCESSOR

Macro substitution, File Inclusion, Compiler control directives

Text Book:

1. Programming in ANSI C by Balagurusamy, 5th Ed., Tata McGraw Hill

Ref. Books:

1. Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
2. Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education
3. The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning

B.TECH. SEMESTER-II (EC/IC/CE/IT/CH/CL)**SUBJECT: MECHANICS OF SOLID (AF 214) (Credits : 4.0)****SYLLABUS & SCHEME**

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
3	3	0	0	2	1	60	40	25	25	150

[A] SIMPLE STRESSES AND STRAINS:

Introduction, stress, strain, tensile, compressive and shear stresses, Elastic limit, Hooke's law, Poisson's Ratio, Modulus of Elasticity, Modulus of Rigidity, Bulk Modulus, Bars of Varying sections, Extension of tapering rods, Bars of uniform strength, temperature stresses, Hoop stress, stress on oblique sections, State of simple shear, Relation between Elastic constants.

[B] MECHANICAL PROPERTIES OF MATERIALS:

Ductility, Brittleness, Toughness, Malleability, Behavior of ferrous and non ferrous metals in tension and compression, shear and bending tests, Standard test pieces, Influence of various parameters on test results, True and nominal stress, Modes of failure, Characteristic stress-strain curves, Strain hardening, Hardness, Different methods of measurement, Izod, Charpy and tension impact tests, Fatigue, Creep, Correlation between different mechanical properties, Effect of temperature. Testing machines and special features, Different types of extensometers and compress meters, Measurement of strain by electrical resistance strain gauges.

[C] BENDING MOMENT AND SHEAR FORCE:

Bending moment, shear force in statically determinate beams subjected to uniformly distributed, concentrated and varying loads. Relation between bending moment, shear force and rate of loading.

[D] MOMENT OF INERTIA:

Concept of moment of Inertia, Moment of Inertia of plane areas, polar moment of Inertia, Radius of gyration of an area, Parallel Axis theorem, Moment of Inertia of composite Areas, product of Inertia, Principal axes and principal Moments of Inertia.

[E] STRESSES IN BEAMS:

Theory of simple bending, Bending stresses, moment of resistance, modulus of section, Built up and composite beam section, Beams of uniform strength, Distribution of shear stress in different sections.

[F] TORSION:

Torsion of circular, solid and hollow section shafts, shear stress angle of twist, torsional moment of resistance, power transmitted by a shaft, keys and couplings, combined bending and torsion, close coiled helical springs.

[G] PRINCIPLE STRESSES AND STRAINS:

Compound stresses, principle planes and principle stresses, Mohr's circle of stress, principle strains, Angle of obliquity of resultant stresses, principle stresses in beams, principle stresses in shafts subjected to bending, torsion and axial force.

Text Books:

1. Strength of Materials
By: Timoshanko (Vol.1 & 2)
2. Strength of Material
By: Popov
3. Mechanics of Structure
By: Junnarkar S.B.
4. Strength of Materials
By: S. Ramamrutham.

B.TECH. SEMESTER- II (EC/IC/CE/IT/CH/CL)

SUBJECT: HEAT POWER (AF 215) (Credits : 4.0)

SYLLABUS & SCHEME (w.e.f. 2009-2010)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory	Sessional	T.W	Viva	Total
3	3	0	0	2	1	60	40	25	25	150

[A] PROPERTIES OF STEAM:

Distinction between gas and vapour, sensible heat, latent heat, total heat and super heat of steam, condition of steam, dryness fraction, methods of determination of dryness fraction, internal energy of steam, specific volume, critical pressure and temperature.

[B] PROPERTIES OF GASES:

Zeroth, first and second laws of thermodynamics, laws of perfect gases(Boyle's law, Charle's law, Regnault's law, Joule's law), Characteristic equation of gas, gas constants, internal energy, specific heat at constant pressure and specific heat at constant volume, relationship between specific heats, thermodynamic processes of perfect gases.

[C] FUELS & COMBUSTION:

Solid, liquid and gaseous fuels used for boilers and I.C. engines, combustion of fuels, air required, products of combustion of fuel, analysis of flue gases, calorific value of fuels and its determination.

[D] BOILERS:

Classification of boilers, Cochran & Babcock-wilcox boiler, boiler mountings and accessories, draught (Natural & Artificial).

[E] I. C. ENGINES:

Prime movers, classification of prime movers with examples of each classes, advantages of I.C. engines over E.C. engines, classification of I.C. engines, thermodynamic air cycles (Carnot cycle, Constant volume auto cycle, Constant pressure Joule cycle, Diesel cycle), Air standard efficiency, construction and working of 2-stroke and 4-stroke cycle engines, P-v diagrams, determination of I.P., B.P., fuel supply in I.C. engines, ignition system of I.C. engines, Cooling of I.C. engines, Lubrication & governing of I.C. engines.

[F] SOLAR ENERGY:

Introduction to solar energy systems.

TERM WORK:

Term – work shall be based on the above syllabus.

Text Books:

1. Elements of Heat Engines (S.I. Units)
Vol- 1
By: R. C. Patel & C. J. Karamchandani
Publisher: Acharya Book Depo
2. Elements of Heat Engines (S.I. Units)
By: N. C. Pandya & C. S. Shah
Publisher: Charotar publishing house

Ref. Books:

1. Heat Engine
By: P. L. Ballaney
2. A Course in Thermodynamics and Heat Engines
By: Kothandraman

B.TECH. SEMESTER-II (EC/IC/CE/IT)

SUBJECT: ELECTRONIC WORKSHOP (CT216) (Credits : 1.5)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
-	-	-	-	3	1.5	-	-	-	50	50

EXPERIMENT LIST

4. Introduction to Electrical Components: switches, MCB, ELCB, Tube light, bulb, parallel connection of electrical components, wiring in fan and motor.
5. Introduction to Electronic Components: active and passive components.
6. Use of basic source & measuring instruments (Power supply, function generator, CRO, DMM)
7. Measure voltage, current, frequency, phase difference, power, power factor for single and three phase supply.
8. Identify various types of ports, cables and connectors.
9. Linux Installation
10. Network Cabling and Crimping for wired and wireless network.
11. PCB Layout design(like proteus) Software Installation and layout design using the same.
12. PCB layout design and manufacturing process.
 1. Solder and de-solder electronic components on PCB
 2. Identify and rectify open circuit and short circuit faults in PCB/system.
13. Test assembled electronic circuit for various parameters and faults.

MINI PROJECT:

Apart from above experiments a group of students has to undertake a mini project. Following are some examples for the same.

1. To design a device for charging small battery during door opening and closing.
2. To design a mobile charger using solar PV cell panel for offices and house hold.
3. To design/develop an electronic weighing machine.
4. To design/develop an electronic lock for house in the workshop.
5. To design/develop an innovative electrical bell using electronics components.

Ref. Books:

1. Electronic Principles, Albert Malvino and David J. Bates, Mc. Graw Hill(7th edition)
2. Electronic Devices, Thomas L. Floyd, Person(7th edition)

B.TECH. SEMESTER-III (EC/IC/CE/IT/CH/CL)

SUBJECT: MATHEMATICS – III (AF301) (Credits : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T/W	Total
4	4	0	0	0	0	60	40	--	--	100

[A] FOURIER SERIES:

Euler's Formulae, condition for a Fourier expansion, functions having points of discontinuity, change of interval, odd & even functions, Expansion of odd & even periodic functions, Half-range series, practical harmonic analysis.

[B] NUMERICAL METHOD:

Solution of algebraic and transcendental equations, by Newton - Raphson method, Direct iteration method, false position method, Solution of linear simultaneous equation : (1) Gauss - elimination (2) Gauss - Jordan (3) Gauss - Siedal method , Numerical methods to solve first order and first degree ordinary differential equations by Picard's method & Taylor's series method, Euler's Method, Modified Euler's Method, Milne's Method, Runge's method, Runge kutta method.

[C] DIFFERENTIAL EQUATIONS:

Linear differential equations of higher order with constant coefficients, equations reducible to linear equations with constant coefficients, Simultaneous linear equations with constant coefficients. Application to engineering problems. Series solution of differential equations of the second order with variable coefficients.

[D] PARTIAL DIFFERENTIAL EQUATIONS:

Introduction, formation, linear equation of first order, non- linear equations of first order-Charpit's method, homogenous linear equations with constant coefficient to find the complementary functions & the particular integral, non- homogenous linear equations with constant coefficients. Monge's Method, Method of separation of variables - vibrating string problem, Heat flow equation etc.

[E] LAPLACE TRANSFORMS:

Application to differential equation, simultaneous linear equation with constant coefficients.

Text Book:

1. Higher Engineering Mathematics
By : Dr. B. S. Grewal

Ref. Books:

1. A Text Book of Applied Mathematics
By : P.N. & J.N. Wartikar
2. Mathematics for Engineering
By : Chandrika Prasad
3. A Text Book of Engineering Mathematics
By : Dr. K. N. Srivastva & G. K. Dhawan

B.TECH. SEMESTER-III (EC/IC)

SUBJECT: LINEAR ELECTRONICS – I (CI 308) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] JUNCTION-DIODE CHARACTERISTIC:

The Temperature Dependence of the V/I Characteristics, Diode Resistance, Space-Charge, or Transition Capacitance C_T , Charge controlled Description, Diffusion Capacitance, Junction-Diode Switching Times, Breakdown Diodes, Tunnel Diodes, Sampling gate.

[B] BIPOLAR TRANSISTOR CHARACTERISTICS:

The Junction Transistor, Transistor Current Components, The Transistor as an Amplifier, Transistor Construction, The Common-Base (CB) Configuration, The Common-Emitter (CE) Configuration, The CE Cutoff Region, Currents, The CE Saturation Region, Typical Transistor-Junction Voltage Values Common-Emitter Current Gain, Common Collector Configuration, Inverted Mode of Operation, Transistor Ratings, Additional Transistor Characteristics, Transistor Switching Times.

[C] TRANSISTOR BIASING & THERMAL STABILIZATION:

The Operating Point of a BJT, Bias Stability, Self-Bias or Emitter Bias, Stabilization against Variations in I_{CO} , V_{BE} and β , Bias compensation, biasing technique for linear integrated circuits, Thermistor & Sensor Compensation

[D] FREQUENCY RESPONSE OF AMPLIFIERS:

Transistor Hybrid Model, The h Parameters, Conversion Formula For The Parameters of the Three Transistor Configurations, Analysis of Transistor Amplifier Circuit Using h Parameters, The Emitter Follower, Comparison of Transistor Amplifier Configurations, Miller's Theorem and its Dual, The Hybrid Pi Common Emitter Transistor Model at high Frequency, Hybrid Pi Conductance's, Hybrid Pi Capacitances, Validity of Hybrid Pi Model, Variation of Hybrid Pi Parameters, The CE Shot Circuited Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, The Gain Bandwidth Product, Emitter Follower At High Frequency, Step Response of an Amplifier, Band pass of Cascaded Stages.

[E] INTEGRATED-CIRCUITS: FABRICATION AND CHARACTERISTICS

Integrated Circuit (Microelectronic) Technology, Basic Monolithic Integrated Circuits, Epitaxial Growth, Masking and Etching, Diffusion of Impurities, Transistors for Monolithic Circuits, Monolithic Diodes, The Metal Semiconductor Contact, Integrated Resistors, Integrated Capacitors, Characteristics of Integrated Components.

[F] FIELD-EFFECT TRANSISTORS:

Construction & characteristics of JFETs, Transfer characteristics, Depletion type MOSFET, Enhancement-type MOSFET, MOSFET Handling, VMOS,CMOS,JFET biasing circuits, Depletion-type MOSFET biasing circuits, Enhancement-type MOSFET biasing circuits, FET Small signal model, AC analysis of different types of biased FET amplifiers.

Text Books:

1. Integrated Electronics, 1st Edition
By: Millman & Halkians
Publisher: Tata McGraw Hill
2. Electronic Devices & Circuit Theory, 8th Edition
By: Robert L. Boylestad & Louis Nashelsky
Publication: Prentice Hall of India

Ref. Book:

1. Integrated Circuits, 9th Edition
By: K. R. Botkar
Publication: Khanna Publications

B.TECH. SEMESTER- III (EC)

SUBJECT: ELECTRONIC INSTRUMENTATION (EC 302) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2015)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] DIRECT-CURRENT INDICATING INSTRUMENTS:

Suspension Galvanometer, Torque and Deflection of the Galvanometer, Permanent-Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, voltmeter- Ammeter Method of Measuring Resistance, Series-Type Ohmmeter Shunt-Type ohmmeter, Multimeter or VOM, Calibration of DC Instruments, Alternating-Current indicating instruments Thermo instruments, Electrodynamometers in Power Measurements Watt-hour Meter, Power-Factor Meter, Instrument Transformers.

[B] BRIDGES AND THEIR APPLICATION:

Introduction, Wheatstone Bridge, Kelvin Bridge, Guarded Wheatstone Bridge, AC Bridges and Their Application, Comparison Bridges, Maxwell Bridge, Hay Bridge, Schering Bridge, Unbalance Conditions, Wien Bridge, Wagner Ground Connection, Potentiometer.

[C] ELECTRONIC INSTRUMENTS FOR MEASURING BASIC PARAMETERS:

Amplified DC Meter, AC Voltmeter Using Rectifiers, True RMS- Responding Voltmeter, Electronic Multimeter, Considerations in Choosing an Analog Voltmeter, Differential Voltmeters, Digital Voltmeters, Component Measuring Instruments, Q Meter, Vector Impedance Meter, Vector Voltmeter, RF Power and Voltage Measurement.

[D] OSCILLOSCOPES:

Introduction, Oscilloscope Block Diagram, Cathode Ray Tube CRT Circuits, Vertical Deflection System, Delay Line, Multiple Trace, Horizontal Deflection System, Oscilloscope Probes and Transducers, Oscilloscope Techniques, Special Oscilloscopes.

[E] CONTROL ACTIONS AND CONTROLLERS:

Control Actions like P, PI, PD & PID, Electronic controllers, Characteristics of different types of Control Valves.

[F] INDUSTRIAL INSTRUMENTATION:

Measurement schemes for Temperature, Pressure, Level & Flow with their industrial applications, Distributed control system (DCS), Programmable Logic Controller (PLC)

Text Book:

1. Electrical & Electronic Measurement & Measuring Instruments, 17th Edition
By: A.K. Sawhney
Publisher: Dhanpat rai

Ref. Books:

1. Electronic Instrumentation and Measurement Technique, 5th Edition
By: William D. Cooper & Albert D. Helfrick
Publisher: Prentice Hall of India
2. Electronics Measurement & Instrumentation, 1st Edition
By: R.K.Rajput
Publication: S. Chand & Company Ltd
3. Electronic Instrumentation, 2nd Edition
By: H.S.Kalsi
Publication: Tata McGraw Hill

B.TECH. SEMESTER-III (EC/IC/CE/IT)

SUBJECT: NETWORK ANALYSIS (EL 304) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] DEVELOPMENT OF THE CIRCUIT CONCEPT:

Introduction, Charge and Energy, The Relationship of Field and Circuit Concepts, The Capacitance Parameter, The Inductance Parameter, The Resistance Parameter, Units and scaling, Approximation of a Physical System as a circuit.

[B] CONVENTIONS FOR DESCRIBING NETWORKS:

Reference Directions for Current and Voltage, Active Element Conventions, The Dot Convention for Coupled Circuits, Topological Description of Networks.

[C] NETWORK EQUATIONS:

Kirchhoff's Laws, The Number of Network Equations, Source Transformations, Examples of the Formulation of Network Equations Loop Variable Analysis, Node Variable Analysis, Determinants: Minors and the Gauss Method, Duality.

[D] INITIAL CONDITIONS IN NETWORKS:

Introduction, Initial Conditions in Elements, Geometrical Interpretation of Derivatives, A Procedure for Evaluating Initial Conditions, Initial State of a Network, Application of Laplace Transform to solution of 1st and 2nd order differential equations arising in electrical circuits.

[E] FIRST ORDER DIFFERENTIAL EQUATIONS:

General and particular solutions, Time constants, the integrating factor.

[F] SOLUTION OF DIFFERENTIAL EQUATIONS:

Classical method of solution of first order and second order differential equations. Solution of first order and higher order differential equations using Laplace Transformation.

[G] TRANSFORMS OF SPECIAL SIGNAL WAVEFORMS:

The Shifted Unit Step Function, The Ramp and impulse Functions, Waveform Synthesis, The Initial and Final Value of $f(t)$ from $F(s)$, The Convolution Integral, Convolution as Summation.

[H] IMPEDANCE FUNCTIONS AND NETWORK THEOREMS:

The Concept of Complex Frequency, Transform Impedance and Transform Circuits, Series and Parallel Combinations of Elements, Superposition and Reciprocity, Thevenin's Theorem and Norton's Theorem.

[I] NETWORK FUNCTIONS: POLES AND ZEROS

Terminal Pairs or Ports, Network Functions for One Port and Two port. The Calculation of Network Function (1) Ladder Networks (2) General Networks, Poles and Zeros of Network Functions, Restrictions on Pole and Zero Locations for Driving-Point Functions Restrictions on Pole and Zero locations for Transfer Functions, Time-domain Behavior from the Pole & zero plot

[J] TWO PORT NETWORKS:

Relationship of two port variables, short circuit admittance parameters, the open circuit impedance parameters, transmission parameters, the hybrid parameters, relationship between parameter sets, parallel connection of two port networks.

Text Books:

1. Network Analysis, 3rd Edition
By: M.E. Van Valkenburg
Publisher: Prentice Hall of India
2. Network Analysis and Synthesis, 3rd Edition
By: U. A. Patel
Publisher: Mahajan Publication House

Ref. Book:

2. Circuit Theory- Analysis & Synthesis, 1st Edition
By: A. Chakrabarti
Publication: Dhanpat rai & Company

B.TECH. SEMESTER- III (EC)

SUBJECT: CONTROL THEORY (EC 316) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

Open loop and closed loop control system, Servomechanism, Historical development of control system, sampled data & digital control system, Multivariable control system, Application in non engineering field.

[B] MATHEMATICAL MODEL OF PHYSICAL SYSTEMS

Introduction, Differential equation of physical systems, Transfer functions, Block diagram algebra, signal flow graph.

(Note: Problems on electrical, mechanical & electromechanical systems only.)

[C] FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS:

Time response, Time domain specifications, steady state and generalized error co- efficient.

[D] TIME DOMAIN ANALYSIS:

Introduction, Standard test signals, Time response of First & Second order system, Steady state error & error constants and generalized error co- efficient (series).

[E] CONCEPT OF STABILITY AND ALGEBRAIC CRITERION:

The concept of stability, Necessary conditions for stability, Hurwitz's & Routh's stability criterion, Relative stability Analysis.

[F] ROOT LOCUS TECHNIQUE:

Introduction, Rules of construction of root loci, sketching of root locus and applications.

[G] FREQUENCY DOMAIN ANALYSIS:

Frequency domain specifications, correlation between time and frequency domain specifications, Bode plot, Polar plot.

[H] STABILITY ANALYSIS IN FREQUENCY DOMAIN:

Introduction, Mathematical Preliminaries, Nyquist Stability Criterion, Relative stability Analysis, Close Loop Frequency Response, Constant M & N Circles, Nichol's chart, Sensitivity Analysis in Frequency Domain.

Text Books:

1. Control System Engineering
By: Nagrath & Gopal
2. Automatic Control Systems
By: S. N. Verma

Ref. Books:

1. A Course in Control Engineering
By: A. Subbarao & Parag R. Desai
2. Modern Control Engineering
By: K. Ogata
3. Feedback Control Systems
By: Di Staffeno

B.TECH. SEMESTER-IV (EC/IC/CE/IT/CH/CL)

SUBJECT: MATHEMATICS – IV (AF 401) (Credits : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs)	Sessional (1 hr)	Practical	T/W	Total
4	4	0	0	0	0	60	40	--	--	100

[A] FUNCTIONS OF COMPLEX VARIABLE:

Analytic functions, Cauchy -Riemann equations, Harmonic functions, orthogonal system, complex potential function, Determination of conjugate function, conformal transformation, some standard transformations, bilinear transformation, line integral, properties of complex integration, Cauchy's theorem and Cauchy's integral formula.

[B] MATRICES:

Fundamental concepts, operations, associated matrices, matrix method of solution of simultaneous equations, Rank of matrix, Linear dependence of vectors, consistency of a system of linear equations, characteristic equation, eigen roots & eigen vectors, Cayley - Hamilton theorem. Reduction of quadratic form to canonical form.

[C] FINITE DIFFERENCES & DIFFERENCE EQUATIONS:

Finite difference, Interpolation, Newton's forward and backward and central differences and Lagrange's formula, Sterling & Bessel's formula, Numerical differentiation & Integration, Trapezoidal rule, Simpson's (both) rules, Difference equations with constant coefficient. Z transform.

[D] VECTOR CALCULUS:

Vector function of a single scalar variable, Differentiation of vectors, simple applications to plane, motion, scalar and vector point functions, Del applied to scalar point function (gradient) Divergence of a vector point function, curl of a vector, second order expressions, line integrals, surface integrals, Green's theorem, Gauss theorem and stoke's theorem.

[E] STATISTICAL METHODS:

Binomial distribution, poisson distribution, normal distribution, calculation of errors, probable errors, standard error, coefficient of correlation, lines of regression.

Text Book:

1. Higher Engineering Mathematics
By : Dr. B.S.Grewal

Ref. Book:

1. A Text Book of Applied Mathematics
By : P.N. & J.N. Wartikar & Chandrika Prasad.

B.TECH. SEMESTER-IV (EC/IC)

SUBJECT: LINEAR ELECTRONICS – II (CL 418) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] POWER CIRCUITS AND SYSTEMS:

Amplifier Classification, Distortion in Amplifiers, Large-Signal Amplifiers, Harmonic Distortion, , Efficiency of a Class A Amplifier, Push-Pull Amplifiers, Class B amplifiers, Class AB Operation, Regulated Power Supplies, Series Voltage Regulator.

[B] FEEDBACK AMPLIFIER CHARACTERISTIC:

Classification of amplifiers, the feedback concept, The Transfer Gain with Feedback, General Characteristics of negative-feedback amplifiers, Input Resistance, Output Resistance, Method Analysis of a feedback amplifier, Voltage-series feedback, Current-series feedback, Current -Shunt feedback, Voltage-shunt feedback.

[C] OSCILLATORS USING TRANSISTOR:

Sinusoidal Oscillators, The phase-shift Oscillators, Resonant-circuit Oscillators, A general form of Oscillator circuits, Colpitt's Oscillator, Hartley's Oscillator, Clapp's Oscillator, Crystal Oscillators.

[D] OPERATIONAL AMPLIFIER CHARACTERISTICS:

Differential amplifier, DC and AC analysis of bipolar differential Amplifier, The ideal operational amplifier, Inverting and Non-inverting Amplifiers, Op-Amp Parameters, Measurement of Op-Amp Parameters, General description of various stages of Op-Amp, Open-loop and Closed-loop Frequency response, Op-Amp Stability, Frequency Compensation.

[E] LINEAR APPLICATIONS OF OP-AMP:

Summing and Difference amplifiers, Integrator and Differentiator, Current-to-voltage converters, Voltage-to-current converters, Current Amplifiers, Voltmeters and Current meters, Instrumentation Amplifiers, Transducer Bridge Amplifiers, Ideal and realistic frequency response of various filters, Basic first-order low-pass and high-pass filters, first order wideband band pass filters(phase-shifter), Second-order low-pass filters, Second-order high-pass filters, Second-order Band-pass filters, Second-order Band-reject filters.

[F] NON-LINEAR APPLICATIONS OF OP-AMP:

Precision half-wave rectifiers, Precision full wave rectifiers, Log amplifiers, Antilog amplifiers, Zero crossing detector, level detectors, Voltage magnitude comparator and window detector, Basic peak detectors using Op-Amps and comparators, Basic Sample and Hold circuits, Digital-to-Analog (D/A) Converters, Analog-to- Digital (A/D) Converters.

[G] WAVESHAPING & WAVEFORM GENERATORS:

The Op-Amp as Voltage comparator, Some Applications of a comparator using Op-Amp, Schmitt trigger circuit, Basic Triangular wave generator, Astable and Monostable multivibrator using Op-Amp, Introduction to 555 Timer, Timer 555 used in Astable and Monostable mode.

Text Books:

1. Integrated Electronics, 1st Edition
By: Millman & Halkians
Publisher: Tata McGraw Hill
2. Op- Amp and Linear Integrated Circuits, 4th Edition
By: Ramakant A. Gayakwad.
Publication: Pearson Education

Ref. Book:

1. Integrated Circuits, 9th Edition
By: K. R. Botkar
Publication: Khanna Publications

B.TECH. SEMESTER-IV (EC)

SUBJECT: OBJECT ORIENTED PROGRAMMING (EC 404) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2009)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

Comparison of C & C++, OOP concepts, OOP concepts (cont.), Introduction to programming in C ++ & features, Input output operations using cin & cout.

[B] DATA TYPES AND OPERATORS:

Data types & operators.

[C] LOOPS AND DECISIONS:

Branching operations in C++, Looping operations in C++.

[D] FUNCTIONS:

Simple functions, Passing arguments & returning values from functions, Function overloading in C++, default arguments.

[E] OBJECTS AND CLASSES:

Comparison of structure and class, Concept of classes and objects, Concept of constructor & destructor, Passing and returning objects, Static data members and functions.

[F] ARRAYS:

Arrays in c++ including string as an array of characters, Array of objects & array within a class.

[G] OPERATOR OVERLOADING:

Operator overloading of unary operator, Operator overloading of binary operator, Conversion from basic to user defined, Conversion from user defined to basic & user defined to user.

[H] INHERITANCE:

Inheritance defined, Concept of Inheritance, single inheritance, Derived class constructor, function overriding, Hierarchical & Multilevel inheritance, Multiple inheritance, constructor in multiple inheritance.

[I] POINTERS:

Introduction to pointers & pointer to an object, Pointers & Arrays , Pointers & functions, Memory management using new & delete, Pointer to a pointer.

[J] VIRTUAL FUNCTIONS:

Friend function, Member function as friend and friend class, Overloading of = and [] (array index) operator, Containership, this pointer, Hybrid inheritance, virtual base class, Virtual functions, dynamic binding, Introduction to stream classes, Basic file operations, Handling of file pointers & command line arguments.

[K] HARDWARE INTERFACING:

Study of parallel port registers, inportb () and outportb () function calls, Programming parallel port of a PC, LED & Relay interfacing with a PC, Project development. Serial port interfacing basics.

[L] TEMPLATES & EXCEPTION HANDLING:

Template programming, Study of various Exception classes, Exception handling mechanisms, Generation of Exceptions.

Text Book:

1. Programming with ANSI C++
By: Bhushan Trivedi
Publication: Oxford Press

Ref. Books:

1. Object Oriented Programming in Turbo C++, 1st Edition
By: Robert Lafore
Publication: Galgotia Publications
2. Let us C++, 1st Edition
By: Yashwant Kanetkar
Publication: BPB

B.TECH. SEMESTER-IV (EC/IC)

SUBJECT: ELECTRICAL MACHINES & POWER (CI 416) (Credits : 5.0)

SYLLABUS & SCHEME (w. e. f. - 2015)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

PART-I: ELECTRICAL MACHINES

[A] DC MACHINES:

Generator : Types of Generator, Iron Losses in Armature, Total Losses in Gen., Stray Losses, Constant Losses (losses), power stages, condition for maximum efficiency and power, No load saturation characteristics, load saturation curve, internal, external characteristics of separately excited generator, critical speed & resistance. All of these characteristics without mathematical treatment.

DC motor: Principle and basic theory

[B] AC MACHINES:

Transformer: (1 phase Transformer) Working principle, construction, elementary theory of ideal transformer, E.M.F. equation, transformer on no load and load, transformer with winding resistance but no magnetic leakage, equivalent resistance, magnetic leakage, transformer with leakage reactance and resistance, exact volt drop, equivalent circuit, O.C. & S.C. tests, efficiency & regulation, why transformer are rated in kva?, losses, condition for maximum efficiency, all day efficiency, concepts of auto transformer, define bucholz relay, basic of 3-phase transformer & their types of connections

Three Phase Motors: Classification, merits & demerits, construction, why does rotor rotate, slip, frequency of rotor current, Relation between torque & rotor p.f., starting torque of squirrel cage & slip ring motors, condition for maximum starting torque, effect of change in supply voltage on starting torque, torque slip characters, effect of voltage on torque & speed, Induction motor as a generator, power stages, torque, mechanical power & rotor output, analogy with mechanical clutch & d.c. motor, Linear Induction motor.

AC Starter: DOL Starter, primary res. Starter, Auto transformer, Star delta (only theory).

Single Phase Motors: Types, Double Field Revolving Theory, Making motor self starting, A.C. Series, Universal motors.

Alternators: Basic principle, difference with D.C. generator, construction, damper winding, factors affecting alternator size, Alternator on load, synchronous reactance, vector diagram of a loaded Alternator, determination of voltage regulation by EMF method, Parallel operation of alternators.

PART-II: ELECTRICAL POWER

[A] GENERATING STATIONS:

schematic arrangement of Power plants- thermal, hydro, nuclear, diesel And gas turbine.

[B] VARIABLE LOAD ON POWER STATIONS:

Structure of electric power system, load curves, important terms and factors, unit generated per annum, load duration curves, types of loads, typical demand and diversity factors.

[C] POWER FACTOR IMPROVEMENT:

Power factor, power triangle, Disadvantage of low pf, causes, (Significance of low and high power factor), (Kvar) calculations, power factor improving equipment, importance of p.f. improvement, Most economical power factor.

[D] MECHANICAL DESIGN OF OVER HEADING LINES:

Main components, conductor materials, line supports, types of insulators, string Efficiency and its improvement.

[E] PERFORMANCE OF TRANSMISSION LINE:

Classification of overload transmission line, important terms, Performance of short transmission line.

[F] UNDER GROUND CABLES:

Construction of cables, insulating materials, classification.

[G] INTRODUCTION TO SWITCH GEAR:

Switchgear, essential features of switchgear, switchgear equipments, busbar arrangement, short-circuit currents, faults in power system.

[H] CIRCUIT BREAKER:

Arc phenomenon, principle and methods of arc quenching, important terms

[I] FUSES:

Fuses, desirable characteristics of fuse element, Fuse element material, important terms, and types of fuse.

[J] RELAY:

Protective relays, Fundamental requirements of protective relaying, relay timing, important terms, time/P.S.M. curve, and calculation of relay operating time.

[K] PROTECTION OF ALTERNATORS & TRANSFORMERS:

differential protection of alternators, Protection of transformer, earth-fault protection

Text Books:

1. Electrical Technology (Vol: II), 23rd Edition
By: B. L. Theraja
Publisher: S. Chand & Company Ltd

2. Electrical Power, 1st Edition
By: V. K. Mehta
Publisher: S. Chand & Company Ltd

Ref. Books:

1. Theory and Performance of Electrical Machine, 13th Edition
By: V.B. Gupta
Publication: Laxmi

2. Electrical Engineering , 1st Edition
By: R.K. Rajput
Publication: Laxmi

3. Course in Power System , 10th Edition
By: J. B. Gupta
Publication: S. K. Kataria & Sons

4. Switchgear and Protection, 2nd Edition
By: J. B. Gupta
Publisher: S. K. Kataria

B.TECH. SEMESTER-IV (EC)

SUBJECT: DIGITAL ELECTRONICS (EC 403) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION TO LOGIC CIRCUITS:

Logic Gates & Networks, Truth Tables, Boolean algebra, Synthesis using AND, OR and NOT gates, NAND – NOR logic Networks, Sum of Products and Product of Sums forms, Introduction to Verilog.

[B] IMPLEMENTATION TECHNOLOGY:

Transistor Switches , nMOS & CMOS logic gates, Negative Logic Systems, Introduction to PAL, PLA , CPLD & FPGAs, MOSFET fabrication, Voltage Levels in Logic Gates, Noise Margin, Dynamic Operation & Power Dissipation in logic gates, Fan-in and Fan-out, Transmission Gates, Transistor-Transistor Logic, Emitter - Coupled logic.

[C] OPTIMIZED IMPLEMENTATION OF LOGIC FUNCTIONS:

Karnaugh Map strategy for minimization, Minimization of POS forms, Multiple output circuits, Multilevel Synthesis, Analysis of Multilevel Synthesis.

[D] COMBINATIONAL CIRCUITS:

Multiplexers, Decoders, Encoders, Code converters, Arithmetic comparison circuits,

[E] SEQUENTIAL CIRCUITS:

Basic Latch, Gated SR Latch, Gated D Latch, Master Slave & Edge Triggered D Flip-Flops, T & JK Flip Flops, Registers , Counters, Reset synchronization, BCD- Ring –Johnson Counters.

[F] SYNCHRONOUS SEQUENTIAL CIRCUITS:

Basic design steps, Mealy State Model, Design of counter, FSM as an arbiter circuit, Analysis of Synchronous Sequential Circuits.

Text Book:

1. Fundamentals of Digital Logic with Verilog Design, 1st Edition
By: Stephen Brown & Zvonko Vranesic
Publisher: Tata McGraw Hill

Ref. Books:

1. Digital Logic and Computer Design, 1st Edition
By: Morris Mano
Publisher: Prentice Hall of India
2. Fundamental of Digital Circuits, 1st Edition
By: Anand Kumar
Publisher: Prentice Hall of India

B.TECH. SEMESTER-IV (EC)

SUBJECT: APPLIED MATHEMATICS (EL 405) (Credits : 1.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
0	0	0	0	2	1	0	0	25	25	25

[A] LIST OF EXPERIMENTS:

- (1) Application of transforms in describing Electronic systems.
- (2) Effect of Fourier Series Truncation on a Square Wave.
- (3) To find spectrum of signal using Discrete Fourier Transform(DFT) and its implementation using matrices.
(Assignment:-Find out the telephone number pressed using FFT)
- (4) (a) To evaluate the capacitance of square plate with unit area.
(b) To evaluate the capacitance of parallel plates with unit area.
- (5) Application of Differential equation for finding response of networks.
- (6) Application of Numerical methods for finding out the Poles & Zeros of a system.
- (7) To implement Baseband Modulation using complex number.
- (8) Application of Linear Algebra in Digital Communication.
- (9) Use of SIMULINK for implementation of a Feedback System.
- (10) To implement Linear Block Code using matrix operation.
- (11) To study Convolution Coding.
- (12) To study convergence in Adaptive Signal Processing.

B.TECH. SEMESTER-V (EC)

SUBJECT: MICROCONTROLLER & APPLICATIONS (EC 511) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f DEC. 2015)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] MICROPROCESSORS AND MICROCONTROLLERS:

Introduction, Microprocessors and Microcontrollers, The Z80 and the 8085, A Microcontroller survey., Development systems for Microcontrollers.

[B] THE 8051 ARCHITECTURE:

Introduction, 8051 Microcontroller Hardware, Input/Output pins, ports and circuits, External memory, Counter and timers, Serial data input/output, Interrupts.

[C] MOVING DATA:

Introduction, Addressing Modes, External data moves, Code memory read only data moves, Push and Pop opcodes, Data exchanges.

[D] LOGICAL OPERATIONS:

Introduction, Byte-level logical operations, Bit-level logical operations, Rotate and Swap operations.

[E] ARITHMETIC OPERATIONS:

Introduction, Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal arithmetic.

[F] JUMP AND CALL INSTRUCTIONS:

Introduction, The jump and call program range, Jump types, Call and Subroutines, Interrupts and Returns, Enabling, Disability & Priority in interrupts.

[G] AN 8051 MICROCONTROLLER DESIGN:

Introduction, A Microcontroller specification, A Microcontroller Design, Testing the design, Subroutines., Lookup tables for the 8051, Serial data transmission.

[H] APPLICATIONS:

Introduction, Keyboards, Displays, Pulse Measurement, D/A and A/D conversions, Case Study.

[I] SERIAL DATA COMMUNICATION:

Serial I/O Modes of Operation, serial data input output programming.

[J] 8096/97 OVERVIEW

8096/97 (16-bit Microcontroller) Architecture overview and additional features.

Text Book:

1. The 8051 Microcontroller based Embedded Systems, 1st Edition
By: Manish K Patel
Publisher: McGraw Hill Education

Ref. Books:

1. The 8051 Microcontroller Architecture, Programming & Applications, 2nd Edition
By: Kenneth J Ayala
Publisher: Penram Internation Pub(India)
2. The 8051 Microcontroller & Embedded Systems, 2nd Edition
By: Muhammad A. Mazidi & Janice G. Mazidi
Publisher: Pearson Education

B.TECH. SEMESTER-V (EC)

SUBJECT: ELECTRONIC COMMUNICATION (EC 512) (Credits : 5.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] RESONANT CIRCUITS:

Series and Parallel Equivalence, Series RLC Circuit, Parallel Tuned Circuit, Skin Effect, Mutual Inductance, Coupling Circuits.

[B] WAVEFORM SPECTRA :

Introduction , Complex Repetitive Waves, Effect of Filtering on Complex Signals.

[C] NOISE:

Introduction, Thermal Noise, Shot Noise, Partition Noise, Low- Frequency or Flicker Noise, High frequency or Transmit Time Noise, Generation-Recombination Noise, Equivalent Noise Resistance, Signal-to-Noise Ratio, Noise Factor, Noise Temperature.

[D] RF AMPLIFIERS:

Tuned RF Amplifiers, Neutralization, Special RF Amplifiers, Frequency Conversion and Mixers.

[E] RECEIVERS:

Introduction, Super heterodyne Receivers, Choice of Intermediate and Oscillator Frequencies, Image Rejection, Adjacent Channel Selectivity, Spurious Responses, Tracking Automatic Gain Control, Double Conversion Receivers, HF Communications Receivers.

[F] AMPLITUDE MODULATION:

Introduction, Amplitude Modulation, Amplitude-Modulated Transmitters, AM Receivers.

[G] SINGLE-SIDEBAND MODULATION:

Introduction, Single Sideband Principles, The Balanced Modulator SSB Generation, SSB Reception, Modified SSB Systems.

[H] ANGLE MODULATION:

Introduction, Frequency Modulation, Phase Modulation, Equivalence between FM and PM, Angle Modulator Circuits, Angle Modulation Detectors.

[I] SATELLITE COMMUNICATION:

Introduction, Orbits, Station Keeping, Satellite Attitude, Transmission Path, Path Loss, Noise Considerations, The Satellite System, Saturation Flux Density, Effective Isotropic Radiated Power, Antenna Look Angles, Elevation and azimuth angle calculations, Uplink and down link power budget calculations, Multiple Access Methods.

[J] FIBER OPTIC COMMUNICATIONS:

Introduction, principles of Light Transmission in Fiber Losses in Fibers, Dispersion, Light Sources for Fiber Optics Photo Detectors, Connectors and Splices, Fiber Optic Communication Systems.

Text Book:

1. Electronic Communications, 3rd Edition
By: Dennis Roddy & John Coolen
Publisher: Prentice Hall of India

Ref. Book:

1. Electronic Communications, 4th Edition
By: George Kennedy
Publication: Tata McGraw Hill

B.TECH. SEMESTER- V (EC)**SUBJECT: ELECTROMAGNETIC FIELDS (EC 505) (Credits : 5.0)****SYLLABUS & SCHEME (w.e.f. 2015)**

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	1	1	0	0	60	40	-	-	100

[A] VECTOR ANALYSIS:

Scalars and Vectors, Vector Algebra, The Cartesian coordinate system, Vector Components and Unit Vectors, The Vector Field, The Dot Product, The Cross Product, Other Coordinate Systems; Circular Cylindrical Coordinates, The Spherical Coordinate System.

[B] COULOMB'S LAW AND ELECTRIC FIELD INTENSITY:

The Experimental Law of Coulomb, Electric Field Intensity, Field Due to a Continuous Volume Charge Distribution, Field of a Sheet of Charge, Streamlines and Sketches of Fields.

[C] ELECTRIC FLUX DENSITY, GAUSS'S LAW, AND DIVERGENCE:

Electric Flux Density, Gauss's Law, Application of Gauss's Law Some Symmetrical Charge, Distributions, Application of Gauss's Law, Differential Volume Element, Divergence, Maxwell's First Equation (Electrostatics), The Vector Operator ∇ and the Divergence Theorem.

[D] ENERGY AND POTENTIAL:

Energy Expended in Moving a Point Charge in an Electric Field, The Line Integral, Definition of Potential Difference and Potential, The Potential Field of a Point Charge, The Potential Field of a System of Charges, Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electrostatic Field.

[E] CONDUCTORS, DIELECTRICS, AND CAPACITANCE:

Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions, The Method of Images, Semiconductors, The Nature of Dielectric Materials, Boundary Conditions for Perfect Dielectric Materials, Capacitance, Several Capacitance Examples, Capacitance of a Two-Wire Line.

[F] POISSON'S AND LAPLACE'S EQUATIONS:

Poisson's and Laplace's Equations, Uniqueness Theorem, Examples of the Solution of Laplace's Equation, Example of the Solution of Poisson's Equation, Product Solution of Laplace's Equation

[G] THE STEADY MAGNETIC FIELD:

Biot-Savart Law, Ampere's Circuital Law, Curl, Stokes' Theorem, Magnetic Flux and Magnetic Flux Density, The Scalar and Vector Magnetic potential, Derivation of Steady- Magnetic-field Laws.

[H] MAGNETIC FORCES, MATERIALS AND INDUCTANCE:

Force on a Moving Charge, Force on a Differential Current Element, Force between Differential Current Elements, Force and Torque on a closed Circuit, The Nature of Magnetic Materials, Magnetization and Permeability, Magnetic Boundary Conditions, The Magnetic Circuit, Potential Energy and Forces on Magnetic Materials, Inductance and Mutual Inductance.

[I] TIME-VARYING FIELDS AND MAXWELL'S EQUATIONS:

Faraday's Law, Displacement Current, Maxwell's Equations in Point Form, Maxwell's Equations in Integral Form, The Retarded Potentials.

[J] THE UNIFORM PLANE:

Wave Motion in Free Space, Wave Motion in Perfect Dielectrics, Plane Waves in Lossy Dielectrics, The Poynting Vector and Power Considerations, Propagation in Good Conductors: Skin Effect, Reflection of Uniform Plane Waves, Standing-Wave Ratio.

[K] TRANSMISSION LINES:

Basic Principles, Reflection co-efficient, Transmission co-efficient, Equation of the impedance on the transmission line.

Text Books:

1. Engineering Electromagnetics, 7th Edition
By: William H. Hayt
Publication: Tata McGraw Hill
2. Electronic Communication Systems, 3rd Edition
By: George Kenedy
Publication: Tata McGraw Hill

Ref. Book:

1. Theory and Problems in Electromagnetics,
1st Edition
By: Joseph Edminister
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-V (EC)

SUBJECT: PROJECT MANAGEMENT (EC 516) (Credits : 4.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	0	0	60	40	-	-	100

[A] PROJECT MANAGEMENT CONCEPT:

Characteristics of a project, Project life cycle, Objectives of project management, Project organizational structures.

[B] PROJECT SELECTION AND EVALUATION:

Time value concepts of money, Project Feasibility analysis (market, technical and financial economic analysis) and investment decision making, Risk assessment.

[C] PROJECT PLANNING AND SCHEDULING:

Project plan development, Work break down structure, Cost Breakdown Structure, Project scheduling tools, Resource planning, Resource scheduling and optimization.

[D] PROJECT MONITORING AND CONTROL:

Time and cost control, Earned Value Analysis, Quality assurance and control aspects, MIS for project.

[E] COMPUTER APPLICATIONS OF PROJECT SCHEDULING AND MANAGEMENT:

Project Management Software, suitability & application.

Text Book:

1. Projects: Planning, Analysis, Selection, Implementation and review, 4th Edition
By: Prasanna Chandra
Publication: Tata McGraw Hill

Ref. Books:

1. Project Management, 1st Edition
By: S. Chaudhary
Publisher: Tata McGraw Hill
2. Project Management: The Managerial Process, 3rd Edition
By: Gray and Larson
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-V (EC)

SUBJECT: POWER ELECTRONICS (EC 507) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2015)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION TO POWER ELECTRONICS:

Overview of power electronics, power semiconductor devices, control characteristics of power devices, characteristic & specifications of switches, types of power circuits, reverse recovery characteristics, types of power diodes, freewheeling diodes, structure and volt-current characteristics of power MOSFETS, COOLMOS, SITs, structure and volt-current characteristics of IGBTs, SiC – MOSFET*, SiC – IGBT*.

[B] THYRISTORS:

Thyristor characteristics, two transistor model of thyristor, thyristor turn-on, thyristor turn-off, types of thyristors, series & parallel connection of thyristors, di/dt & dv/dt protection, gate drive circuits.

[C] UNCONTROLLED AND CONTROLLED RECTIFIERS:

Multiphase star rectifiers, three-phase bridge rectifiers, three-phase bridge rectifier with RL load, 3-phase rectifier design, principal of phase controlled converter, single phase semi converter, single phase full converter, three phase half wave converters, three phase semi converter, three phase full converter. (Without analysis for RL load), power factor improvement, pulse width modulation using IGBT, single phase sinusoidal PWM using IGBT, three phase PWM control using IGBT.

[D] INVERTERS:

Principal of operation of pulse width modulated inverters, performance parameters, single-phase bridge inverters, voltage control of single-phase inverters, current source inverter, multilevel concept, applications & features of multilevel inverter.

[E] DC-DC CONVERTERS:

Principal of step down converter, principal of step up converter, performance parameters, converter classification, switch mode buck, boost, buck-boost & cuk regulators, chopper circuit design.

[F] AC CONTROLLERS:

Principal of on off control, principal of phase control, Cycloconverters, PWM controlled AC voltage controllers.

[G] PROTECTION OF DEVICES & CIRCUITS:

Cooling and heat sinks, snubber circuits, reverse recovery transients, supply & load side transients, current & voltage protection, magnetic interference, protection of IGBT**

[H] DC DRIVES:

Characteristics of DC motor, operating modes, single-phase DC drives, braking schemes of DC-DC converter drives, closed-loop control of DC drives.

[I] AC DRIVES:

Induction motor drives, close-loop control of induction motors, synchronous motor drives, stepper motor control, Basics of DC drives and comparison with AC drives.

[J] POWER SUPPLIES:

Switched-mode power supplies, UPS, CVT.

*,** - To be supplemented from reference material

Text Book:

1. Power Electronics circuits, Devices and Applications, 3rd Edition
By: Muhammad H. Rashid
Publisher: Pearson Education and PHI

Ref. Books:

1. Power Electronics, 2nd Edition
By: M. D. Singh and K. B. Khanchandani
Publisher: The McGraw Hill
2. Power Electronics, 4th Edition
By: Dr. P.S.Bhimbhara
Publisher: Khanna Publication
3. Power Electronics, 2nd Edition
By: B. R. Gupta & V. Singhal
Publisher: S.K. Kataria & Sons

B.TECH. SEMESTER-V (EC)

SUBJECT: TERM PROJECT(EC 506) (Credits : 1.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (hrs.)	Sessional (hrs.)	Practical	T.W.	Total
0	0	0	0	2	1	0	0	25	25	50

Students have to design a circuit based on any concept of electronics/communication and implement with hardware on PCB.

B.TECH. SEMESTER-VI (EC)

SUBJECT: ADVANCED MICROPROCESSORS (EC 601) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2006)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] THE MICROPROCESSOR AND ITS ARCHITECTURE:

Internal Architecture, Real mode memory addressing, protected mode memory addressing, memory paging.

[B] ADDRESSING MODES:

Data addressing mode, program memory addressing mode, stack memory addressing mode.

[C] DATA MOVEMENT INSTRUCTIONS:

MOV, PUSH/POP, Load effective address, String data transfer, Miscellaneous, Segment override prefix, assembler details.

[D] ARITHMETIC AND LOGICAL INSTRUCTIONS:

Addition, subtraction, comparison, multiplication, division, BCD and ASCII arithmetic, basic logic instructions shift and rotate, string comparison.

[E] PROGRAM CONTROL INSTRUCTIONS:

Jump group, controlling the flow of an ALP, procedures, interrupts, machine control and miscellaneous instructions

[F] 8086/8088 HARDWARE SPECIFICATIONS:

Pin-outs, pin functions, clock generator, bus buffering and latching, bus timing, ready and the wait state, minimum mode versus maximum mode.

[G] MEMORY INTERFACE:

Memory devices, address decoding, 8088 and 80188 memory interface, 8086, 80186, 80286, 80386SX, 80386DX, 80486, Pentium and Pentium pro memory interface, Dynamic RAM.

[H] BASIC I/O INTERFACE:

Introduction to i/o interface, i/o address decoding, the programmable peripheral device (8255), The 8279 Programmable keyboard/display interface, USB basics and interfacing.

[I] INTERRUPTS:

Basic interrupt processing, Hardware interrupts, Expanding the interrupt structure, 8259A Programmable interrupt controller.

[J] DIRECT MEMORY ACCESS:

Basic DMA operation.

[K] 80186, 80188, 80286 MICROPROCESSORS:

Introduction to the 80286.

[L] THE PENTIUM AND PENTIUM PROMICROPROCESSORS:

Introduction to Pentium microprocessor, system timings, how to interface slower memory with Pentium, Protected mode, paging mode, virtual 8086 mode, memory management mode with Pentium, Introduction Pentium Pro.

Text Book:

1. The Intel Microprocessors 8086, 8088, 80186, 80188, 80286, 80386, 80486, Pentium, Pentium Pro Processors, 6th Edition
By: Barry B. Brey
Publisher: Prentice Hall of India

Ref. Books:

1. Microprocessors and Interfacing- Programming & Hardware, 2nd Edition
By: Douglas V. Hall
Publisher: Tata McGraw Hill
2. IBC PC Assembly Language Programming, 2nd Edition
By: Peter Abel
Publisher: Prentice Hall of India

B.TECH. SEMESTER-VI (EC)**SUBJECT: COMMUNICATION SYSTEMS(EC 604) (Credits : 5.0)****SYLLABUS & SCHEME (w.e.f. 2005)**

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

Communication System, Analog and Digital message, the signal-to-noise ratio, the channel bandwidth and the rate of communication, Modulation, Randomness, redundancy, and coding.

[B] ANALYSIS AND TRANSMISSION OF SIGNALS:**Part I : Signal Analysis**

Periodic signal representation by Fourier series Exponential representation of non periodic signals: The Fourier transforms, Properties of the Fourier transform, the sampling theorem.

Part II : Signal Transmission

Distortion less transmission through a linear system, Signal distortion over a channel, The bandwidth and the rate of pulse transmission, The energy spectral density, The power spectral density, The power spectral density of noise.

[C] DIGITAL COMMUNICATION SYSTEMS:

Conversion of analog signals to digital form: Pulse code and Delta modulation, Digital multiplexing, Line coding, Pulse shaping, Scrambling, The regenerative repeater, Detection error probability, M-ary communication, Digital carrier systems.

[D] DIGITAL MODULATION TECHNIQUES:

Coherent binary PSK, Coherent binary, Coherent udraphase shift keying, Coherent minimum shift keying, Noncoherent orthogonal modulation, noncoherent frequency shift keying, differential shift keying, Comparison of binary and quaternary modulation schemes, M-ary modulation techniques.

[E] MODULATION:**Part I: Amplitude (Linear) Modulation**

Amplitude modulation : single sideband (SSB) Signal equation Hilbert's transform, Effects of frequency and phase errors in synchronous, demodulation, Digital carrier systems, Interference and noise in AM systems, Frequency-division multiplexing.

Part II: Angle (Exponential) Modulation

Interference and noise in angle-modulated systems, the stereo FM receiver.

Text Books:

1. Modern Digital and Analog Communication System, 2nd Edition
By: B. P. Lathi
Publisher: Oxford Publication
2. Communication Systems, 3rd edition
By: Simon Haykin
Publisher: John wiley & sons

Ref. Books:

1. Electronic Communication System- Fundamental through Advance, 3rd Edition
By: Tomas W.
Publisher: Wisley
2. Communication System Analog & Digital, 1st Edition
By: R. P. Singh
Publisher: Tata McGraw Hill

B.TECH. SEMESTER- VI (EC)

SUBJECT: MICROWAVE & ANTENNAS (EC 610) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2007)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] TRANSMISSION LINES:

The Smith Chart & its Applications, Transmission Line Components.

[B] RADIATION AND PROPAGATION OF WAVES:

Electromagnetic Radiation, Propagation of Waves, Ground, Space and Sky wave propagation, Scatter propagation, Duct propagation, Multi hop propagation, Fading and Diversity.

[C] ANTENNAS:

Basic considerations, Wire Radiators in Space, Terms and Definitions, Effect of Ground on Antennas, basic antenna parameters, point sources and array of point sources, Broad side and End fire array, Array Synthesis, Directional High frequency Antennas, loop and helical antennas, folded dipole and Yagi-uda array, Log periodic antenna, Babinet's principle, horn and complimentary antennas, Microwave Antennas, Wide band and Special purpose Antennas.

[D] WAVEGUIDES, RESONATOR & COMPONENTS:

Rectangular waveguides, Circular and other waveguides, Waveguide Coupling, Matching & Attenuation, Cavity Resonator, Auxiliary components.

[E] MICROWAVE TUBES & CIRCUITS:

Microwave Triodes, Multicavity Klystron, Reflex Klystron, Magnetron, Traveling Wave Tube and other Microwave Tubes.

[F] SEMICONDUCTOR MICROWAVE DEVICES & CIRCUITS:

Passive Microwave Circuits, Transistor & Integrated Circuits, Varactor and Step Recovery, Diodes and Multipliers, Parametric Amplifiers, Tunnel Diodes and Negative Resistance Amplifiers, Gunn Effect Diodes, Avalanche Effect and Diodes, other Microwave Diodes, Micro-strip Line.

Text Books:

1. Electronic Communication Systems, 3rd Edition
By: George Kennedy
Publisher: Tata McGraw Hill
2. Microwave Devices and Circuits, 3rd edition
By S. Y. Liao
Publisher: Prentice Hall of India

Ref. Books:

6. EM Waves and Radiation Systems, 2nd Edition
By: Jordan & Balmain
Publisher: Prentice Hall of India
7. Antennas, 3rd Edition
By: Kraus
Publisher: Tata McGraw Hill
8. Antennas & Wave Propagation, 1st Edition
By: K. D. Prasad
Publisher: Khanna Publication

B.TECH. SEMESTER- VI (EC)

SUBJECT: DIGITAL SIGNAL PROCESSING (EC 611) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

Signal and signal classification (analog, digital), signal processing, digital signal processing, advantages and disadvantages of DSP.

[B] DISCRETE SIGNALS:

Operations on discrete signals, decimation and interpolation.

[C] DISCRETE TIME SYSTEMS:

System classification, digital filters, difference equation, impulse response, stability, connections.

[D] DISCRETE CONVOLUTION:

Discrete convolution, convolution of finite sequences, stability, system response to periodic inputs.

[E] THE Z-TRANSFORM:

Definition, properties, z-plane representation, the transfer function, inverse-z transform, system analysis, frequency response.

[F] APPLICATIONS OF Z-TRANSFORM:

Time domain analysis, frequency response - graphical interpretation, application : digital audio effects.

[G] IIR FILTER DESIGN:

Introduction, IIR filter design, response matching, matched-z transforms, mappings, bilinear transformation.

[H] FIR FILTERS DESIGN:

Linear phase requirement and symmetric sequences, FIR design by fourier series method, windowing.

[I] THE DFT AND FFT:

Fourier series, Fourier transform, DTFT, DFT - definitions, properties, Spectral smoothing by time windows, The FFT, DIT- FFT, DIF-FFT, IDFT, Applications- overlap-add method, overlap - save method.

[J] ADVANCE DSP CONCEPTS:

Multirate signal processing, adaptive signal processing, finite word length effect.

[K] APPLICATIONS OF DSP:

Speech processing: speech analysis, speech synthesis, speech recognition, speaker recognition, Image processing: Extracting the edges, blurring the images (Basic low pass and high pass filtering of an image) Biomedical signal processing: ECG analysis, noise detection and diagnosis.

[L] DSP PROCESSOR ARCHITECTURE:

Introduction to Digital Signal Processors: characteristics of DSP algorithms and hardware requirements, von Neumann architecture, Harvard architecture, parallelism and hardware units of typical digital signal processor. Architectural details of TMS320C6x.

Text Books:

1. Analog and Digital Signal Processing, 2nd Edition
By: Ashok Ambardar
Publisher: THOMSON Brooks/Ole
2. Digital Signal Processing, 3rd Edition
By: John G. Proakis & Dimitris G. Manolakis
Publisher: Prentice Hall of India

Ref. Books:

1. Digital Filters- Analysis, Design and Applications, 2nd Edition
By: Andreas Antonion

2. Digital Signal Processing - A Computer Based Approach, 3rd Edition
By: Sanjit K Mitra
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-VI (EC)

SUBJECT: CMOS VLSI DESIGN (EC 612) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] AN OVERVIEW OF VLSI:

[B] SILICON LOGIC:

Logic Design with MOSFETs, Physical structure of CMOS integrated circuits, Fabrication of CMOS integrated circuits, Element of physical design.

[C] THE LOGIC – ELETRONICS INTERFACE:

Electrical characteristics of MOSFETs. Electronic analysis of CMOS logic gates. Designing high speed CMOS logic Network. Advanced techniques in CMOS logic circuits.

[D] THE DESIGN OF VLSI SYSTEM:

Memories and programmable logic, System- level physical design. VLSI clocking and system design. Reliability and testing of VLSI circuits.

Text Book:

1. Introduction to VLSI Circuits & Systems, 1st Edition
By: John P. Uyemura
Publisher: John Wiley & Sons Inc.

Ref. Books:

1. CMOS logic Circuit Design, 1st Edition
By: John P. Uyemura
Publisher: Spriger Private limited
2. Digital Integrated Circuits - A Design Perspective, 2nd Edition
By J.M. Rambaey, A. Chandrakassan & B. Nikolic
Publisher: Prentice Hall of India
3. Principles of CMOS VLSI Design - A System Perspective, 2nd Edition
By: N.H.E. Weste & K. Eshraghian.
Publisher: Prentice Hall of India
4. Modern VLSI design - System On Chip Design, 3rd Edition
By: W. Wolf.
Publisher: Pearson Asia

B.TECH. SEMESTER-VI (EC)

SUBJECT: AUDIO-VIDEO ENGINEERING (EC 614) (Credits : 1.0)

SYLLABUS & SCHEME (w.e.f. July, 2014)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Prac.	T.W.	Total
0	0	0	0	2	1	-	-	-	25	25

Student have to carry out experiments based on monochrome and color television like Pattern generator, Vetroscope, VIF section, RF section, Chroma section and Composite video signal generator.

[A] LIST OF EXPERIMENTS:

1. Comparison of monochrome & Color TV Receiver by study video chroma section
2. The R.F. tuner & video section with step-by-step fault finding
3. Measurement of the horizontal & vertical details & from horizontal & vertical section of the TV receiver with fault finding
 - A) To study Composite video signal.
 - B) To Study Colour signal
4. The Characteristics of the Microphone
5. The Characteristics of the Speaker of different diameters & power rating
6. The Characteristics of the Woofer
7. Audio Power Amplifier & Audio Mixer
8. LCD & LED TV Receiver
9. HDTV & Plasma TV Receiver
10. DTH Receiver

B.TECH. SEMESTER-VI (EC)

SUBJECT: TERM PROJECT (EC 607) (Credits : 1.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (hrs.)	Sessional (hrs.)	Practical	T.W.	Total
0	0	0	0	2	1	0	0	25	25	50

Students have to design a circuit based on controller application and implement with hardware on PCB.

B.TECH. SEMESTER-VII (EC)

SUBJECT: DATA & COMPUTER COMMUNICATIONS (EC 702) (Elective-IV) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2006)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

The uses of computer networks, network structure, network architecture, OSI Reference model, Classification of computer networks, TCP/IP Protocol suite, connection less Vs connection oriented services, Services & interface.

[B] THE MEDIUM ACCESS SUBLAYER:

The channel allocation problem, multiple access protocols, Collision free protocols, IEEE standard 802.x for LAN and MANs, Bridges.

[C] THE DATA LINK LAYER:

Data link layer design issues, elementary data link protocols, sliding window protocols.

[D] THE NETWORK LAYER:

IPv4 addressing, Special addresses, Network layer design issues, routing algorithms, congestion control algorithms, internetworking, Internetworking devices, The network layer in Internet. ARP, IP and ICMP network layer protocols.

[E] THE TRANSPORT LAYER:

The transport services, Elements of Transport protocols, The internet transport protocols (TCP and UDP).

[F] THE APPLICATION LAYER:

Network security.

Text Book:

1. Computer Networks, 3rd Edition
By: Andrew S. Tanenbaum
Publisher: Prentice Hall of India

Ref. Books:

1. Data and Computer Communications, 3rd Edition
By: William Stallings
Publisher: Prentice Hall of India
2. Data Communications and Networking, 3rd Edition
By Behrouz A. Forouzan
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-VII (EC)

SUBJECT: EMBEDDED SYSTEMS (EC 718) (Elective-III) (Credits : 5.0)

SYLLABUS & SCHEME (w. e. f. July, 2014)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION TO ARM:

Overview of ARM Processor, Fundamental of RISC & CISC, Evolution of RISC, Comparison of RISC & CISC, Design for LPC.

[B] ARM ARCHITECTURE:

Architectural inheritance, Programmer's model, ARM development tools, Software Assembler (ARM), 'C' Language Compiler, Simulator, Hardware Board, Board organization, Communication with external world. 3-stage pipeline ARM organization, ARM instruction execution, ARM implementation.

[C] ARM ASSEMBLY LANGUAGE PROGRAMMING:

Data processing instructions, Data transfer instructions, Control flow instructions, Programs based on assembly language.

Introduction, Exceptions, Conditional execution, Branch and Branch with Link (B, BL), Branch, Branch with Link and eXchange (BX, BLX), Software Interrupt (SWI), Data processing instructions, Multiply instructions, Count leading zeros (CLZ), Single word and unsigned byte data transfer instructions, Half-word and signed byte data transfer instructions, Multiple register transfer instructions, Swap memory and register instructions (SWP), Status register to general register transfer instructions, General register to status register transfer instructions, Coprocessor instructions.

Data types, Floating-point data types.

[D] THE THUMB INSTRUCTION SET:

The Thumb bit in the Current Program Status Register (CPSR), The Thumb programmer's model, Thumb branch instructions, Thumb software interrupt instruction, Thumb data processing instructions, Thumb single register data transfer instructions, Thumb multiple register data transfer instructions, Thumb breakpoint instruction, Thumb implementation, Thumb applications.

[E] ARCHITECTURAL SUPPORT FOR SYSTEM DEVELOPMENT & MEMORY HIERARCHY: (3)

The ARM memory interface, The Advanced Microcontroller Bus Architecture (AMBA), Memory size and speed, On-chip memory, Caches, Cache design - an example, Memory management.

[F] COMMONLY USED SERIAL & PARALLEL BUS PROTOCOLS: (1/2)

Introduction to serial data transfer protocols: I²C, SPI.

[G] INTRODUCTION TO VECTORED INTERRUPT CONTROLLER

[H] INTRODUCTION TO OPERATING SYSTEMS

Operating System Concepts, System Calls

[I] PROCESSES

Introduction, The Process Model, Implementation of Processes, Threads, Interprocess Communication, Race Conditions, Critical Sections, Mutual Exclusion with Busy Waiting, Sleep and Wakeup, Semaphores, Monitors, Message Passing, Classical IPC Problems, The Dining Philosophers Problem, The Readers and Writers Problem, The Sleeping Barber Problem, Process Scheduling, Round Robin Scheduling, Priority Scheduling, Multiple Queues, Shortest Job First, Guaranteed Scheduling, Lottery Scheduling, Real-Time Scheduling, Two-level Scheduling, Policy versus Mechanism

[J] INPUT/OUTPUT

Principles of I/O Hardware & Software, Interrupt Handlers, Device Drivers, Device-Independent I/O Software, User-Space I/O Software, Deadlocks, Resources, Principles of Deadlock, Theostrich Algorithm, Detection and Recovery, Deadlock Prevention and Avoidance, RAM Disks, RAM Disk Hardware and Software, Disk Hardware and Software, Clock Hardware and Software, Terminal Hardware and Software, Implementation of the Device-Independent Terminal Driver, Implementation of the Keyboard and the Display Driver.

Text Book:

1. ARM - System-On- Chip Architecture, 2nd Edition
By: Steve Furber
Publisher: Prentice Hall of India
2. Operating Systems: Design and Implementation
By: A.S.Tanenbaum & A.S. Woodhull
Publisher: Prentice Hall of India

Ref. Books:

4. ARM System Developer Guide
By: Andrew Sloss, Dominic Symes, Chris Wright
Publication: Morgan Kaufmann
5. Technical Ref. Manual, ARM7TDMI (3) UM10211 LPC 2364/66/68/78 User Manual, NXP Ltd.

B.TECH. SEMESTER-VII (EC)

SUBJECT: WIRELESS COMMUNICATION(EC 719) (Elective-II) (Credits : 4.0)

SYLLABUS & SCHEME (w.e.f. 2008)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	0	0	60	40	-	-	100

[A] INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM:

Evolution of mobile radio communications, Cellular Telephone System.

[B] MODERN WIRELESS COMMUNICATION SYSTEMS:

Second generation (2G) cellular networks, Third generation (3G) wireless networks, Bluetooth and personal area network.

[C] THE CELLULAR CONCEPT-SYSTEM DESIGN FUNDAMENTALS:

Introduction, Frequency reuse, Channel assignment strategies, Handoff strategies, Interference and system capacity, Trunking and grade of service, Improving coverage & capacity in cellular systems.

[D] MOBILE RADIO PROPAGATION:

Large scale path loss, Small scale path loss fading and multi path Doppler shift, Fading offset, Level crossing rate, Fade duration.

[E] MODULATION TECHNIQUES FOR MOBILE RADIO:

Digital modulation - an overview, Pulse shaping Techniques, Linear modulation techniques, Constant envelope modulation, combined linear and constant envelope modulation (QAM), Spread spectrum modulation techniques.

[F] EQUALIZATION, DIVERSITY, AND CHANNEL CODING:

Introduction, Fundamentals of equalization, Training , A generic adaptive equalizer, Equalizers in a communications receiver, Survey of equalization techniques, Linear equalizers, Nonlinear equalization, Diversity techniques, RAKE receiver, Interleaving, Fundamentals of channel coding.

[G] SPEECH CODING:

Introduction, Characteristics of speech signals, Quantization techniques, Adaptive differential pulse code modulation (ADPCM), Vocoders, Linear predictive coders, choosing speech codec for mobile communications, The GSM codec.

[H] MULTIPLE- ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION:

Introduction, Frequency division multiple access (FDMA), Time division multiple access, Spread spectrum multiple access, Frequency hopped multiple access (FHMA), Code- division multiple access (CDMA), Hybrid spread spectrum techniques, Space division multiple access (SDMA), Packet radio, Capacity of cellular systems.

[I] GSM SYSTEM:

RF specifications, Time slot data structure, Speech frame, Control channels System structure. HLR VLR AUC EIR MSC BSC BTS MS Equalization, Diversity, Channel Coding, Speech Coding.

[J] CODE DIVISION MULTIPLE ACCESS:

Use of orthogonal signals & correlated Walsh Functions, Walsh Hadamard matrix, processing gain IS-95 Digital Cellular system , Forward channel, Reverse channel Receiver structures , Mobile & Base station receivers, Power control, Reverse-link open control & closed loop control, Synchronization , call procedures , soft hand-off.

Text Book:

1. Wireless Communication, 2nd Edition
By: Theodore Rappaport.
Publication: Prentice Hall of India

Ref. Book:

3. Wireless Communication, 3rd Edition
By: W. C. Y. Lee
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-VII (EC)

SUBJECT: CODING THEORY & COMPRESSION TECHNIQUES (EC 717) (Credits : 4.0)

SYLLABUS & SCHEME (w.e.f. 2010)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	0	0	60	40	-	-	100

[A] PROBABILITY THEORY AND RANDOM PROCESS:

Part (1) Introduction to the theory of probability, Random variables, Statistical averages, The central-limit theorem, correlation, binary case.

[B] AN INTRODUCTION TO INFORMATION THEORY:

Measure of information, Source encoding, Error-free communication over a noisy channel, The channel capacity of a discrete memory less channel, channel capacity of a continuous channel, Practical communication systems in the light of Shannon's equation.

[C] ERROR-CORRECTING CODES:

Introduction, Linear block codes, Cyclic codes, Burst-error- detecting and correcting codes, Interlaced codes for burst and random error correction, Convolution codes, Comparison of coded and uncoded systems.

[D] DICTIONARY TECHNIQUES:

Introduction, static Dictionary, diagram coding, Adaptive Dictionary, The LZ77 approach, The LZ78 approach, File compression, Image compression (GIF), Compression over modems.

[E] TRANSFORM CODING:

Introduction, The transform, Transforms of interest, Discrete cosine transform, Discrete sine transform Quantization and coding of transform coefficients, Application to image compression-JPEG: The transform, quantization, coding.

[F] VIDEO COMPRESSION STANDARDS :

Introduction, MPEG, H.261, H-263, H-264, Packet Video

Text Books:

1. Modern Digital And Analog Communication Systems, 3rd Edition
By B. P. Lathi
Publisher : Hold Saunders International
2. Introduction to Data Compression, 2nd Edition
By: Khalid Sayood
Publisher: Elsevier

Ref. Books:

1. Data Compression, 3rd Edition
By: David Salomon
Publisher: Spriger
2. Information Theory, Coding & Cryptograph, 2nd Edition
By: Ranjan Bose
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-VII (EC)

SUBJECT: IMAGE PROCESSING (EC 720) (Elective-I) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2010)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION:

Digital Image Processing, The Origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

[B] DIGITAL IMAGE FUNDAMENTALS:

Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships Between Pixels, Linear and Nonlinear Operations.

[C] IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:

Background, Some Basic Gray Level Transformations, Histogram Processing, Enhancement using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

[D] IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:

Background, Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation.

[E] IMAGE RESTORATION:

A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations.

[F] COLOR IMAGE PROCESSING:

Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing.

[G] MORPHOLOGICAL IMAGE PROCESSING:

Preliminaries. Dilation and Erosion. Opening and Closing. The Hit-or-Miss Transformation. Some Basic Morphological Algorithms. Extensions to Gray-Scale Images.

[H] IMAGE SEGMENTATION:

Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds, The Use of Motion in Segmentation.

[I] REPRESENTATION AND DESCRIPTION:

Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Relational Descriptors.

Text Book:

1. Digital Image Processing (2nd Ed)
By: Rafae C.Gonzalez
Publisher: Wesley Publishing Co.

Ref. Books:

3. Image Processing, 1st Edition
By: Don Pearson
Publisher: Tata McGraw Hill
4. Digital Picture Processing, 1st Edition
By: Azriel Resenfeld, Avinash C.Kak
Publisher: Academic Press, New York.
5. Digital Image Processing, 1st Edition
By: Kenneth R. Castleman
Publisher: Pearson Education
6. Fundamental of Digital Image Processing, 1st Edition
By: Anil K. Jain
Publisher: Pearson Education

B.TECH. SEMESTER-VII (EC)

SUBJECT: TERM PROJECT(EC 707) (Credits : 1.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (hrs.)	Sessional (hrs.)	Practical	T.W.	Total
0	0	0	0	2	1	0	0	25	25	50

Students have to develop any application on any software platform.

B.TECH. SEMESTER-VII (EC)

SUBJECT: ADVANCE DIGITAL SIGNAL PROCESSING (Elective-I) (Credits : 5.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] OVERVIEW:

Z-transform, DFT, FFT, IIR design methods, FIR design methods.

[B] FILTER STRUCTURES FOR IIR AND FIR FILTERS, DIRECT FORM I AND II, PARALLEL AND CASCADE FORMS, LATTICE

[C] FINITE WORD-LENGTH EFFECTS IN DIGITAL FILTERS:

Fixed and floating point representation of numbers, quantization noise in signal representations, finite word-length effects in coefficient representation, round-off noise, SQNR computation and limit cycle.

[D] MULTI-RATE SIGNAL PROCESSING:

Decimation and interpolation; polyphase decomposition; digital filter banks: Nyquist filters, two channel quadrature mirror filter bank and perfect reconstruction filter banks, sub-band coding.

[E] OPTIMAL AND ADAPTIVE FILTERING:

Minimum mean square error and linear minimum mean square error criteria, FIR Wiener filter and linear prediction, steepest descent algorithm and LMS algorithm. Applications: Adaptive Modelling and System Identification, Inverse Adaptive Modeling, Deconvolution, Adaptive Inverse Control, Adaptive Interference Cancelling.

[F] POWER SPECTRAL ANALYSIS AND APPLICATIONS

[G] HILBERT TRANSFORMS AND APPLICATIONS

[H] WAVELET TRANSFORMS AND APPLICATIONS

[I] INTRODUCTION TO DIGITAL SIGNAL PROCESSORS:

Characteristics of DSP algorithms and hardware requirements, von Neumann architecture, Harvard architecture, parallelism and hardware units of typical digital signal processor. Architectural details of TMS320C6x.

Text Books:

1. Discrete-Time Signal Processing, 2nd Edition
By: A. V. Oppenheim and R. W. Shafer
Publisher: Prentice Hall of India
2. Digital Signal Processing: A computer-Based Approach, 2nd Edition
By: S. K. Mitra
Publisher: Tata McGraw Hill
3. Analog and Digital Signal Processing, 1st Edition
By: Ashok Ambardar
Publisher: THOMSON Brooks

4. Adaptive Filter Theory, 4th Edition
By: Simon Haykin
Publisher: Prentice Hall of India

Ref. Books:

1. Digital Signal Processing, 3rd Edition
By: J.G. Proakis and D. G. Manolakis
Publisher: Prentice Hall of India
2. Statistical Digital Signal Processing & Modeling, 1st Edition
By: M. H. Hayes
Publisher: John Wiley & Sons

B.TECH. SEMESTER-VII (EC)

SUBJECT: BIOMEDICAL INSTRUMENTATION (Elective-I) (Credits : 5.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	-	-	150

[A] MEASUREMENT, RECORDING AND MONITORING:

Fundamental of Medical Instrumentation, Bio electric signals and Electrodes, Recording systems, Patient Monitoring Systems, Arrhythmia and Ambulatory Monitoring Instruments, Cardiac O/P measurement, Pulmonary Function Analyzers.

[B] MODERN IMAGING SYSTEM:

X- Ray Machines and Digital Radiography, Ultrasonic Imaging Systems

[C] THERAPEUTIC EQUIPMENT:

Cardiac Pacemakers, Cardiac Defibrillator, Instruments for surgery, LASER application in biomedical Engineering, Physiotherapy and Electrotherapy Equipments, Haemodialysis machine, Electrical Safety of Medical Equipment, Latest Issues in BME.

Text Books:

1. Biomedical Instrumentation and measurements
By: Cromwell, Welbell & Preiffer
Publisher: Prentice Hall of India
2. Hand book of Biomedical Instrumentation
By R. S. Khandpur.
Publisher: Tata McGraw Hill

Ref. Books:

1. Introduction to Biomaterials
By: Sujata Bhat
Publisher: Narosa Publishing House
2. Introduction to Biomedical Equipment Technology
By: Joseph Carr and John Brown
Publication: Pearson Education
3. Biomedical Digital Signal Processors
By: Wills J. Tompkins
Publication: Prentice Hall of India
4. Medical Instrumentation – Application and Design
By: John G. Webster
Publication: Wiley

B.TECH. SEMESTER-VII (EC)

SUBJECT: RADAR & NAVIGATION (ELECTIVE-II) (Credits : 4.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	0	0	60	40	25	25	150

[A] ELEMENTARY CONCEPT:

Fundamental concept of Radar, Function Performed by Radar, Overall System Consideration, Types of Radar Targets, Radars' Waveform, Power & Energy.

[B] RADAR EQUATION:

Radar Equation, Important Network Definitions and Properties, Incremental Modeling of Noise Sources, Incremental Modeling of Noisy Networks, Practical Modeling of Noisy Sources and Networks, Overall Radar Receiver Model.

[C] RADAR CROSS SECTION:

Cross Section for Small Targets, Target Scattering Matrices, Examples of Target Cross Sections, Cross Sections of Area Targets, Sea Surfaces as Area Targets, Land Surfaces as Area Targets, Cross Section of Volume Targets, Meteorological Volume Targets, Cross Section Fluctuations and Models.

[D] RADAR SIGNAL & NETWORKS:

Real Radar Signals, Complex Radar Signal, Analytic Radar Signals, Duration, Frequency and Bandwidth of Signals, Transmissions of Signals through Networks, Matched Filter for Noise, Ambiguity Function.

[E] MATHEMATICAL FUNDAMENTALS OF NAVIGATION:

Reference Frame, Principles of Positioning Determination, Principles of Velocity Determination, Principles of Attitude Determination, Accuracy Measures, Least Square Estimation, Principles of Routing and Guidance.

[F] MAPS:

Types of Maps, Map Projections, Digital Map.

[G] TERRESTRIAL NAVIGATION:

Instruments and Observables, Position Determination, Drift.

[H] TERRESTRIAL RADIO NAVIGATION:

Point Source Systems, Area Based Systems, Aircraft Landing Systems.

[I] SATELLITE BASED NAVIGATION:

GPS, GLONASS, Galileo, Other Satellite Based Navigation Systems.

Text Books:

1. Radar Principles, 2nd Edition
By: Peyton Z. Peebles
Publisher: Wiley
2. Navigation: Principles of Positioning and Guidance, 1st Edition
By: Hoffmann-Wellenhof, Legat, Wieser
Publisher: Springer

Ref. Book:

1. Global Positioning Systems, Inertial Navigation, and Integration, 2nd Edition
By: Mohinder S. Grewal, Lawrence R. Weill, Angus P. Andrews
Publisher: John Wiley & Sons

B.TECH. SEMESTER-VII (EC)

SUBJECT: RF Circuit Design (Elective-III) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2016)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] Introduction:

Importance of RF circuit design, RF behavior of passive component like resistors, inductors, capacitors

[B] Scattering parameters:

Definitions, chain scattering parameters, conversion between Z and S parameters, generalization of S-parameters, measurement of S-parameters

[C] Impedance Matching:

Q factor, resonance, bandwidth, Smith Chart, matching networks using lumped elements, Quarter wave transformer, Stub matching RF

[D] Transceiver Architectures:

Receiver Front End-General Design Philosophy, Harmonic distortion, Intermodulation, Third-order Intercept Point (IP3), Cascaded non-linear stages, Noise figure (NF), cascaded noisy stages, Calculation of NF, IIP3 of receiver front end, transmitter architecture

[E] RF Filter Design:

Ideal and Approximate Filter Types, Transfer Function and Basic Filter Concepts, Filter Design by Image Parameter Method, Filter Design by the Insertion Loss Method, Filter Design Issues

[F] Amplifier Design:

Stability Considerations, Amplifier Design for Maximum Gain, Constant Gain Circles, Constant Noise Figure Circles, Low Noise Amplifier design, Broad band Amplifiers, Different classes of amplifiers

[G] Oscillator Design:

Feedback and basic concept, Crystal Oscillators, RF Transistor Oscillators, Phased-Locked Loop, Frequency Synthesizers

[H] Mixer Design: Mixer Characteristics, Switching type Mixers, Diode Mixers, FET Mixers, Other Mixers

[I] Other RF circuits:

Power combiners/dividers, directional couplers, hybrid couplers, isolators, Resonant circuits, Recent trends in RF circuits

Text / Reference Books:

1. Radio-Frequency and Microwave Communication Circuits by Devendra K. Misra, John Wiley & Sons, 2nd Edition, ISBN: 978-0-471-47873-7. Pearson Education, 2nd Edition, ISBN-13: 9780130953230.
2. RF Circuit Design, Theory & Applications by Reinhold Ludwig and Pavel Bretchko, John Wiley & Sons, 4th Edition, ISBN : 978-1-118-29813-8.
3. Microwave Engineering, David M. Pozar, John Wiley & Sons, 4th Edition, ISBN : 978-1-118-29813-8.

B.Tech. SEMESTER-VII (EC)

SUBJECT: SATELLITE COMMUNICATION (Elective-IV) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2016)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] INTRODUCTION TO SATELLITE COMMUNICATION:

The origin of satellite communications, A brief history of satellite communications, The current state of satellite communications, An overview of satellite communications.

[B] ORBITAL ASPECTS OF SATELLITE COMMUNICATIONS:

The orbital mechanics, Look angle determination, Numerical examples, Orbital perturbations, Orbit determination, Launches and launch vehicles, Orbital effects in communications system performance-Doppler shift, Range variation, Eclipse, Sun transit outage.

[C] SPACECRAFT:

Introduction, Spacecraft Subsystem, Attitude and orbit control system, Telemetry, tracing and command system, Power Systems, Communications subsystem, Spacecraft Antennas, Equipment reliability and space qualification.

[D] SATELLITE LINK DESIGN:

Basic transmission theory, System noise temperature and G/T ratio, Design of downlink, Domestic satellite systems using small earth stations, Uplink design, Design of satellite links for specified C/N.

[E] MODULATION AND MULTIPLEXING TECHNIQUES FOR SATELLITE LINKS:

Analog telephone transmission, Analog television transmission, Energy dispersal, Digital transmission, Digital modulation and demodulation, Digital transmission of voice, Digital TV and bandwidth compression, TDM.

[F] MULTIPLE ACCESS:

FDMA, TDMA, CDMA, Estimating channel requirement, Practical demand access systems, Random access, Multiple access with on-board processing.

[G] ENCODING AND FORWARD ERROR CORRECTING FOR DIGITAL SATELLITE LINKS:

Error Detection and correction, Channel capacity, Error detection coding, Error detection and correction capabilities of linear block codes, Binary Cyclic codes, Performance of block error correction codes, convolution codes, Implementation of error detection on satellite links.

[H] PROPAGATION ON SATELLITE EARTH PATHS AND ITS INFLUENCE ON THE LINK DESIGN:

Quantifying attenuation and depolarization, Propagation effects that are not associated with hydrometeors, Rain and ice effects, Eliminating or alleviating propagation effects. **Comparison of Satellite band in terms of signal attenuation and fading.**

[I] EARTH STATION TECHNOLOGY:

Earth station design, Basic antenna theory, Design of large antennas, Tracking, Small earth station antennas, Equipment for earth stations, Video receive only systems, Frequency coordination.

[J] SATELLITE TELEVISION:

Transponder frequencies and designations, Satellite television receivers, Legal matters, direct broadcast satellites.

[K] VSAT:

VSAT fundamentals, VSAT technology, VSAT networks, Applications.

[L] GPS:

GPS Fundamentals, GPS technology, Applications.

Text Book:

1. Satellite Communications, 2nd Edition
By: Timothy Pratt & Charles W. Bostian
Publisher: John Wiley & Sons.

Ref. Book:

1. Satellite Communication, 3rd Edition
By: Dennis Reddy
Publisher: Tata McGraw Hill

B.TECH. SEMESTER-VI (EC)

SUBJECT: FIBER OPTIC COMMUNICATION (Elective - IV) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2016)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] Introduction Optical Fiber Communications

Introduction, The Nature of Light, Basic Optical Laws and Definitions, Optical Fiber Modes and Configurations, Mode Theory for Circular Waveguides, Single-Mode Fibers, Graded-Index Fiber Structure, Basics of Fiber Materials

[B] Signal Degradation in Optical Fibers

Attenuation, Signal Distortion in Optical Waveguide, Pulse Broadening in Graded-Index Waveguides, Mode Coupling, Design Optimization of Single-Mode Fibers

[C] Optical Sources

Basics of Optical Sources, Light-Emitting Diodes (LEDs), Laser Diodes, Light Source Linearity, Modal, Partition, and Reflection Noise

[D] Power Launching and Coupling

Source-to-Fiber Power Launching, Lensing Schemes for Coupling Improvement, Fiber-to-Fiber Joints, LED Coupling to Single-Mode Fibers, Basics of Fiber Splicing, Optical Fiber Connectors

[E] Photodetectors

Physical Principles of Photodiodes, Photodetector Noise, Detector Response Time, Avalanche Multiplication Noise, Temperature Effect on Avalanche Gain, Comparison of Photodetectors

[F] Transmission Systems

Digital

Point-to-Point Links, System Considerations, Link Power Budget, Rise-Time Budget, First-Window Transmission Distance, Transmission Distance for Single-Mode Links, Noise Effects on System Performance

Analog

Overview of Analog Links, Carrier-to-Noise Ratio, Multichannel Transmission Techniques

[G] WDM Concepts and Components

Operational Principles of WDM, Passive Components, Tunable Sources, Tunable Filters

[H] Optical Amplifiers

Basic Applications and Types of Optical Amplifiers, Semiconductor Optical Amplifiers, Erbium-Doped Fiber Amplifiers, System Applications, Wavelength Converters

[I] Optical Networks

Basic Networks, SONET/SDH, Broadcast-and-Select WDM Networks, Wavelength-Routed Networks, Nonlinear Effects on Network Performance, Performance of WDM+EDFA Systems, Solitons, Optical CDMA

[J] Measurements

Measurement Instruments, Attenuation Measurements, Dispersion Measurements, OTDR Field Applications

Text Book:

1. Optical fiber Communication, Gerd Kaiser, 3rd Edition McGraw Hill Publication

Ref. Books

1. Fiber-Optic Communication Systems, Govind P. Agrawal, 4th Edition Wiley Publications

B.TECH. SEMESTER-VIII (EC)

SUBJECT: PROJECT/INDUSTRIAL TRAINING (EC 801) (Credits : 18.0)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)			Marks
L Hrs	C	T hrs	C	P hrs	C	Seminar	Practical	T.W.	Total
-	-	-	-	24	18	100	300	100	500

The students are required to present seminar on project/given topic every week.

The students will undertake project work for the period of full semester. They should design/develop & fabricate the hardware and/or software system. They may also undertake project involving study and analysis of existing electronic systems in the industry and suggesting modifications for revamping the system.

They are supposed to prepare and submit a project report as a part of their term work and give seminars on their work. The students may be sent to the industry for their project and they are to timely report to the institute regarding monitoring and necessary guidance. The faculty should arrange visits at the places where the students are performing their project work.

They should arrange for demonstration of the project work, if any. They are to be examined based on viva and/or demonstration.