

**COURSE STRUCTURE  
AND  
DETAILED SYLLABUS**

for

**B.Tech Four Year Degree Course**

in

**ELECTRICAL AND ELECTRONICS ENGINEERING  
(EEE)**

(Applicable for the batches admitted from 2014-2015)



**SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY**

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar, R.R.District-501 301.

**SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)****B.Tech in Electrical & Electronics Engineering****COURSE STRUCTURE & SYLLABUS (2014-15)****I Year – I Semester**

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4H101	English – I	2	1	---	2	30	70
2	4H111	Engineering Mathematics –I	3	2	---	3	30	70
3	4H121	Engineering Physics – I	3	1	---	3	30	70
4	4H131	Engineering Chemistry-I	3	1	---	3	30	70
5	4F101	Computer Programming	4	1	---	4	30	70
6	4B101	Engineering Drawing - I	2	---	4	4	30	70
7	4H171	ELCS Lab - I	---	---	2	1	25	50
8	4H181	Engineering Physics Lab – I	---	---	3/2	1	25	50
9	4H186	Engineering Chemistry Lab	---	---	4/2	2	25	50
10	4F171	Computer Programming Lab	---	---	3	2	25	50
11	4B171	Engineering Workshop -I	---	---	3/2	1	25	50
12	4F172	IT work shop – I	---	---	3/2	1	25	50
13	4A185	Technical paper writing & seminar - I	---	---	2	1	25	---
<b>Total</b>			<b>17</b>	<b>6</b>	<b>17.5</b>	<b>28</b>	355	720

## I Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4H202	English – II	2	1	---	2	30	70
2	4H213	Engineering Mathematics – II	4	1	---	4	30	70
3	4H222	Engineering Physics – II	3	1	---	3	30	70
4	4E201	Data Structures and C ++	4	1	---	4	30	70
5	4B202	Engineering Drawing – II	2	---	3	3	30	70
6	4H232	Engineering Chemistry-II	3	1	---	3	30	70
7	4A201	Circuits & Networks - I	3	2	---	3	30	70
8	4H272	English Language Lab - II	---	---	2	1	25	50
9	4E271	Data Structures and C ++ Lab	---	---	3	2	25	50
10	4B273	Engineering Workshop – II	---	---	3/2	1	25	50
11	4H282	Engineering Physics Lab- II	---	---	3/2	1	25	50
12	4A286	Technical paper writing & seminar – II	---	---	2	1	25	---
<b>Total</b>			<b>21</b>	<b>7</b>	<b>13</b>	<b>28</b>	<b>335</b>	<b>690</b>

## II Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4H315	Engineering Mathematics-III	3	2	---	3	30	70
2	4CC02	Switching Theory and Logic Design	4	1	---	4	30	70
3	4CC01	Electronic Devices and Circuits	4	1	---	4	30	70
4	4A302	Electro Magnetic Fields	3	1	---	3	30	70
5	4A303	Electrical Machines – I	3	2	---	3	30	70
6	4A304	Circuits & Networks – II	4	1	---	4	30	70
7	4HC73	Functional and Communicative Written English	---	---	3	2	25	50
8	4CC71	Electronic Devices & Circuits Lab	---	---	4	2	25	50
9	4A371	Electrical Circuits & Simulation Lab	---	---	4	2	25	50
10	4A387	Technical paper writing & seminar – III	---	---	2	1	25	---
<b>Total</b>			<b>21</b>	<b>8</b>	<b>13</b>	<b>28</b>	<b>280</b>	<b>570</b>

## II Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4HC16	Probability & Statistics	3	1	---	3	30	70
2	4A405	Electrical Machines – II	3	1	---	3	30	70
3	4A406	Power System – I	4	1	---	4	30	70
4	4AC07	Control Systems	4	1	---	4	30	70
5	4C433	Electronic Circuits	3	1	---	3	30	70
6	4BC04	Basic Mechanical Engineering	3	2	---	3	30	70
7	4HC74	Effective English Communication and Soft Skills	---	---	3	2	25	50
8	4A472	Comprehensive Viva-Voce- I	---	---	---	1	---	50
9	4A473	Electrical Machines Lab – I	---	---	4	2	25	50
10	4C481	Electronic Circuits Lab	---	---	4	2	25	50
11	4A488	Technical paper writing & seminar – IV	---	---	2	1	25	---
<b>Total</b>			<b>20</b>	<b>7</b>	<b>13</b>	<b>28</b>	<b>280</b>	<b>620</b>

**III Year – I Semester**

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4BC04	Basic Mechanical Engineering	3	1	---	3	30	70
2	4CC09	Linear and Digital IC Applications	3	1	---	3	30	70
3	4A508	Electrical Machines – III	4	1	--	4	30	70
4	4A509	Power Electronics	3	1	--	3	30	70
5	4A510	Power Systems – II	4	1	--	4	30	70
6		<b>Open Elective – I</b>	3	--	--	3	30	70
7	4HC76	Quantitative Aptitude	---	--	3	2	25	50
8	4A574	Group Project	--	--	3	1	25	50
9	4CC76	Linear and Digital IC Applications Lab	--	--	3	2	25	50
10	4A575	Control Systems Lab	--	--	3	2	25	50
11	4A589	Technical paper writing and seminar - V	---	---	2	1	25	---
<b>Total</b>			<b>20</b>	<b>5</b>	<b>14</b>	<b>28</b>	<b>305</b>	<b>620</b>

**Open Elective – I**

4CC04	Signals And Systems
4FC21	Fundamentals of Database Management Systems
4DC01	Discrete Structures And Graph Theory
4DC07	VLSI Design
4DC06	Embedded And Real Time Systems
4BC15	Product and Service Design
4ZC04	Entrepreneurship
4EC26	SAP-I

**III Year – II Semester**

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4ZC01	Managerial Economics and Financial Analysis	4	1	--	4	30	70
2	4DC05	Microprocessor and Microcontrollers	3	1	--	3	30	70
3	4A616	Utilization of Electrical Energy	3	1	--	3	30	70
4	4A611	Power Systems – III	4	1	---	4	30	70
5	4A612	Measurements & Instrumentation	3	1	--	3	30	70
6		<b>Open Elective – II</b>	3	--	--	3	30	70
7	4HC77	Logical Reasoning	---	--	3	2	25	50

8	4A676	Comprehensive Viva-Voce- II	--	--	--	1	--	50
9	4A677	Electrical Machines Lab – II	--	--	3	2	25	50
10	4A678	Power Electronics Lab	--	--	3	2	25	50
11	4A690	Technical paper writing and seminar – VI	---	---	2	1	25	---
<b>Total</b>			<b>20</b>	<b>5</b>	<b>11</b>	<b>28</b>	<b>280</b>	<b>620</b>

### Open Elective – II

4HC51	Basic Spanish Language
4HC41	Basic French Language
4HC46	Basic German Language
4ZC05	General Management and Entrepreneurship
4ZC07	Fundamentals of Disaster Management
4ZC12	Project Management and Finance
4E607	Operating System Concepts
4EC27	SAP-II

\*\*\*Industry Oriented Mini Project will be conducted by all students in summer vacation of III / IV B.Tech, II – Semester for a period of One Month. The report must be submitted in IV / IV B.Tech I –Semester and will have to be defended. Marks allotted are “75” and Two Credits are provided.

### IV Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							INT	EXT
1	4GC33	Culture values, Professional Ethics and IPR	2	1	---	2	30	70
2	4A714	Power Systems – IV	4	0	--	4	30	70
3	4A715	Non conventional Sources of Energy	3	1	--	3	30	70
4	4A713	Power Semi Conductor Drives	4	1	--	4	30	70
5	4ZC02	Management Science	4	1	--	4	30	70
6		<b>Professional Elective – II</b>	4	1	---	4	30	70
7	4A779	Project Phase –I	--	--	2	1	50	--
8	4A780	Industry Oriented Mini Project	--	--	--	2	25	50
9	4A781	Electrical workshop	--	--	3	2	25	50
10	4DC71	Microprocessor and Microcontrollers Lab	--	--	3	2	25	50
11	4A782	Measurements and Instrumentation Lab	--	--	3	2	25	50
12	4A791	Technical paper writing and seminar - VII	---	---	2	1	25	---
<b>Total</b>			<b>21</b>	<b>5</b>	<b>13</b>	<b>31</b>	<b>355</b>	<b>620</b>

### Professional Elective – II

4A717	High Voltage Engineering
4CC15	Digital Signal Processing
4A718	Optimization Techniques
4FC10	Neural Networks and Fuzzy Logic
4EC05	Fundamentals of Computer Networks

### IV Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							Int	Ext
1	4A820	Electrical Distribution Systems	3	1	---	3	30	70
	4GC06	Environmental Studies	4	--	--	4	30	70
2		<b>Professional Elective – III</b>	4	--	---	4	30	70
3	4A883	Project Phase -II	---	---	15	12	50	150
4	4A884	Comprehensive Viva-voce-III	---	---	---	1	---	50
5	4A892	Technical paper writing and seminar - VIII	---	---	2	1	25	---
<b>Total</b>			<b>11</b>	<b>1</b>	<b>17</b>	<b>25</b>	<b>165</b>	<b>410</b>

### Professional Elective – III

4A819	Flexible AC Transmission Systems
4FC22	Big Data Analytics
4A821	High Voltage DC Transmission
4A823	Control of Electric Drives
4ZC19	Project Management and Structured Finance

**L** - Lectures;      **T** - Tutorial;      **P/D** - Practical / Drawing;      **C** – Credit







## DIAGNOSTIC TEST 2

### Remedial Activity 2

#### UNIT 4: Creativity

Lesson: *A Tea Party* by **Ruth Prawar Jhabwala**

Vocabulary: Text based words, meanings and sentences / Affixation, Prefixes, Infixes and Suffixes

Grammar: Sentences Using the Correct Form of given base word

Writing: Informal / Formal Letter Writing (*Salutation, Introduction, Body, Conclusion, Complimentary Close and Signature*)

Speaking: Situational Dialogues

#### UNIT 5: Inspiring Speech

*Moon Shot Speech (1961)* by **John F. Kennedy**

Vocabulary: Text Based Words / Meanings

Collocations: Words that go together

Exercises based on Collocations

Phrasal Verbs

Exercises

Grammar: Scrambled Words and Writing Sentences

Writing: Summarizing

Speaking: Topic related short speeches / Narrating an anecdote

*Tex Book: Compiled by Faculty - Department of English (SNIST)*

*Suggested Reading: Essential English Grammar by Raymond Murphy*

*Intermediate English Grammar by Raymond Murphy*

				<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>				
				<b>3</b>	<b>2</b>	<b>0</b>	<b>3</b>				
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**I Year B.Tech. I Semester**

**Code: 4H111 ENGINEERING MATHEMATICS –I**  
**(Common to all branches except Bio-Technology)**

**UNIT-I: Differential Calculus:**

Rolle's theorem, Lagranges and Cauchy mean value theorems (without proofs). Taylor's series and Maclarin series- Applications to find approximation of definite integrals.

**Functions of several variables:** Continuity of function of variables, Partial derivatives of Higher order, Euler's theorem, Total differentiation, Jacobian and its properties, Extreme values of a function of several variables- Applications.

**UNIT-II: Ordinary Differential Equations of first order:**

Differential equations of first order and first degree-Exact, Linear and Bernoulli equations. Applications: Law of natural growth and decay, Newton's law of cooling, orthogonal trajectories.

**UNIT-III: Ordinary Differential Equations of Higher order:**

Linear differential equations of second and higher orders with constant coefficients, method of variation of parameters, system of linear differential equations with constant coefficients. Applications: simple Harmonic motion, LCR circuit.

**UNIT-IV: Multiple integrals:**

Double Integrals, Iterated Integrals-Integrals over Rectangular and General Regions, Change of Variables, Polar Coordinates, Triple integrals in Cartesian coordinates, Change of variables. Applications -Moment of Inertia, Calculation of volumes using Triple Integrals.

**UNIT-V: Vector Differential Calculus:**

Scalar and Vector Fields, Vector Differentiation, Level Surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence and Curl of a Vector Field, Laplacian Operator and related properties.

**UNIT-VI: Vector Integral Calculus:**

Line Integral, Surface Integral, Volume Integral, Verification of problems on Green's Theorem in Plane, Gauss-Divergence Theorem and Stoke's Theorem.

**TEXT BOOKS:**

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.

**REFERENCE BOOKS:**

1. A Text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

Code: 4H121

**B.Tech. I Year – I semester**  
**Engineering Physics – I**  
 (Common to all branches)

**L T P/D C**  
**3 1 -- 3**

a	b	c	d	e	f	g	h	i	j	k	l
x											

**UNIT – I: Crystallography and Crystal Structures:**

Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, and hcp Structures. Atomic densities along various important directions and planes and comparison of deformability of BCC, FCC and hcp metals.

**UNIT-II: Defects in Crystals:**

Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects-Calculation of concentration, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector.

**X-ray Diffraction:** Basic Principles, Bragg's Law, Powder Method, Applications of X-ray Diffraction.

**UNIT- III: Elements of Statistical Mechanics:**

Phase space, Ensemble, Difference between micro, canonical & grand canonical ensemble, Qualitative explanation of Maxwell - Boltzman Statistics, Bose – Einstein Statistics, and Fermi – Dirac Statistics, Density of states quantitative treatment.

**UNIT-IV: Principles of Quantum Mechanics:**

Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation -Physical Significance of the Wave Function -Particle in One Dimensional Potential Box.

**UNIT-V: Free electron theory of Metals:**

Classical free electron theory (Drude and Lorentz), Electrical conductivity of a metals, Relaxation time, Collision time and mean free path, Success of classical free electron theory, Breakdown of free electron theory, Fermi – Dirac distribution function- variation with temperature, The quantum free electron theory.

**UNIT-VI: Band Theory of Solids:**

Bloch Theorem, Kronig-Penny  $\bar{e}$  Model (Qualitative Treatment), E-K curve, velocity of, point of inflection, effective mass of an  $\bar{e}$  electron and its significance, Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators.

**Text Book:**

1. P K Palanisamy, Engineering Physics, Sitech Publications

**Reference Books:**

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
2. Neil W. Ashcroft, N. David Mermin., Solid State Physics, Thomson Publisher,
3. Donald Allan McQuarrie, Statistical Mechanics, University Science Books Publisher, California
4. Sathya Prakash, Statistical Mechanics, Pragathi Prakashan Publisher
5. Quantum Mechanics by G. Aruldas
6. John L Powel, Quantum Mechanics, Narosa Publications
7. Ramamurti Shanker, Principles of quantum Mechanics, Springer Publication
8. M Chandrashekar and P Appala Naidu, Applied Physics, VGS Book Links
9. K. Vijaya Kumar, S Chandralingam, Modern Engineering Physics, S Chand Publisher

CODE: 4H131

**B.Tech I Year I Sem**  
**ENGINEERING CHEMISTRY-I**  
 (Common to all)

**L     T   P/D   C**  
**3     1     -     3**

a	b	c	d	e	f	g	h	i	j	k	l
x		x	x								

**UNIT - I     WATER TECHNOLOGY**

- (a) **Water quality Parameters**:-Hardness of water – types of hardness (temporary and permanent). Estimation of hardness of water by EDTA Method.
- (b) **Water for Industrial purpose**: Water for steam making, Boiler troubles-Carry over (priming & foaming).Boiler Corrosion, Scale and sludge, caustic embrittlement.
- (c) **Treatment of Water**: Internal Conditioning- Phosphate, Carbonate & Calgon conditioning. External Treatment: Lime- Soda, Zeolite, Ion-exchange process, Desalination-Reverse osmosis and electro dialysis. Methods of Treatment of Water for Domestic purpose-Sedimentation, Coagulation, Filtration, Disinfection-Chlorination, Ozonization. (Numerical problems on calculation temporary and permanent hardness). **Engineering applications: Methodology and working of mineral water plant (ISI) for drinking purpose.**

**UNIT - II     ELECTROCHEMISTRY**

**Electro Ionics**:- Conductance – conductors (metallic and electrolytic) – Types of conductance – specific, Equivalent, molar conductance – Effect of dilution on conductance – Kohlrausch's law and its applications  
 i) Determination of equivalent conductance for weak electrolytes ii) Degree of dissociation iii) Solubility of sparingly soluble salts – numerical problems on Kohlrausch's law.

**Electrodeics** :- E M F of electrochemical cells – cell notation and cell reaction – electrode potential (oxidation and reduction) Nernst Equation and its applications. Types of electrodes (a) Gas electrode (H<sub>2</sub> electrode) (b) Metal ion electrode (Zn/Zn<sup>+2</sup>) (c) Redox electrode (Quinhydrode electrode) (d) Metal – Metal insoluble salt electrode(SCE) (e) Ion selective electrode. **Engineering Applications** – determination of P<sup>H</sup>.

**UNIT - III     ELECTROCHEMICAL ENERGY SOURCES – BATTERIES**

**Cell and batteries** – types of batteries

- (a) Primary batteries – Lechalanche cell (dry cell), Lithium cell  
 (b) Secondary batteries(Accumulators) – Lead acid battery, Alkaline battery Ni-Cd battery, , Lithium-ion battery  
 (c) Fuel cells- H<sub>2</sub> – O<sub>2</sub> fuel cell & Methanol – Oxygen fuel cell  
 (d) Photovoltaic Cell- Solar Cell

**Engineering applications** – future water powered car, solar cells in domestic and automobiles.

**UNIT - IV     CORROSION AND ITS CONTROL**

Corrosion – Basic concepts – Mechanism of chemical, electrochemical Corrosion (absorption of O<sub>2</sub> and evaluation of H<sub>2</sub>) – Pilling - Bed worth rule – Types of electrochemical Corrosion – Galvanic Corrosion – Pitting Corrosion – Concentration Cell Corrosion – Factors affecting the rate of Corrosion.

**Engineering Applications:**

- a) **Corrosion Control Methods**- Cathodic protection – sacrificial anode and impressed current cathode method.
- b) **Protective Coatings** -- Surface preparation for metallic coatings like hot dipping (**tinning and galvanizing**) metal cladding (**Al Cladding**) electro plating (**copper plating**) and electroless plating (**Nickel plating**). Methodology and production of gold decorative articles.

## UNIT - V PHASE EQUILIBRIA AND ALLOYS

**Phase rule:-** Introduction, definition of terms with examples, one components system – Water system, reduced phase rule – Two component systems, classification – lead – silver system.

**Alloys:** - Introduction – Definition – properties of alloys – significance of alloying, functions and effect of alloying elements. **Engineering applications of ferrous alloys – Ni chrome and stainless steel, nonferrous alloys – brass and bronze.**

## UNIT - VI NANO CHEMISTRY

**Basics** – distinction between molecules, nanoparticles and bulk materials, size – dependent properties.

**Nano Particles:** nano cluster, Nano rod, nano tube (CNT) and nano wire.

**Synthesis:** Precipitation, thermolysis, hydrothermal, solvothermal, electrode position, laser ablation, wet chemical methods of preparation (micro emulsion – solvent extraction Reduction – chemical oxidation Reduction. **Applications of Nano materials in Medicine and Energy systems** - Carbon nanotubes in efficient solar cell and fuel cells.

### Text Book:

1. Engineering Chemistry: P.K. Jain and M.K. Jain, Dhanpathrai Publications-14<sup>th</sup> Edition.

### Reference Books:

1. Essentials of Physical Chemistry: Baul & Tuli, S. Chand Publications.
2. Text of Engineering Chemistry by S.S. Dara & Mukkanti, S. Chand & CO, New Delhi (2014).
3. Chemistry of Engineering Materials by C.V. Agarwal, C.P. Murthy, A. Naidu; BS publications.
4. Text Book of Nano Science and Nano Technology by B.S. Murthy and P. Shankar, University press.

**B. Tech. I Year I semester  
COMPUTER PROGRAMMING  
(Common to all Branches)**

CODE: 4F101

				<b>L</b>				<b>T</b>		<b>P</b>		<b>C</b>
				<b>4</b>				<b>1</b>		<b>0</b>		<b>4</b>
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>	
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>					<b>x</b>	<b>x</b>			

**UNIT – I**

**Computer fundamentals** – Computer Systems, Computer Hardware, Computer Software, Computer Environments – Personal Computing Environment, Time-sharing Environment, Client/Server Environment, Distributed Computing, Computer Languages – Machine Languages, Symbolic Languages, High-Level Languages, Creating and running programs – Writing and Editing, compiling, linking, and executing programs, System Development – SDLC (Pages 1 – 28 of Text Book 1).

**Problem solving Techniques** – Algorithms, pseudo code, flowcharts – Simple illustrations and domain problems like: Sum of digits of a number, Nature of quadratic equations, Income Tax Problem, Standard Deviation (Pages 1019 – 1032 of Text Book 1).

**UNIT – II**

**Introduction to the C language** – Background, C Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables and keywords.

**Types** – void, integral, and floating-point types. Variables – declarations and initialization. Input / Output – Streams, Formatting input and output (Pages 29 – 76 of Text Book 1).

**Expressions** – Primary expressions, post-fix expressions, pre-fix expressions, unary expressions, binary expressions, Precedence and associativity, evaluating expressions, type conversions – implicit type conversion, explicit type conversion, statements – statement type, role of semicolon, statements and defined constants (Pages 94 – 134 of Text Book 1).

**Decision control structures** – Logical data and operators, Two-way selection – if..else, nested if, dangling else, conditional expressions, Multi-way selection – switch statement, else-if (231 – 263 of Text Book 1).

**UNIT – III**

**Repetitive control structures** – Pre-test and post-test loops – initialization and updation, event and counter controlled loops, while, do..while, for, break and continue statements, comma expression (Pages 303 – 348 of Text Book 1).

**Functions** – User-defined functions - Function definition, arguments, return value, prototype, arguments and parameters, inner-function communication. Standard functions – Math functions, Random numbers. Scope – local global (Pages 149 – 199 of Text Book 1).

**Parameter passing** – Call by value and call by reference.

**Recursive functions** – Definition, examples, advantages and disadvantages (Pages 349 – 359 of Text Book 1).

**Macros** – Definition, examples, comparison with functions.

**UNIT – IV**

**Arrays** – Definition and declaration, initialization, accessing elements of in arrays, storing values in arrays, inter-function communication – passing individual elements, passing the whole array, array applications, bubble sort, sequential search. Two dimensional and multidimensional arrays (Pages 459 – 487 and 493, 501 of Text Book 1).

**UNIT – V**

**Pointers** – Introduction, pointer constants, pointer values, pointer variables, accessing variables through pointers, pointer declaration and definition, declaration versus redirection, initialization of pointer variables, pointer for inter function communication, pointer to pointers (Pages 557 – 577 of Text Book 1).



*Arrays and pointers* – Pointer arithmetic and arrays, Memory allocation functions – static and dynamic memory allocation, array of pointers (Pages 612 – 633 of Text Book 1).

*Strings* – Input output functions, string handling functions.

#### **UNIT – VI**

*Enumerated, Structure, and Union types* – The type definition (typedef), enumerated types, Structure, Unions (Pages 745 – 786 of Text Book 1).

*Files* – File name, file information table, streams, text and binary streams, stream file processing, system created streams, Standard library I/O functions, file open and close, formatting I/O functions, character I/O functions, Binary I/O, Standard library functions (Pages 393 – 441, 821 – 840 of Text Book 1).

#### **Text Books:**

1. Computer science, a structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

#### **References:**

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education.
2. Let us C by Yashwanth P. Kanetkar 8<sup>th</sup> edition BPB publications.
3. Computer programming for teens by Mary Farrell.

Code: 4B101

**B. Tech. I Year I semester  
ENGINEERING DRAWING – I  
(Common to all branches)**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
2	0	4	4

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**UNIT – I**

**Introduction to Engineering Drawing:** Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning.

**Construction of polygons:** Inscription and superscription of polygons given the diameter of circle.

**Introduction To Scales (Theory Only):** Scales Used In Engineering Practice and Concept Of Representative Fraction

**Curves used in Engineering Practice and their Constructions:**

Conic Sections including Rectangular Hyperbola - General method only.

**UNIT – II**

**Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only):** Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths, traces.

**UNIT – III**

**Projections of Planes:** Projections of regular Planes, traces, Oblique planes, Introduction to Auxiliary planes

**UNIT –IV**

**Projections of Solids:** Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes.

**UNIT –V**

**Sections of Solids:** Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views

**UNIT –VI**

**Intersection of Similar and Dis-similar Solids:** Line method, Cutting plane method, Intersection of Prism Vs Prism, Cylinders Vs Cylinder (Under Similar category) and Cylinder Vs Prism (Under Dis-similar category)

**TEXT BOOKS:**

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing 2nd Edition [Basant Agrawal](#), [C. M. Agrawal](#), Tata McGraw-Hill Education

**REFERENCES:**

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.





CODE: 4H186

**B. TECH - I Year I Semester  
ENGINEERING CHEMISTRY LABORATORY**

L    T    P/D    C  
-    -    4/2    2

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

*The objective of the Laboratory practicals is to make the student to acquire the basic Knowledge used for engineering applications.*

1. Determination of Hardness of a **ground water** sample.
2. Preparation of **Thiokol rubber**.
3. Determination of **Viscosity of a lubricant** by Redwood Viscometer..
4. Estimation of Copper in **Brass alloy** (HYPO)
5. Estimation of Calcium in **Portland cement**.
6. Estimation of Iron content in **Ore sample** using Colorimeter (KSCN)
7. Estimation of **rate of Corrosion of Aluminium** in acidic and alkaline medium.
8. Determination of **Mohr's salt** by **Potentiometric** method.
9. Determination of **Calorific value** of Solid fuel by using Bomb Calorimeter.
10. Experiment on Green chemistry;**Aldol condensation**(not by Classic route)
11. Determination of Flash point and fire point of a **lubricant**
12. Determination of strength of Strong Acid using Strong Base (**HCl vs NaOH**) by **Conductometric titrations**.

Code: 4F171

**B. Tech I Year I semester  
COMPUTER PROGRAMMING LAB  
(Common to all Branches)**

	<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>							
	-	-	3	2							
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>						<b>x</b>		

1. **Unit I (Cycle 1)**
  - a. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
  - b. Write an algorithm to find the largest of three given numbers and draw a flowchart.
  - c. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
  - d. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.
  
2. **Unit II (Cycle 2)**
  - a. Write an algorithm, flowchart, and C program for:
    1. Finding the area and circumference of a circle of given radius.
    2. Finding the volume of a sphere of given radius.
    3. Finding the lateral surface area of a right circular cone of given base radius and height.
    4. Finding selling price of an item, given its cost price and profit percent.
    5. Finding the interest on a given principal for a given period of time at a given rate of per year.
  - b. Write a C program to display all the sizes of data types in C.
  - c. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.
  
3. **Unit II (Cycle 3)**
  - a. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
  - b. Write a C program for finding the largest of three given numbers.
  - c. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.
  
4. **Unit III (Cycle 4)**
  - a. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
  - b. Write a C program to compute the sum of:
    1.  $1+x+x^2+x^3+\dots+x^n$ , given x and n.
    2.  $1! + 2! + 3! + \dots + n!$ , given n.
    3.  $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \dots$  to n terms where the n<sup>th</sup> term becomes less than 0.0001.
  
5. **Unit III (Cycle 5)**
  - a. Write a C program in the menu driven style to perform the operations +, -, \*, /, % between two given integers.
  - b. Write a C program to find the largest and the least of some numbers given by the user.
  - c. Write a C program to find the sum of the digits of a positive integer.
  
6. **Unit III (Cycle 6)**
  - a. Write C functions for the following:
    1. A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
    2. A function that takes a real number x and a positive integer n as arguments and returns  $x^n$ .

3. A function that takes a positive integer  $n$  as an argument and returns the  $n^{\text{th}}$  Fibonacci number.
  - b. Using recursion write C functions for the following:
    1. Factorial of a non-negative integer  $n$ .
    2. Number of combinations of  $n$  things taken  $r$  at a time.
    3. Greatest Common Divisor of two integers.
    4. Least Common Multiple of two integers.
7. **Unit III (Cycle 7)**
1. Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
  2. Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
    1. Larger of two numbers.
    2. Smaller of two numbers.
    3. Sum of the squares of two numbers.
  3. Write a program to generate Pascal's triangle.
  4. Write a program to count the number of letters, words, and lines in a given text.
8. **Unit IV (Cycle 8)**
- a. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
  - b. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
  - c. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.
9. **Unit IV (Cycle 9)**
- a. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
  - b. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.
10. **Unit V (Cycle 10)**
- a. Write a function to swap two numbers.
  - b. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.
11. **Unit VI (Cycle 11)**
- a. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
  - b. Define a structure point. Write a program to find the distance between two points.
  - c. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.
12. **Unit VI (Cycle 12)**
- a. Write a program to:
    1. Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
    2. Open the file created above and display the contents of the file.
    3. Copy a file into some other file, file names given by the user or by command line arguments.
    4. Append a user mentioned file to another file.
    5. Reverse the first  $n$  characters of a file.

Code: 4B171

**B. Tech. I Year I semester  
ENGINEERING WORKSHOP – I  
(Common to all branches)**

**L      T      P/D      C**  
---      ---      3/2      1

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>		<b>x</b>									

**1. House Wiring**

To connect the Tube Light as per circuit diagram

To connect the Calling Bell as per circuit diagram

**2. Home Appliances**

Practice of disassembly and assembly of various home appliances such as Fans, Mixers, Washing machines etc.,

**3. Welding**

Preparation and welding of Lap Joint

Preparation and welding of Butt Joint



**B. Tech I Year I semester  
IT WORKSHOP-I**

Code: 4F172

				L	T	P/D			C		
				0	0	3/2			1		
a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

**Week1:**

**Introduction to Computer:** Identify the peripherals of a computer, components/peripherals in a CPU & its functions. Introduction to the types of Operating System, Install computer with dual boot operating system (windows, Linux with PowerPoint presentation). Comparison of types of OS in different platform.

**Week 2:** Assembling and Deassembling Praticals

**Week 3:**

**Introduction to Microsoft Windows 7:** Software and data, Components of Desktop, Working with windows

**Week 4:**

**Getting Started with Microsoft Windows 7:** Using the Start Menu, Obainting Help on Windows Changing Setting, Using Applications in Windows, Shutting Down Windows

**Week 5:**

Introduction to Linux Operating system, Linux Commands, DOS commands

**Week 6:**

Install computer applications in Linux and windows.  
Software and hardware trouble shoot, personal computer security settings and application software of the system.

**Cyber Ethics:** Access websites and email, effectively and securely browse (banksites, https webpages) and share the data, categories of websites (.com, .in, .edu, .org).

**TEXT BOOK:**

1. "Comdex Information Technology Course Kit" by Vikas Gupta, Dreamtech Press

**I Year B.Tech – I Sem**  
**Code: 4A185**                      **TECHNICAL PAPER WRITING AND SEMINAR - I**

**L            T            P/D        C**  
**-            -            2           1**

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

There shall be a technical seminar evaluated for 25 marks in first year first semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defense before a departmental committee consisting of Head, a senior faculty and supervisor	15 marks

I Year B.Tech – II Sem  
ENGLISH -II

Code: 4H202

					<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>			
					<b>2</b>	<b>1</b>	<b>0</b>	<b>2</b>			
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
								x			

**UNIT 1: Short Story**

Lesson: *A Short Story of an Indian Engineer / A Talent, Undone* by **Bhargav Prasanna**

Grammar: Active and Passive Voice

Vocabulary: Words and Phrases from the text

Writing: Paragraph Writing (*Guided and Free*)

Speaking: Narration of Places of Interest (*India and Overseas*)

**UNIT 2: Speech**

Lesson: *The Convocation Speech* by **Narayana Murthy**

Vocabulary: Phrasal Verbs from the text

Grammar: Direct and Indirect Speech

Exercises related to speech

Writing: Précis Writing

Speaking: *Speaking on Current Affairs / Latest Technology*

**UNIT 3: Analysis of an Essay**

Lesson: *The Secret of Work* by **Swami Vivekananda**

Vocabulary: One Word Substitutes

Writing: Essay Writing

Speaking: Giving Instructions and Directions

**UNIT 4: Life History**

Lesson: *Three Days to See* by **Hellen Keller**

Concept and Elements of a Biography; Fiction and Non-Fiction; Ideas; Reminiscing

Writing: Critical Appreciation

Speaking: Speaking on past experiences and life's events

**UNIT 5: Advancement of Technology**

Lesson: *The Cyber Age* (**Polymer Bank Notes**)

Question and Answers regarding a report / Testing on Mood, Tense and Voice

Vocabulary: Text Based Words / Meanings

Writing: Report on the economic status due to Credit/Debit Card

Speaking: Debate on conventional Currency and "plastic money"

*Prescribed Text: Compiled by Faculty - Department of English (SNIST)*

*Suggested Reading: Essential English Grammar by Raymond Murphy*

*Intermediate English Grammar by Raymond Murphy*

Code: 4H213

**I Year B.Tech. II Semester**  
**ENGINEERING MATHEMATICS – II**  
 (Common to all branches except Bio-Technology)

**L T P/D C**  
**4 1 0 4**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**UNIT-I**

**Matrices and Linear System:** Rank of a matrix, Echelon form, normal form, Inverse of a matrix by Gauss-Jordan method, Linear dependence and independence of a vectors, Solution of Linear system-Gauss Elimination method, Rank method, Iteration methods: Gauss Jordan and Gauss seidal methods. Applications: Finding the current in electrical circuits.

**UNIT-II**

**Eigen Values and Eigen Vectors:** Linear Eigen values and Eigenvectors- properties, Cayley Hamilton theorem (without proof) and its applications, Digitalization of a matrix.

**UNIT-III**

**Special Functions:**

Beta, Gamma Functions –Properties, Relation between Beta and Gamma functions- Evaluation of improper integrals.

**UNIT-IV**

**Laplace Transformations:**

Laplace Transformations – Laplace transform, Shifting theorems, Multiplication by powers of t, Division by t, Laplace transform of Unit Step function, Impulse function, and periodic functions.

**Inverse Laplace transforms:**

Inverse Laplace transforms Shifting theorems, Partial fraction method, convolution theorem (without proof), Applications of Laplace transform to solve ordinary differential equations with constant coefficients.

**UNIT-V**

**Z- transforms:**

Z- Transforms – Inverse Z- transforms – properties – Damping rule – Shifting properties – Initial and final value theorems – Convolution theorem. Applications-Solution of difference equation by Z- transforms

**UNIT-VI**

**Fourier series:** Fourier series – Even and Odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine series.

**Fourier Transforms:**

Fourier transformation, Sine and Cosine transformations, Finite fourier transforms, Parseval’s identity.

**TEXT BOOKS:**

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.

**REFERENCE BOOKS:**

1. A Text Book of KREYSZIG’s Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

CODE: 4H222

**I Year B.Tech. II Semester**  
**ENGINEERING PHYSICS – II**

L T P/D C  
3 1 -- 3

a	b	c	d	e	f	g	h	i	j	k	l
x		x						x			

(EEE, ECE, ECM, CSE, IT)

**UNIT-I**

**Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, calculation of carrier concentration of Intrinsic and Extrinsic Semiconductors, Direct & Indirect Band Gap Semiconductors, Thermistor, Hall Effect in semiconductors and applications.

**UNIT-II**

**Physics of Semiconductor Devices:** Formation of PN Junction and working of PN junction. Energy Diagram of PN Diode, I-V Characteristics of PN Junction, LED, Solar cell, applications.

**UNIT-III**

**Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizabilities; Orientation Polarization(qualitative), Internal fields in Solids, Clausius-Mossotti equation, Frequency and temperature effect on Dielectrics(qualitative), Piezo-electricity, Pyro-electricity and Ferro- electricity, Applications.

**UNIT - IV**

**Magnetic Properties** Permeability, Field intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications, Super conductivity, effect of Magnetic Field, Critical current density, Meissner's effect, Type-I & Type-II superconductors, Introduction to BCS theory of Superconductivity, applications of super conductors.

**UNIT - V**

**Lasers:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

**Basics of Fiber Optics:** Introduction, Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical fibres. Attenuation in Optical Fibers, Optical Fiber in communication system.

**UNIT - VI**

**Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Chemical Vapour Deposition; Top-down Fabrication: Thermal evaporation, Ball Milling, Characterization of Nano materials(XRD&TEM), carbon nanotubes, Applications of Nano Materials.

**Text Books:**

1. P K Palanisamy, Engineering Physics, Sitech Publications

**Reference Books: -**

1. Introduction to Solid Physics, by Charles Kittel
2. Solid State Physics Neil by W. Ashcroft, N. David Mermin
3. Solid State Physics by S L Singal
4. Physics for semiconductor devices by Michael Shur
5. Engineering Physics P K Palanisamy
6. Nanotechnology: A Gentle Introduction To The Next Big Idea by M Ratner, D Ratner
7. Nano Materials by A K Bandyopadhyay
8. Applied Physics by P.K. Mittal
9. Modern Engineering Physics by S.Chandralingam, K.Vijay Kumar
10. Heat and Thermodynamics by Zemansky

Code: 4E201

**B. Tech I Year II semester  
DATA STRUCTURES AND C++  
(Common to all Branches)**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
<b>4</b>	<b>1</b>	<b>-</b>	<b>4</b>

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
	<b>x</b>	<b>x</b>	<b>x</b>					<b>x</b>	<b>x</b>		

**UNIT – I**

Introduction to data structures: Abstract data type (ADT), Stacks and Queues circular queues and their implementation with arrays.

Applications of Stack: infix to post fix conversion, postfix expression evaluation.

Applications of Queues

Objective:

On completion of the unit/chapter, a student should be able to: (i) Define what is an abstract data type (ii) Differentiate linear and non-linear data structures (iii) Representation and implementation of stack and queue using arrays. (iv) Convert the given infix expression to post fix notation and evaluate the postfix expression using stack. (v) Understand the applications of stack and queue.

**UNIT – II**

Singly linked lists, Advantages of Linked lists over Arrays, Doubly linked lists, Circular list and their operations, representing stacks and queues with Linked lists.

Objective:

On completion of the unit/chapter a student should be able to:(i) Understand what is a linked list (ii) know how structurally the distinct categories of lists differ from each other (iii) implement various categories of lists such as singly linked lists, doubly linked lists and circular lists (iv) understand how to represent and implement stack and queue using linked list

**UNIT – III**

Trees- Binary trees, terminology, representation, traversals.

AVL trees, AVL tree operations: Insertion, deletion and searching.

Graphs- terminology, representation, graph traversals (DFS & BFS).

Objective:

On completion of the unit/chapter a student should be able to:(i)understand the terminology and uses of trees and graphs(ii)explain distinct representations of trees as well the graphs(iii)analyze binary search tree(iv)construct binary search tree, given the elements and traverse the tree in pre-order, in-order and post-order(v)differentiate Depth First Search(DFS) and Breadth First Search (BFS) techniques and could traverse through the graph using DFS and/or BFS

**UNIT - IV**

Searching - Linear and binary search methods. Hash table representation, hash functions, double hashing.

Sorting - Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

Objective:

On completion of the unit/chapter a student should be able to:(i)understand what is meant by searching and could differentiate linear search operation performed on an ordered set of elements and an unordered set of elements(ii)differentiate the linear search and binary search techniques (iii)explain the procedure involved in binary search method(iv)understand the necessity of sorting techniques(v)list and implement different types of sorting techniques(vi)know and compare the time complexity of each sorting technique

**UNIT – V**

Introduction to C++ programming-object oriented programming concepts, Structured Vs OOP. Classes and objects-class definition, Objects, class scope and accessing members, Constructors-default constructor, parameterized constructor, constructor initialization list, copy constructor. Destructors.

Objective:

On completion of the unit/chapter a student should be able to:(i)differentiate structured programming approach and the object oriented programming approach(ii)understand the terms class, object and could write simple programs in C++ (iii)understand how to use access specifiers (iv)explain the differences between constructor and normal function

**UNIT – VI**

Static class members, this pointer, friend functions, Dynamic memory management with operators new and delete. Overloading-function overloading, Operator overloading, restrictions on operator overloading, overloading unary and binary operators, templates, inheritance: single, multiple and multi level inheritance.

Objective:

On completion of the unit/chapter a student should be able to:(i)describe static class members(ii)make use of this pointer, friend function(iii)demonstrate the dynamic memory allocation and deallocation (iv)understand what is overloading and write programs on function overloading, operator overloading(v)understand and differentiate types of templates (vi)learn inheritance and its usage.

**TEXT BOOKS**

1. Data Structure Through C by Yashavant Kanetkar.
2. The complete reference C++ By Herb Schildt.
3. Data Structures, A pseudocode Approach with C by Richard F. Gilberg & Behrouz A. Forouzan.

**REFERENCES**

1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. *Data Structures and Algorithms*. Addison Wesley, 1983.
2. Data Structures using c Aaron M.Tenenbaum , Yedidyah Langsam,Moshe J Augenstein.
3. Introduction To Data Structures In C By Kamtane

Code: 4B202

**B. Tech. I Year II semester  
ENGINEERING DRAWING – II  
(Common to all branches)**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
2	---	3	3

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**UNIT – I**

**Scales:** Construction of Plain, Diagonal, Comparative, Vernier Scales and Scale of chords.

**UNIT – II**

**Development of Surfaces:** Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their parts.

**UNIT – III**

**Isometric Projections/views:** Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

Conversion of Orthographic Views to Isometric Views of simple objects.

**UNIT –IV**

**Transformation of Projections:** Conversion of isometric views to orthographic views of simple objects.

**UNIT –V**

**Perspective Projections:** Principle, Perspective elements, Perspective View of Points, Lines, Plane Figures and Simple Solids - Vanishing Point Method, Visual ray method.

**UNIT –VI**

**Introduction to Computer Aided Drafting:** Generation of points, lines, curves, polygons, simple solids, dimensioning.

**TEXT BOOKS:**

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing 2<sup>nd</sup> Edition [Basant Agrawal](#), [C. M. Agrawal](#), Tata McGraw-Hill Education

**REFERENCES:**

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.



CODE: 4H232

**B.Tech I Year II Sem**  
**ENGINEERING CHEMISTRY-II**  
 (Common to EEE, ME, ECE, CSE, IT and ECM)

L    T    P/D    C  
 3    1    -    3

a	b	c	d	e	f	g	h	i	j	k	l
x		x	x								

**UNIT - I POLYMER TECHNOLOGY**

Polymer, polymerization - Types of Polymerization.

**Plastics** – thermosetting and thermoplastics , preparation, properties and **Engineering applications** of the following: PVC, Teflon, Bakelite, Nylon 6,6 and epoxy resins.

**Rubber** – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **Engineering applications**.

**conducting polymers**- classification, preparation of polyacetylene, polyaniline and their **Engineering applications**.

**UNIT - II SURFACE CHEMISTRY AND COLLOIDS**

**Surface Chemistry**: Adsorption – Types of Adsorption, Isotherms Langmuir adsorption isotherm.

**Engineering applications of adsorption**.

**Colloids**: Classification of colloids, Electrical and optical properties, micelles, gold number, Types of emulsions, preparation, Emulsifier, liquid in solids(gel), classification, preparation and properties

**Engineering applications of colloids in industry**.

**UNIT - III FUEL TECHNOLOGY**

**Classification of Fuels**- Solid ,Liquid & gaseous fuels. Characteristics of good fuel , calorific value (HCV&LCV) . Determination of calorific value by Bomb & Junkers gas calorimeter. Solid Fuels:- Coal and its chemical composition, Analysis of Coal and their importance. Liquid fuels:-Source –Petroleum-refining of petroleum- Production of petrol by Bergius and Fischer tropesch’s process.- (**the production of synthetic petrol**). Gaseous Fuels:- Natural gas –Analysis of flue gas by Orsat’s apparatus. **Engineering applications of fuels**.

**UNIT - IV EXPLOSIVES, PROPELLANTS AND LUBRICANTS**

**Explosives**: Classification, Precautions during Storage, blasting fuses, important explosives and their **Engineering applications**.

**Propellants**: Classification of Propellants, Solid Rocket propellants **and their engineering applications**.

**Lubricants:**

Classification- Solid , Semi Solid, Liquid, emulsion- Properties- Selection of lubricants for different purposes. Lubrication: Mechanism of lubrication (fluid film, boundary and extreme pressure lubrication). Characteristics of Lubricants, Viscosity, viscosity index, Cloud and pour point, flash and fire point, mechanical strength.**Engineering applications of lubricants**.

**UNIT – V CHEMISTRY OF ENGINEERING MATERIALS**

**Refractories** : Definition, Classification with examples, criteria of a good refractory material, Causes for the failure of a Refractory material. **Engineering applications of refractories**.

**Insulators**: Definition & Classification with examples, Characteristics of Insulating materials-Thermal insulators, Electrical insulators- Their Characteristics and **Engineering applications of electrical insulators**.

**Glass**:- Manufacture of glass –types of glasses-Soft glass- hard glass , **Applications of glass as an Engineering and Architectural material**.

**Ceramics** : Structural clay products, white wares and chemical stone wares. **Engineering applications of ceramics.**

**UNIT - VI GREEN CHEMISTRY**

Introduction, Concepts, Principles of green chemistry, development of green chemistry, importance of measurement in green chemistry, Principles of green engineering.

**Engineering Applications of green chemistry:** Manufacture of polylactic acid for **plastic production**, Production of **biodegradable polymer (poly hydroxyl alkanates (PHA))**.

**Text Books:**

1. Engineering Chemistry: P.K. Jain and M.K. Jain, Dhanpathrai Publications-14<sup>th</sup> Edition.

**Reference Books:**

1. Essentials of Physical Chemistry: Baul & Tuli, S. Chand Publications.
2. Text of Engineering Chemistry by S.S. Dara & Mukkanti, S. Chand & CO, New Delhi (2014).
3. Chemistry of Engineering Materials by C.V. Agarwal, C.P. Murthy, A. Naidu; BS publications.
4. Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. *Green Chemistry Experiments: A Monograph*, I.K. International Publishing Hopuse pvt Ltd. New Delhi, Bangalore (2013).
5. Text Book of Nano Science and Nano Technology by B.S. Murthy and P. Shankar, University press.

Code: 4A201

I year B.Tech – II Sem  
**CIRCUITS & NETWORKS – I**

						L 3	T 2	P/D -	C 3		
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
x	x		x	x							

**UNIT – I: INTRODUCTION TO ELECTRICAL CIRCUITS:**

Circuit concept, R – L – C parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Kirchoff's Laws, Network reduction techniques, Series, Parallel, Series - parallel, Star – to – delta and Delta – to – star transformation, Mesh analysis, Nodal analysis, Concept of super mesh and super node. Voltage current relationship for passive elements (for different input signals – square, ramp, saw tooth, triangular)

**UNIT – II: NETWORK TOPOLOGY:**

Definitions, Graph, Tree, Basic cutset and Basic tieset matrices for planar networks, Loop and Nodal methods of analysis of Networks using graph theory, Duality & dual networks

**UNIT – III: MAGNETIC CIRCUITS:**

Basic terms in Magnetic Circuits, Comparison between electric and magnetic circuits, Composite magnetic circuit, Analysis of series, parallel magnetic circuits, Faraday's Laws of electromagnetic induction, Concept of self and mutual inductance, Dot convention, Co-efficient of coupling.

**UNIT - IV: SINGLE PHASE A.C. CIRCUITS:**

R.M.S. and Average values, Form factor for different periodic wave forms, j Notation, Complex and polar forms of representation, Steady state analysis of R,L,C circuits (in series, parallel and series parallel combinations) with sinusoidal excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase angle, Concept of power factor, Real, Reactive powers and Complex power.

**UNIT – V: LOCUS DIAGRAMS & RESONANCE:**

Locus diagrams of R-L, R-C circuits with variation of various parameters (series and parallel), Resonance in series, parallel circuits, Concept of band width and Q factor.

**UNIT – VI: NETWORK THEOREMS:**

Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power transfer, Millman's and Compensation theorems with D.C.& A.C. excitations.

**TEXT BOOKS:**

1. Engineering circuit analysis - William Hayt and Jack E.Kemmerly, Tata McGraw - Hill Company, 6<sup>th</sup> edition.
2. Circuits & Networks - A.Sudhakar and Shyamamohan S.Palli, Tata Mc Graw Hill, 3<sup>rd</sup> edition.

**REFERENCES:**

1. Network Analysis - M.E. Vanvalkenberg, Printice Hall of India, 3rd edition
2. Circuit theory (Analysis & Synthesis) - A.Chakravarthy, Dhanpath Rai & Co., 6<sup>th</sup> edition.

Code: 4H272

I year B.Tech – II Sem  
ENGLISH LANGUAGE LAB- II

L	T	P/D	C
0	0	2	1

a	b	c	d	e	f	g	h	i	j	k	l
								x			

**Lab Activities:**

1. Reading Comprehension / Vocabulary Activities
2. Reading Comprehension / Vocabulary Activities
3. Reading Comprehension / Vocabulary Activities
4. Reading Comprehension / Vocabulary Activities
5. Reading Comprehension / Grammar
6. Reading Comprehension / Grammar
7. Reading Comprehension / Grammar
8. Reading Comprehension / Grammar

**Communication Skills:**

1. Speaking Activity: Agreement and Disagreement
2. Speaking Activity: Hobbies / Books
3. Speaking Activity: Hobbies / Movies / Travel
4. Speaking Activity: Picture Perception
5. Speaking Activity: Picture Perception
6. Speaking Activity: Extemporaneous
7. Speaking Activity: Debate

Code: 4E271

**B. Tech I Year II semester  
DATASTRUCTURES AND C++ LAB  
(Common to all Branches)**

			<b>L</b>		<b>T</b>		<b>P/D</b>		<b>C</b>		
			-		-		3		2		
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
	x	x	x					x	x		

**Lab Objective:**

On completion of all the exercises, a student should be able to:

- Represent and Implement the operations on basic linear and non-linear data structures
- Implement basic C++ programs using object oriented programming concepts

1. Write a C program that implement stack and its operations using arrays
2. Write a C program that implement Queue and its operations using arrays.
3. Write a C program that uses Stack operations to perform the following
  - i) Converting infix expression into postfix expression
  - ii) Evaluating the postfix expression
4. Write a C program that uses functions to perform the following operations on singly linked list.:
  - i) Creation ii) Insertion iii) Deletion iv) Traversal
5. Write a C program that uses functions to perform the following operations on doubly linked list.:
  - i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways
6. Write a C program that uses functions to perform the following:
  - i) Creating a Binary Tree of integers
  - ii) Traversing the above binary tree in preorder, inorder and postorder.
7. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
  - i) Linear search ii) Binary search
8. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
  - i) Bubble sort ii) Quick sort
9. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
  - i) Insertion sort ii) Merge sort iii) Selection Sort
10. Write a C++ program that prints all real solutions to the quadratic equation  $ax^2+bx+c=0$ . Read in a,b,c and use the quadratic formula. If the discriminant  $b^2-4ac$  is negative, display a message stating that there are no real solutions.
11. A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.
12. Write a C++ program that checks whether a given string is palindrome or not.

**TEXT BOOKS:**

1. Data Structure through C by Yashavant Kanetkar.
2. The complete reference C++ by Herb Schildt.
3. Data Structures, A pseudocode Approach with C by Richard F. Gilberg & Behrouz A. Forouzan.

Code:4B273

**B. Tech. I Year II semester**  
**ENGINEERING WORKSHOP – II**  
 (Common to all branches except CSE & IT)

					<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>				
					0	0	3/2	1				
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>	
		x										

**1. Fitting**

To make a Step Fitting as per the dimensions  
 To make a Half Round Fitting as per the dimensions

**2. Tin Smithy**

Preparation of Funnel  
 Preparation of Square box

**3. Black Smithy**

Fabrication of S - Shape  
 Fabrication of Hook shape

Code:4H282

**B. Tech. I Year II semester**  
**ENGINEERING PHYSICS LAB– II**  
 (Common to all branches)

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
0	0	3/2	1

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>		<b>x</b>									

1. Energy gap of a semiconductor
2. To study the characteristics of a thermistor
3. Characteristics of laser Diode
4. Numerical aperture of optical fiber and Bending losses of an optical fiber
5. Diffraction Grating.
6. Stewart & Gee's Experiment (Determination of magnetic induction flux density along the axis of a circular coil).
7. Newton's Rings
8. Hall effect
9. Dielectric constant of a given material
10. Dispersive power of Prism

Note: Any six of the above nine Experiments are to be conducted

**Prescribed Practical Book by Dr. Y. Aparna, Professor & HOD of Physics Department, JNTUH**

**I Year B.Tech – II Sem**  
**Code: 4A186 TECHNICAL PAPER WRITTING AND SEMINAR - II**

								<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
								<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
								x	x		x

There shall be a technical seminar evaluated for 25 marks in first year second semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defense before a departmental committee consisting of Head, a senior faculty and supervisor	15 marks



Code: 4H315

**II Year B.Tech – I Sem**  
**ENGINEERING MATHEMATICS – III**  
 (Common to all branches except Bio-Tech)

**L T P/D C**  
**3 2 - 3**

a	b	c	d	e	f	g	h	i	j	k	l
x											

**UNIT-I**

**Special Functions:** Beta, Gamma Functions –Properties, Relation between Beta and Gamma functions. Applications: Evaluation of improper integrals.

**UNIT-II**

**Complex Analysis:** Limits, continuity and differentiation, Analytic functions, Cauchy-Riemann equations, Complex integration, Cauchy's integral theorem (without proof), Cauchy's integral formula. Taylor's and Laurent's series, Singularities and zeros, Cauchy's Residue Theorem (without proof). Applications: Evaluation of real integrals using Cauchy residue theorem.

**UNIT-III****Fourier Transform:**

Fourier transform of a function, Sine and Cosine transformations, Finite fourier transform, Parseval's identity.

Application : Solution of differential equations using Fourier transform.

**UNIT-IV****Solution of algebraic and transcendental equations and Numerical integration:**

Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method, Trapezoidal rule – Simpson's 1/3 rule , Simpson's 3/8 rule.

**UNIT-V****Interpolation:**

Introduction-- Finite differences- Forward Differences, Backward differences, Central differences. Newton's formulae for interpolation – Gauss Central Difference Formulae (without proofs), Lagrange's Interpolation formula for unevenly spaced points.

**UNIT-VI****Numerical solution of Ordinary Differential equations:**

Solution by Taylor's series –Picard's Method of Successive Approximations –Euler's Method, Runge-Kutta Methods, Predictor-Corrector Methods- Milne's method, Adams-Bashforth method.

**TEXT BOOKS:**

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.
4. Erwyn Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 8<sup>th</sup> Edition.

**REFERENCE BOOKS:**

1. A Text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

Code: 4CC02

**II Year B.Tech – I Sem**  
**SWITCHING THEORY AND LOGIC DESIGN**  
 (Common to all branches except Bio-Tech)

**L T P/D C**  
**4 1 0 4**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>							

After studying this course, the students will be able to

1. Understand the rules of Boolean algebra and use it to simplify Boolean expressions.
2. Understand simplification of Boolean expressions using K-map.
3. Understand operations of combinational circuits such as full adders, multiplexers, decoders, encoders, code converters.
4. Understand the operation of sequential circuits such as flip-flops
5. Understand the operation of counters and registers. Able to design them.
6. Understand the structure of PLD's such as ROM's, PLA's, PAL's. Understand the basic concepts of State Machine Charts and models.

**UNIT – I**

**Number System:** binary, decimal, octal, hexa decimal, weighted and un-weighted codes.

**Boolean Algebra:** Axiomatic definition of Boolean algebra, Binary operators, postulates of and theorems.

Boolean addition, subtraction, 1's complement, 2's complement. Switching functions, Canonical forms and Standard forms, Simplification of switching functions using theorems.

**UNIT – II**

**Logic gates:** Basic gates and universal gates.

**Minimization of Switching Functions:** Karnaugh map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Quine-McCluskey Tabular Method, Prime Implicant chart, simplification rules.

**UNIT - III**

**Combinational Logic Design:** Single output and multiple output combinational logic circuit design, AND-OR, OR-AND, and NAND/NOR realizations, Exclusive-OR and Equivalence functions, Binary adders/subtractors, Encoder, Decoder, Multiplexer, Demultiplexer, MUX realization of switching functions, Parity bit generator, Code-converters, Contact Networks, Hazards and hazard free realizations.

**UNIT - IV**

**Sequential Circuits 1:** Classification of sequential circuits (Synchronous, Asynchronous Pulse mode, and Level mode with examples). Basic flip-flops-Triggering and excitation tables. Conversions of flip flops.

**UNIT - V**

**Sequential Circuits 2:**

The sequential circuit model. Asynchronous counters, Design of simple synchronous sequential circuits such as counters. Design of modulo-N counter, Ring counter, twisted ring counter. Shift registers

**UNIT - VI**

**Programmable Logic Devices:** Basic PLD's-ROM, PROM, PLA, and PLD Realization of Switching functions using PLDs .

**Algorithmic State Machines:**

State machines and state diagrams. Examples of weighing machine and Binary multiplier.

**Text Books:**

1. Morris Mano-,*Digital design* –PHI, 2nd Edition.
2. Zvi Kohavi -*Switching & Finite Automata theory* – TMH, 2nd Edition.

**References:**

1. Fletcher -*An Engineering Approach to Digital Design* – PHI.
2. Charles H. Roth,-*Fundamentals of Logic Design* –Thomson Publications, 5th Edition, 2004.
3. R.P.Jain-*Switching Theory and Logic Design*- TMH Edition,2003.
4. John M. Yarbrough -*Digital Logic Applications and Design* – Thomson Publications, 2006
5. CVS Rao -*Switching Theory and Logic Design* –Pearson Education, 2005

Code: 4CC01

**II Year B.Tech – I Sem  
ELECTRONIC DEVICES AND CIRCUITS  
(Common to ECE, ECM&EEE)**

											<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
											<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>			
<b>X</b>	<b>X</b>	<b>x</b>		<b>X</b>										

After studying this course, the students will be able to

1. Understand the Principle of operation and applications of CRO.
2. Understand the operation of diode and its application as rectifier.
3. Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
4. Understand the Fundamentals of JFET operation, Characteristics and importance of MOSFETs.
5. Understand the Small signal Model of BJT and Amplifier Analysis under CB, CE and CC configurations.
6. Understand the Basic regulator circuits and voltage multipliers.

**UNIT-I**

**ELECTRON DYNAMICS AND CRO:** Motion of charged particles in electric and magnetic fields. Simple problems based on electric and magnetic fields. Electrostatic and magnetic focusing, Principle of CRT. Deflection Sensitivity (Electrostatic and Magnetic deflection). Parallel Electric and Magnetic fields.

**UNIT- II**

**PN JUNCTION DIODE:** P-N junction diode under forward & reverse bias. Transition capacitance and Diffusion capacitance. Break down of junctions (Avalanche and Zener Break down). Zener Diode Characteristics. Applications: Half wave Rectifier, Full wave Rectifier, Bridge Rectifier: Analysis.

**UNIT-III**

**BIPOLAR JUNCTION TRANSISTOR:** Fundamentals of BJT & Operation, Minority carrier profiles. I/P and O/P Characteristics CB, CE and CC configurations. Switching characteristics (Rise time, Fall time, Delay Time and Storage time) .Biasing Methods & Stabilization Fixed Bias, Collector to Base Bias, Voltage Divider Bias and Problems, Thermal runaway in BJTs.

**UNIT-IV**

**FIELD EFFECT TRANSISTOR:** Working of JFET, JFET characteristics, Drain current equation, FET Parameters, Small signal model of JFET. Construction and characteristics of MOSFET (Enhancement and depletion mode); Comparison of JFET & MOSFET .SCR: Two transistor Analogy and Characteristics, UJT: Operation and Characteristics.

**UNIT- V**

**TRANSISTOR AMPLIFIERS:** Small signal Model of BJT, h-parameter representation-Determination of voltage gain, current gain, input impedance, output impedance .CE Amplifier-its Analysis, Frequency Response. Problems. RC coupled amplifier: Analysis. Approximate analysis of CB and CC Amplifiers.

**UNIT-VI**

**VOLTAGE REGULATORS:** Terminology, Basic regulator circuit: Zener, Transistor Based: Shunt and Series Voltage regulators. Protection Circuits: Current limiting, Short circuit protection. Specifications of Voltage regulator, Voltage multipliers.

**Text Books**

1. Electronic Devices and Circuits-J.Millman, C.C.Halkias and satyabratha jit Tata Mc Graw Hill, 2 Ed. 2007
2. Electronic Devices AND Circuits-R.L.Boylestad & Louis Nashelsky, Pearson/Prentice Hall, 9th edition, 2006.

**References:**

1. Integrated Electronics- J.Millman, C.C.Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits – K.LalKishore, 2 ed., 2005, BSP.
3. Electronic Devices and Circuits by Sanjeev Gupta, Dhapat Rai Publications.
4. Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata Mc Graw Hill Publications.

Code: 4A302

**II year B.Tech – I Sem  
ELECTRO MAGNETIC FIELDS**

**L T P/D C**  
3 1 0 3

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>							

**UNIT – I ELECTROSTATICS:**

Coordinate systems-Cartesian, Spherical and Cylindrical coordinate systems- Conversion of coordinates to other systems.

Electrostatic Fields – Coulomb’s Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass’s law – Application of Guass’s Law – Maxwell’s first law,  $\text{div} ( D )=pv$ -Laplace’s and Poisson’s equations.

**UNIT – II ELECTRIC DIPOLE & CONDUCTORS:**

Electric dipole –Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field, Energy stored and energy density in a static electric field.

Behavior of conductors in an electric field, Conductors and Insulators, Current density – conduction and Convection current densities – Ohm’s law in point form – Equation of continuity.

**UNIT – III DIELECTRICS, CAPACITANCE & MAGNETO STATICS:**

Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics.

Static magnetic fields – Biot-Savart’s law – Oesterd’s experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell’s second Equation,  $\text{div}(B)=0$ -

**UNIT – IV AMPERE’S CIRCUITAL LAW & FORCE IN MAGNETIC FIELDS:**

Ampere’s circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere’s circuital law – Maxwell’s third equation,  $\text{Curl} (H)=Jc$ , Field due to a circular loop, rectangular and square loops.

Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors –

**UNIT – V MAGNETIC DIPOLE & MAGNETIC POTENTIAL:**

Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field.

Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson’s equations.

**UNIT – VI SELF & MUTUAL INDUCTANCE AND TIME VARYING FIELDS:**

Self and Mutual inductance – Neumans’s formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

Time varying fields – Faraday’s laws of electromagnetic induction – Its integral and point forms – Maxwell’s fourth equation,  $\text{Curl} (E)=-\partial B/\partial t$  – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell’s equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

**TEXT BOOKS:**

1. “Engineering Electromagnetic’s” - William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7<sup>th</sup> Editon.2006.
2. “Electro magnetic Fields” - Sadiku, Oxford Publications

**REFERENCES:**

1. “Introduction to Electro Dynamics” - D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition
2. “Electromagnetics” - J P Tewari.
3. “Electromagnetics” - J. D Kraus Mc Graw-Hill Inc. 4<sup>th</sup> edition 1992.
4. “Electromagnetic fields”, - S. Kamakshaiah, Right Publishers, 2007.

**II Year B.Tech – I Sem  
ELECTRICAL MACHINES – I**

Code: 4A303

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
3	2	0	3

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>							

After studying this course, the students will be able to

1. Understand the constructional features & Principle of operation of DC machine.
2. Understand the characteristic features of DC machines.
3. Understand the starting & speed control techniques of various types of DC motors.
4. Analyze the various testing procedures of DC machines.
5. Understand the various applications of DC machines.

**UNIT – I D.C. GENERATORS – CONSTRUCTION & OPERATION:**

D.C. Generators, Principle of operation, Action of commutator, Constructional features, Armature windings, Lap and wave windings, Simplex and multiplex windings, Use of laminated armature, E. M.F Equation, Problems.

**UNIT – II ARMATURE REACTION IN D.C. GENERATOR:**

Armature reaction, Cross magnetizing and de-magnetizing AT/pole, compensating winding, Commutation reactance voltage, Methods of improving commutation, Simple Problems.

**UNIT – III TYPES OF D.C GENERATORS:**

Methods of Excitation, Separately excited and self excited generators, Build-up of E.M.F, Critical field resistance and critical speed, Causes for failure to self excite and remedial measures, Problems.

**UNIT –IV LOAD CHARACTERISTICS OF GENERATORS:**

Load characteristics of shunt, Series and compound generators, Parallel operation of d.c shunt and series generators, Load sharing, Problems.

**UNIT – V D.C. MOTORS AND SPEED CONTROL METHODS:**

D.C Motors, Principle of operation, Back E.M.F, Torque equation, Characteristics and application of shunt, Series and compound motors, Speed control of d.c. Motors: Armature voltage and field flux control methods. Ward-Leonard system, Principle of 3 point and 4 point starters, Protective devices, Problems.

**UNIT – VI TESTING OF D.C. MACHINES:**

Losses in a D.C. Machines, Calculation of efficiency, Condition for maximum efficiency, Methods of Testing, brake test , Swinburne’s test, Hopkinson’s test and Field’s test, Problems.

**TEXT BOOKS:**

1. Electric Machinery – A. E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5<sup>th</sup> edition.
2. Electrical Machines – P.S. Bimbra, Khanna Publishers.

**REFERENCES:**

1. Performance and Design of D.C Machines – Clayton & Hancock, BPB Publishers.
2. Electrical Machines -S.K. Battacharya.
3. Electric Machines - I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3<sup>rd</sup> edition, 2004.



Code: 4A304

II year B.Tech – I Sem  
CIRCUITS & NETWORKS- II

					L	T	P/D	C			
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a	b	c	d	e	f	g	h	i	j	k	l
x	x		x	x							

**UNIT – I: THREE PHASE CIRCUITS:**

Phase sequence, Star and delta connection, Relation between line and phase voltages and currents in balanced system, Analysis of balanced and unbalanced 3 phase circuits, Measurement of 3Φ active power by two watt meter method and reactive power by one watt meter method.

**UNIT – II: D.C AND A.C. TRANSIENT ANALYSIS:**

Transient response of R- L, R-C, R-L-C circuits (Series and parallel combination) for D.C. excitation, Initial conditions, Solution method using differential equation and Laplace transforms. Transient response of R- L, R-C, R-L-C circuits (Series and parallel combination) for sinusoidal excitations, Initial conditions, Solution method using differential equation and Laplace transforms.

**UNIT – III: NETWORK FUNCTIONS:**

The concept of complex frequency, Physical interpretation of complex frequency, Transform impedance and transform circuits, Series and parallel combination of elements, Terminal pairs or ports, Network functions for the one port and two-port, Poles and zeros of network functions, Significance of poles and zeros, Properties of driving point functions, Properties of transfer Functions, Necessary conditions for driving point functions, Necessary conditions for transfer functions, Time domain response from pole zero plot.

**UNIT – IV: NETWORK PARAMETERS:**

Two port network parameters, Z, Y, ABCD and hybrid parameters and their relations, Series, parallel and cascaded networks, Concept of transformed network, 2 port network parameters using transformed variables.

**UNIT – V: FILTERS:**

Classification of filters, Filter networks, Characteristic impedance in the pass and stop bands, Constant k and m – derived T – Section filters (Low pass, High pass, Band pass and Band stop), illustrative problems.

**UNIT – VI: FOURIER ANALYSIS OF A.C. CIRCUITS:**

The Fourier theorem, Consideration of symmetry, Exponential form of Fourier series, Line spectra and phase angle spectra, Fourier integrals and Fourier transforms, Properties of Fourier transforms.

**TEXT BOOKS:**

1. Circuit theory (Analysis & Synthesis) - A.Chakravarthy, Dhanpath Rai & Co., 6<sup>th</sup> edition.
2. Electric Circuits – T.Nagasarkar Oxford publications.

**REFERENCES:**

1. Engineering circuit analysis - William Hayt and Jack E.Kemmerly, Tata McGraw - Hill Company, 6<sup>th</sup> edition.
2. Circuits & Networks - A.Sudhakar and Shyamamohan S.Palli, Tata McGraw – Hill, 3<sup>rd</sup> edition.

## II year B.Tech – I Sem

## Code: 4HC73 Functional Communicative Written English (FCWE)

					L	T	P/D	C			
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a	b	c	d	e	f	g	h	i	j	k	l
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**UNIT 1: Speed Reading Strategies**

- Vocabulary skills:** Word recognition, guessing the meaning from the context, analysis of word structure (prefix – suffix)
- Prediction Techniques:** Index, headings, sub-headings, nonverbal context and linguistic clues
- Scanning skills:** Speed Reading, Regional practice
- Skimming Skills** for identifying the central idea and recognizing the main ideas
- Identifying** the writing pattern of the passage/text
- Intensive reading:** Identifying difference between facts/opinions and drawing inferences and conclusions

**UNIT 2: Group Discussions**

- Definitions:** Difference between a Group Discussion and Debate
- Purpose of Group Discussion:** Problem Solving, Decision Making and Personality Assessment
- Features / Characteristics** of successful Group Discussion: Agreement on Group Goals, Goal Oriented, Interactive Agreement for procedures, cooperative and friendly atmosphere
- Evaluation method** in Group Discussion for selection: Subject knowledge, oral communication skills, leadership skills and team management
- Group Discussion strategies:** Appropriate strategy for effective participation in Group Discussion, contributing systematically, creating a friendly and cooperative atmosphere, moving the discussion along, promoting optimal participation, handling conflict and effective closure
- Techniques for Individual contribution:** Topic analysis, Discussing opinions, problems, case studies

**UNIT 3: Nature of Technical Communication**

- Definition of Communication
- Stages of Communication; Channels of Communication; Nature of Technical Communication
- Aspects of Technical Competence – *Subject, Linguistic, Organizational Competence*
- Features of Technical Competence – Audience, Objective Language, Format Style and Visual Aids
- Difference between General Communication and Technical Communication
- Need and Importance of Technical Communication; Types of Technical Communications
- Technical Communication Skills:
  - Listening** - General, Academic and Professional
  - Speaking** - Asking and Answering Questions, Experiencing Opinion and Comments, Academic and Professional oral Interaction, Academic and Professional Discussions
  - Reading** – General, Academic, Professional
  - Writing** - General, Academic, Professional
- Barriers to Effective Communication: Improper encoding, Bypassing, Frame of Reference, Physical Distractions, Psychological and Emotional Interference and Intercultural differences

**UNIT 4: Presentation Skills**

- Nature and importance of Oral Presentation
- Planning the presentation
- Define the purpose
- Analysis the Audience and Occasion
- Choose a suitable Title/Topic.
- Preparing the Presentation: Develop the central idea, main ideas, supporting material, plan and prepare visual aids
- Presentation: Introduction, Body and Conclusion

- h. Rehearsing and Presentation: Vocal aspects, body language, Time management, Handling questions, meeting unexpected situations
- i. Handling Stage Fright
- j. DOs and DON'Ts of Presentations

**UNIT 5: Writing Strategies**

- a. Pre-writing; Writing; Re-writing
- b. Letter Writing - Formal and Informal Letter Writing; Inquiry Letters, Replies to Letters of urging action, Complaint, Bank and Insurance, Business and Industrial Sales, Correspondence, Social Correspondence
- c. E – Correspondence: Purpose, Structure, Layout and Form, Tone, Types,
- d. E-mails: Principles and Fundamentals
- e. E-mail Messages: Advantages of E-mail
- f. Characteristics of successful E-messages
- g. Formatting E-mail messages
- h. Standard E-mail practices
- i. E-mail writing strategies
- j. DOs and DON'Ts in E-Correspondence
- k. Nature and Significance of Report Writing
- l. Types of Reports: Informational and Analytical Reports, Routine and Special Reports, Oral and Written Reports, Formal and Informal Reports
- m. Formats of Reports: Printed, Letter, Memo, Manuscript
- n. Structure of Formal Reports
- o. Writing Strategies: Preparation steps to write a Report

**Suggested Books:**

1. *Technical communication- Meenakshi Raman and Sangeetha Sharma (Oxford Publications)*
2. *Effective Technical Communication – Ashraf Rizwi*
3. *Developing Communication Skills – Krishna Mohan and Meera Benarjee*
4. *SOFT SKILLS – Dr. K. Alex, S.Chand publications*
5. *Advanced Technical communication - Kavita Tyagi and Padma Mistri*

**II Year B. Tech - I semester  
ELECTRONIC DEVICES AND CIRCUITS LAB**

**CODE: 4CC71**

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<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>				<b>X</b>			

**ELECTRONIC WORKSHOP PRACTICE (in 6 lab sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Soldering practice – Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of
  - Multimeters (Analog and Digital)
  - Function Generator
  - Regulated Power Supplies
6. Study and Operation of CRO:
 

CRO Varieties and Operations:  
Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger Pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency.  
Dual trace oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.
7. Data sheets of p-n junction diode, zener diode, transistor, FET, UJT and SCR

**PART B: (For Laboratory examination – Minimum of 13 experiments)**

1. PN Junction diode characteristics A. Forward bias B. Reverse bias.
2. Zener diode characteristics
3. Transistor CB characteristics (Input and Output)
4. Transistor CE characteristics (Input and Output)
5. Rectifier without filters (Full wave & Half wave)
6. Rectifier with filters (Full wave & Half wave)
7. FET characteristics
8. CE Amplifier
9. CC Amplifier (Emitter Follower).
10. FET amplifier (Common Source)
11. RC Phase Shift Oscillator
12. Feed back amplifier (Voltage Series).
13. Hartley Oscillator

**II year B.Tech – I Sem  
ELECTRICAL CIRCUITS AND SIMULATION LAB**

Code: 4A371

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**PART-A: ELECTRICAL CIRCUITS:**

- 1) Thevenin's, Norton's and Maximum Power Transfer Theorems
- 2) Superposition theorem and RMS value of complex wave
- 3) Verification of Compensation Theorem
- 4) Reciprocity, Millmann's Theorems
- 5) Locus Diagrams of RL and RC Series Circuits
- 6) Series and Parallel Resonance
- 7) Determination of Self, Mutual Inductances and Coefficient of coupling
- 8) Z and Y Parameters
- 9) Transmission and hybrid parameters
- 10) Measurement of Active Power for Star and Delta connected balanced loads
- 11) Measurement of Reactive Power for Star and Delta connected balanced loads
- 12) Measurement of 3-phase Power by two Wattmeter Method for unbalanced loads

**PART-B: PSPICE SIMULATION:**

- 1) Simulation of DC Circuits
- 2) DC Transient response
- 3) Mesh Analysis
- 4) Nodal Analysis

**NOTE:**

- PSPICE Software Package is necessary.
- Eight experiments are to be conducted from PART-A & any Two from PART-B

Code: 4A187      **II Year B.Tech – I Sem**

**TECHNICAL PAPER WRITING AND SEMINAR – III**

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There shall be a technical seminar evaluated for 25 marks in second year first semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defense before a departmental committee consisting of Head, a senior faculty and supervisor	15 marks

**II Year B.Tech. II Semester**  
**PROBABILITY AND STATISTICS**  
 (Common to All Branches)

**Code: 4HC16**

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<b>x</b>											

**UNIT-I**

**Probability:**

Introduction, Sample Space and Events – Counting, Probability, The Axioms of probability, Addition theorem, Conditional, Multiplication theorem, Theorem of Total Probability, Baye’s Theorem.

*UNIT-II*

*Probability Distributions:*

Random variable – Discrete and Continuous, Distribution functions of probability- mass and density, Expectation, Probability distributions - Binomial, Poisson and Gaussian (Normal) distribution–Related properties.

**UNIT-III**

**Sampling Distributions:**

Populations and samples, Sampling distribution of the Mean (known ) and The sampling distribution of the mean (unknown), proportions, sums and differences. Central limit theorem and its applications. Estimation- Point Estimation, Interval Estimation, Bayesian Estimation.

**UNIT -IV**

**Inferences Concerning Means and Proportions:**

Tests of Hypothesis, Type-I and Type-II Errors, Hypothesis testing concerning to One mean and two means of large and small size samples. Test of Hypothesis Concerning to Proportions.

**UNIT-V**

**Test of significance:** Student t-test, F-test,  $\chi^2$  test- Goodness of fit, Independence of Attributes.

**UNIT-VI**

**Quality Control:**

Control Charts for Measurements, Control Charts for Attributes, Tolerance Limits, Acceptance Sampling.

**Text Books:**

1. Probability and Statistics for Engineers: Miller and John E. Freund, PHI Publishers, 9<sup>th</sup> Edition.
2. Probability and Statistics, V.Srinivas and R.Umamaheshwar Rao, Paramount Publishing House.

**REFERENCE BOOKS:**

1. Fundamentals of Mathematical Statistics: Gupta and Kapoor – S. Chand and Co.
2. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.

Code: 4A405

I year B.Tech – II Sem  
ELECTRICAL MACHINES-II

			L			T			P/D			C		
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x	x		x	x										

**UNIT-I SINGLE PHASE TRANSFORMERS – CONSTRUCTION, OPERATION AND PERFORMANCE:**

Single phase transformers-types - constructional details-minimization of hysteresis and eddy current losses-emf equation - operation on no load and on load - phasor diagrams- Equivalent circuit - losses and efficiency-regulation. All day efficiency - Effect of variations of frequency & supply voltage on iron losses

**UNIT-II - TESTING OF SINGLE PHASE TRANSFORMER AND AUTOTRANSFORMER:**

OC and SC tests - Sumpner’s test - predetermination of efficiency and regulation-separation of losses test-parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers.

**UNIT-III - POLYPHASE TRANSFORMER:**

Polyphase transformers - Polyphase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Third harmonics in phase voltages-three winding transformers-tertiary windings-determination of Zp, Zs and Zt transients in switching - off load and on load tap changing; Scott connection.

**UNIT- IV POLYPHASE INDUCTION MOTORS:**

Polyphase induction motors-construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor reactance, rotor current and pf at standstill and during operation- Rotor power input, rotor copper loss and mechanical power developed and their inter relation.

**UNIT-V - TORQUE- SPEED CHARACTERISTICS AND CIRCLE DIAGRAM OF INDUCTION MOTORS:**

Torque equation-deduction from torque equation- expressions for maximum torque and starting torque - torque slip characteristic- Double cage and deep bar rotors - crawling and cogging - equivalent circuit - phasor diagram-Circle diagram-no load and blocked rotor tests-predetermination of performance.

**UNIT-VI METHODS OF STARTING AND SPEED CONTROL OF INDUCTION MOTOR:**

Methods of starting and starting current and torque calculations-Speed control-change of frequency; change of poles and methods of consequent poles; cascade connection. Injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

**TEXT BOOKS:**

1. Electric machinery - A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw Hill Companies, 5<sup>th</sup> edition
2. Electrical machines- P S Bhimbra, Khanna Publishers.

**REFERENCES:**

1. Performance and Design of AC Machines – MG.Say, BPB Publishers
2. Theory of Alternating Current Machinery – Langsdorf, Tata McGraw-Hill Companies, 2<sup>nd</sup> edition.
3. Electric Machines – I.J.Nagrath & D.P.Kothari, Tata Mc Graw Hill, 7<sup>th</sup> Edition.2005



Code: 4A406

**II year B.Tech – II Sem  
POWER SYSTEMS - I**

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**UNIT -1 HYDROELECTRIC POWER STATION:**

Elements of hydro electric power station, Types, Concept of pumped storage plants, Storage requirements, Mass curve(explanation only) Estimation of power developed from a given catchments area, Heads and efficiencies

**Thermal power stations:**

Line diagram of Thermal Power Station (TPS) showing paths of coal, Steam, Water, Air, ash and flue gasses, Brief description of TPS components, Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

**UNIT -II GAS AND NUCLEAR POWER STATIONS:**

Nuclear Fission and Chain reaction, Nuclear fuels, Principle of operation of Nuclear reactor, Reactor Components, Moderators, Control rods, Reflectors and Coolants, Radiation hazards, Shielding and Safety precautions, Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations, Principle of Operation and Components (Block Diagram Approach Only).

**UNIT-III TRANSMISSION LINE PARAMETERS:**

Types of conductors - calculation of resistance for solid conductors - Calculation of inductance for single phase and three phase, single and double circuit lines, concept of GMR & GMD, symmetrical and asymmetrical conductor configuration with and without transposition, Numerical Problems. Calculation of capacitance for 2 wire and 3 wire systems, effect of ground on capacitance, capacitance calculations for symmetrical and asymmetrical single and three phase, single and double circuit lines, Numerical Problems.

**UNIT-IV PERFORMANCE OF SHORT, MEDIUM AND LONG LENGTH TRANSMISSION LINES:**

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems. Mathematical Solutions to estimate regulation and efficiency of all types of lines - Numerical Problems.

Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Surge Impedance and SIL of Long Lines, Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models (numerical problems).

**UNIT-V OVERHEAD LINE INSULATORS:**

Types of Insulators, String efficiency and Methods for improvement, Numerical Problems – voltage distribution, calculation of string efficiency, Capacitance grading and Static Shielding.

**SAG AND TENSION CALCULATIONS:**

Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems - Stringing chart and sag template and its applications.

Skin and Proximity effects - Description and effect on Resistance of Solid Conductors -Ferranti effect - Charging Current - Effect on Regulation of the Transmission Line, Shunt Compensation. Corona - Description of the phenomenon, factors affecting corona, critical voltages and power loss, Radio Interference.

**UNIT-VI UNDERGROUND CABLES:**

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Numerical Problems. Capacitance of Single and 3-Core belted cables, Numerical Problems. Grading of Cables - Capacitance grading, Numerical Problems, Description of Inter-sheath grading.

**TEXT BOOKS:**

1. A Text Book on Power System Engineering - M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Electrical power systems - C.L.Wadhwa, New Age International (P) Limited, Publishers, 1998.

**REFERENCES:**

1. Power system Analysis- John J Grainger William D Stevenson, TMC Companies, 4<sup>th</sup> edition
2. Power System Analysis and Design - B.R.Gupta, Wheeler Publishing.
3. Power System Analysis - Hadi Saadat – TMH Edition.
4. Modern Power System Analysis - I.J.Nagaraj and D.P.Kothari, Tata McGraw Hill, 2<sup>nd</sup> Edition.

Code: 4AC07

**II year B.Tech – II Sem  
CONTROL SYSTEMS**

**L T P/D C**  
4 1 - 4

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**UNIT – I INTRODUCTION:**

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions – Translational and Rotational mechanical systems

**Transfer function representation:**

Transfer Function of Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason’s gain formula.

**UNIT-II TIME RESPONSE ANALYSIS:**

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems, PID controllers.

**UNIT – III STABILITY ANALYSIS IN S-DOMAIN:**

The concept of stability – Routh’s stability criterion – qualitative stability and conditional stability – limitations of Routh’s stability.

**Root Locus Technique:** The root locus concept - construction of root loci-effects of adding poles and zeros to  $G(s)H(s)$  on the root loci.

**UNIT – IV FREQUENCY RESPONSE ANALYSIS:**

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

**UNIT – V STABILITY ANALYSIS IN FREQUENCY DOMAIN:**

Polar Plots-Nyquist Plots-Stability Analysis.

**CLASSICAL CONTROL DESIGN TECHNIQUES:** Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain.

**UNIT – VI STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:**

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

**TEXT BOOKS:**

1. Automatic Control Systems 8th edition –B. C. Kuo 2003– John wiley and sons.
2. Control Systems Engineering – I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2<sup>nd</sup> edition.

**REFERENCES:**

1. Modern Control Engineering – Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3<sup>rd</sup> edition, 1998.
2. Control Systems – N.K.Sinha, New Age International (P) Limited Publishers, 3<sup>rd</sup> Edition, 1998.
3. Control Systems Engg. – NISE 3<sup>rd</sup> Edition – John wiley.
4. “Modeling & Control of Dynamic Systems” – Narciso F. Macia George J. Thaler, Thomson Publishers.

Code: 4C433

**II year B.Tech – II Sem  
ELECTRONIC CIRCUITS**

			<b>L</b>			<b>T</b>			<b>P/D</b>		<b>C</b>
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<b>x</b>	<b>x</b>			<b>x</b>					<b>x</b>		

After studying this course, the students will be able to

1. Understand the design and analysis of single stage amplifier
2. Understand the different types positive and negative feedback amplifiers.
3. Understand the Fundamentals linear and non linear wave shaping circuits.
4. Understand the working of transistor switch and its design
5. Understand the various multivibrators applications.
6. Understand the concept of power amplifiers and distortions' present in amplifiers

**UNIT – I**

**SINGLE STATE AMPLIFIERS DESIGN AND ANALYSIS**

Review of CE, CB, CC & CS amplifiers- classification of Amplifiers, Distortion in amplifiers – Approximate analysis, CE, CB, CC amplifiers comparison.

**BJT & FET FREQUENCY RESPONSE**

Logarithms- decibels – General Frequency consideration – Low frequency analysis – Low frequency response of BJT amplifiers- low frequency response of FET amplifier – Miller effect capacitance – High frequency response BJT amplifier.

**UNIT – II**

**FEED BACK AMPLIFIERS:**

Concept of feedback, classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, voltage series shunt, current series and current shunt feedback configuration, simple problems.

**OSCILLATORS**

Conditions for oscillations, RC and LC type Oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators, RC-Phase shift and Wien-bridge oscillators.

**UNIT – III**

**LINEAR WAVE SHAPING:**

high pass, low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp inputs.

**NON-LINEAR WAVE SHAPING:**

clippers and clampers: Diode clippers- Transistor clippers- clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper- comparators, Applications of voltage comparators, Clamping operation, clamping circuits with different inputs, clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, transfer characteristics of clampers.

**UNIT – IV**

**SWITCHING CHARACTERISTICS OF DEVICES:**

Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of transistors and their variation with temperature, design of transistor switch, transistor , Switching times.

**UNIT – V**

**MULTI VIBRATORS:**

Analysis and Design of Bistable, Monostable, Astable Multi vibrators and Schmitt trigger using transistors and applications of Astable multivibrator and monostable multivibrator

**UNIT – VI**

**Large signal amplifiers:** Class, A power amplifier, Maximum Value of efficiency of Class – A amplifier, Transformer couple amplifier, Push Pull Amplifier, complimentary symmetry circuits (Transformer Less class B Power Amplifier), Phase inverters, Transistor Power Dissipation, Thermal Runway, Heat sinks.

**TEXT BOOKS:**

1. Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nasheisky, 9<sup>th</sup> Edition 2007, Pearson Education.
2. Solid State Circuits - David A.Bell 4<sup>th</sup> Edition, Prentice Hall of India.

**REFERENCES:**

1. Introductory Electronic Devices and Circuits (Conventional Flow version) - Robert T.Paynter, 7<sup>th</sup> Edition, 2009, PEI
2. Electronic Devices and Circuits- Ani K.Maini, Varsha Agarwal, 1<sup>st</sup> Edition, Wiley.

**B. Tech. I Year II semester**  
**BASIC MECHANICAL ENGINEERING**  
 (Common to All Branches Except Mechanical Engineering)

**Code: 4BC04**

**L T P/D C**  
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**UNIT - I**

**Thermodynamics:** Basic concepts of Thermodynamics, Property of gases, Zeroth Law. First Law of Thermodynamics and its applications, Second Law of Thermodynamics, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

**Internal combustion engines:** Internal combustion engines, definition, classification, components, working of two-stroke, four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

**UNIT-II**

- a) **Steam Power plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers :- “Cochron”, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).
- b) **Steam turbines:- Impulse & Reaction Turbines**
- c) **Gas turbine-power plants :- Closed & Open cycle types**

**UNIT- III**

- a) **Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant
- b) **Refrigeration & Air conditioning systems:-** Description of Vapour Compression and Vapour Absorption systems

**UNIT-IV**

**Manufacturing Processes:**

**Foundry Practice:-** Patterns, Moulding and Moulding materials, casting methods-Sand Casting, Shell mould Casting, Investment Casting, Die Casting ,Centrifugal casting – Principle and Application of these processes

**Welding:-** Types of Welding- Electric Arc welding - Coated electrode, TIG welding & MIG welding, Gas welding and cutting, Resistance welding- Spot welding, Soldering and Brazing .

**UNIT-V**

**Mechanical working :-** Hot and Cold working, Rolling- Rolling products, Types of Rolling mills, Forging-operations, forging methods, Extrusion-methods, Metal Spinning and Wire Drawing

**Press working operations:-**Cutting, Bending, Drawing and Squeezing

**UNIT-VI**

**Machine tools:** Construction of lathe, shaper, drilling, milling, grinding and CNC machine tools-Advantages, Machine controls, vertical & horizontal spindles.

**TEXT BOOKS :**

Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.

R.K. Rajput, “Elements of Mechanical Engineering”, Laxmi Publications, 1994.

**REFERENCES :**

P.N.Gupta, M.P. Poonia, “Elements of Mechanical Engineering”, Standard Publishers Distributors Nai Sarak, Delhi.

R.C.Gupta, “Mechanical Engineering”, Khanna Publishers, Delhi.

**B. Tech.II Year II semester**

**Code: 4HC74 Effective English Communication and Soft Skills (EECSS)**

(Common to All Branches except Mechanical Engineering)

**L T P/D C**  
**0 0 3 2**

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		

**UNIT 1: The Art of Communication**

Introduction: Analytical Communication for leaders

1. Non-verbal Communication
  - a. Body Language
  - b. Listening
  - c. Writing
2. Oral Communication (Speaking)

***8 detrimental facts to Communication:***

1. At peace with self
2. Awareness
3. Transparency (Being yourself)
4. Helping Hand
5. Realistic Response (Unemotional)
6. Resolving Misunderstandings
7. Overcoming Fear
8. Blamelessness

**UNIT 2: Soft Skills**

1. What are Soft Skills?
2. Importance of Soft Skills
3. Attributes regarded as Soft Skills
4. Social Skills
5. Exhibiting; Identifying and Improving your Soft Skills
6. Top 60 soft skills
7. Practicing soft skills

**Attitude: “ATTITUDE IS EVERYTHING!”**

1. Meaning; Features of attitudes
2. Attitude and Behavior
3. Formation of attitudes
4. Change of Attitudes: How to change Attitude for the betterment?
5. Attitude in a workplace
6. The power of positive attitude - Developing positive attitude
7. Positive attitude and its benefits; Negative attitude and its results
8. Examples of negative attitudes
9. Overcoming negative attitude

Exercise 1: Measure your soft skills

Exercise 2: Measure your attitude

**UNIT 3: Time Management; Goal Setting; Team Dynamics**

**Time management**

Introduction:

1. The 80:20 rule
2. Take a good look at the people around you
3. Examine your work
4. Sense of time management
5. Features of time; Three secrets of time management
6. Time management matrix: Analysis of time matrix; Effective scheduling; Grouping of activities
7. Five steps to successful time management

8. Difficulties in time management: Evils of not planning; Overcoming procrastination
9. Time management tips for students
10. Interesting facts about time
11. Ideal way of spending a day
12. Time wasters – Time savers

### **Goal Setting**

Introduction:

1. The purpose of goal setting
2. Types of Goals
3. How to set goals
4. Qualities of effective goals: Steps toward setting effective goals
5. How to achieve goals-Reasons for not meeting the goals.

### **Team Dynamics**

Introduction:

1. Meaning
2. Aspects of team building: Skills needed for teamwork
3. A model of team building: Team Vs Group
4. Characteristics of an effective team: Role of a team leader and team members
5. Inter-Group collaboration: Advantages of inter-group collaboration; Difficulties faced in inter-group collaboration; Factors shaping inter-group collaboration.

Exercise 1: Test your time management skills

Exercise 2: Test your goal setting

Exercise 3: Test your teamwork skills

### **UNIT 4: Etiquettes and Manners**

**Etiquette:** Introduction:

1. Modern etiquette
2. Benefits of etiquette
3. Classification of etiquette
4. Accompanying women
5. Taboo topics
6. Proposing the toast.

**Manners:** Introduction:

1. Why should you practice good manners?
2. Poor manners noticed in youth
3. Practicing good manners
4. Manners at the wheel : Driving and Manners in the flight
5. Respecting the sacred : Visiting holy places, Dealing with the challenged, Attending funeral
6. Professional manners: Social skills (manners), Getting along with people, Manners to get respect from others
7. Annoying office habits.

Exercise 1: Test your etiquette

Exercise 2: Test your manners

### **UNIT 5: Résumé writing and Interview skills**

**Résumé:** Introduction:

1. Types of Résumé
2. Difference among Bio-data, Curriculum Vitaé and Résumé
3. The terms: The purpose of Curriculum Vitaé writing
4. Types of Résumés



5. Tips to write Résumé: Curriculum Vitaé / Résumé preparation
6. The DOs and the DON'Ts of Résumé preparation
7. Resume check up
8. Design of a Curriculum Vitaé: Entry level Résumé, Content of the Résumé
9. References, Power words
10. Key skills that can be mentioned in the Résumé
11. Cover letter: Cover letter tips

**Interview skills:** Introduction:

1. Why an Interview?
2. Types of interviews (*Face to Face / Panel Interviews*, etc.)
3. Types of questions asked
4. Reasons for selecting a candidate / Reasons for rejecting a candidate
5. On the day of interview
6. Attending job fair
7. Common mistakes
8. What not to ask during an Interview
9. Dress code at an interview
10. FAQs
11. Quick / Basic Interview and job search related tips

Exercise 1: Write a resume

Exercise 2: Conduct Mock Interviews

**Books recommended:**

1. *Soft Skills - Dr.K.Alex, published by S.Chand*
2. *Technical communication- Meenakshi Raman and Sangeetha Sharma (Oxford Publications)*
3. *Effective Technical Communication – Ashraf Rizwi*

**Syllabus for B. Tech. II Year II Semester**  
**Code: 4A472** **COMPREHENSIVE VIVA- I**

								<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
								-	-	-	<b>1</b>
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
								x	x		

There shall be a Comprehensive Viva-Voce in II year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an external examiner, Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech. course of study up to II Year. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

Code: 4A473

**II year B.Tech – II Sem  
ELECTRICAL MACHINES LAB – I**

			<b>L</b>		<b>T</b>		<b>P/D</b>		<b>C</b>			
			-		-		4		2			
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>	
<b>x</b>				<b>x</b>					<b>x</b>			

**The following experiments are required to be conducted compulsory experiments:**

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Load test on DC series generator. Determination of characteristics.
4. Load test on DC compound generator. Determination of characteristics.
5. Hopkinson’s test on DC shunt machines. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Swinburne’s test and speed control of DC shunt motor. Predetermination of efficiencies.
8. Brake test on DC compound motor. Determination of performance curves.

**In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:**

9. Brake test on DC shunt motor. Determination of performance curves.
10. Retardation test on DC shunt motor. Determination of losses at rated speed.
11. Separation of losses in DC shunt motor.

Code: 4C481

**II year B.Tech – II Sem  
ELECTRONIC CIRCUITS LAB**

			L		T		P/D		C		
			-		-		4		2		
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>				<b>x</b>					<b>x</b>		

**Minimum ten experiments to be conducted:**

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Wien Bridge Oscillator using Transistors
6. RC Phase Shift Oscillator using Transistors
7. Astable Multivibrator.
8. Monostable Multivibrator.
9. Bistable Multivibrator.
10. Schmitt Trigger.
11. Common Emitter and Common Source amplifier
12. Current shunt and Feedback Amplifier
13. Class A Power Amplifier (Transformer less)
14. Class B Complementary Symmetry Amplifier

**Equipment required for Laboratories:**

- |                        |   |              |
|------------------------|---|--------------|
| 1. RPS                 | - | 0 – 30 V     |
| 2. CRO                 | - | 0 – 20 M Hz. |
| 3. Function Generators | - | 0 – 1 M Hz   |
| 4. Components          |   |              |
- Multi Meters



**B. Tech. III Year I semester**  
**Code: 4BC04**  
**BASIC MECHANICAL ENGINEERING**  
 (Common to All Branches Except Mechanical Engineering)

**L T P/D C**

**3 1 -- 3**

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x							x	

**Course Objective:**

The main objective of the course is to offer the students get the awareness on basic thermodynamic principles, First law and second law of thermodynamics and its applications to a wide variety of systems, functionality of various power plants and refrigeration systems. The main objective of the course how manufacturers use technology to change raw materials into finished products, also introduce the basic concepts of casting, pattern preparation, gating system and knowledge on basic features of various welding and cutting processes, and also to study the concepts of press working process and their applications.

**Course Outcomes:**

- To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
- To identify & understand the function of components used in the steam power plant & gas power plant, & how the power generation takes place in steam and gas power plant.
- To identify & understand the function of components used in VCR & VAR system, & working principle of VCR & VAR.
- To acquire the knowledge about the working of hydraulic pumps & hydraulic turbines.
- To acquire the knowledge to identify the different casting methods and welding methods and their applications.
- To acquire the knowledge to identify the different machine tools and their construction.

**UNIT – I: Thermodynamics:** Basic concepts of Thermodynamics, Property of gases, Zeroth Law. First Law of Thermodynamics and its applications, Second Law of Thermodynamics, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

**Internal combustion engines:** Internal combustion engines, definition, classification, components, working of two-stroke, four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

**UNIT-II: Steam Power plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers: - “Cochron”, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

- Steam turbines:- Impulse & Reaction Turbines**
- Gas turbine-power plants :- Closed & Open cycle types**

**UNIT- III: a) Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant.

b) **Refrigeration & Air conditioning systems:-** Description of Vapour Compression and Vapour Absorption systems

**UNIT-IV: Manufacturing Processes:**

**Foundry Practice:-** Patterns, Moulding and Moulding materials, casting methods-Sand Casting, Shell mould Casting, Investment Casting, Die Casting ,Centrifugal casting – Principle and Application of these processes

**Welding:** - Types of Welding- Electric Arc welding - Coated electrode, TIG welding & MIG welding, Gas welding and cutting, Resistance welding- Spot welding, Soldering and Brazing.

**UNIT-V : Mechanical working :-** Hot and Cold working, Rolling- Rolling products, Types of Rolling mills, Forging-operations, forging methods, Extrusion-methods, Metal Spinning

and Wire Drawing

**Press working operations:-**Cutting, Bending, Drawing and Squeezing

**UNIT-VI: Machine tools:** Construction of lathe, shaper, drilling, milling, grinding and CNC machine tools-Advantages, Machine controls, vertical & horizontal spindles.

**TEXT BOOKS:**

- 1) Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.
- 2) R.K. Rajput, “Elements of Mechanical Engineering”, Laxmi Publications, 1994.

**REFERENCES:**

- 1) P.N.Gupta, M.P. Poonia, “Elements of Mechanical Engineering”, Standard Publishers Distributors Nai Sarak, Delhi.
- 2) R.C.Gupta, “Mechanical Engineering”, Khanna Publishers, Delhi.

**III year B.Tech – I Sem**  
**LINEAR AND DIGITAL IC APPLICATIONS**

Code: 4CC09

			L			T			P			C		
				3				1					3	
a	b	c	d	e	f	g	h	i	j	k	l			
x	x	x		x					x					

**Course Objectives:**

The objectives of this course are

- To maintain the right blend of theory and practice in analyzing and designing a wide variety of applications using IC 741 op-amps.
- To acquaint the learners with a wide variety of Digital ICs families, and their applications in various digital circuits and systems.

**Course Outcomes:** After studying this course, the students will be able to

CO1	Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
CO2	Design the basic circuits using Operational Amplifiers.
CO3	Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
CO4	Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters.
CO5	Classify and characterize the various Logic Families.
CO6	Explore the combinational and sequential logic ICs in design of various digital systems.

**Unit-I: OPAMP & ITS CHARACTERISTICS**

Differential Amplifiers and its Characteristics. Op-Amp Block Diagram, Ideal OP-AMP Characteristics, DC and AC Characteristics. 741 Op-Amp and its Features and Characteristics. Parameters Measurement: Offset Voltage and Current, Slew Rate and CMRR. Frequency Compensation.

**Unit-II: BASIC APPLICATIONS OF OP-AMPS**

Adder/Subtractor, Difference Amplifier, Instrumentation Amplifier, Differentiator, Integrator, V/I & I/V Converters, Comparators, Multivibrators, Square and Triangular Waveform Generators, Clippers, Clampers, Peak Detector, S/H circuit.

**Unit-III: FILTERS, TIMERS & PLLs**

Filters: Introduction, Butterworth Filters- First and Second Order Active Filters- LPF, HPF, BPF, BRF. Introduction to 555 Timer, Functional Block, 555 timers as Monostable and Astable Multivibrators and Applications, Schmitt Trigger. Voltage Controlled Oscillator (IC 566), Phase Locked Loop.

**Applications: Design of visitors counter using 555 timer.****Unit-IV: OSCILLATORS, D/A AND A/D CONVERTERS**

Oscillators: Introduction, Design and Analysis of Wein Bridge, RC Phase shift Oscillators using op-amp. D/A Converters: Introduction, Characteristic Parameters, R-2R Ladder, Weighted Resistor, Inverter R-2R type D/A Converter, IC 1408 DAC. A/D Converters: Introduction, Characteristic Parameters, Counter Type, Dual Slope, Successive Approximation and Flash types A/D Converters.

**Unit-V: LOGIC FAMILIES**

Classification of IC Logic Families. Standard TTL NAND & NOR Gate-Analysis & Characteristics, TTL Open Collector Outputs. Tristate TTL. MOS & CMOS Logic, Open Drain and Tristate Outputs. ECL. Comparison of Various Logic Families. IC interfacing, TTL driving CMOS & CMOS driving TTL.

**Course Outcomes: The students learnt and explored the knowledge of classifying and characterizing the logic circuits of various Logic Families.**



**UNIT VI: TTL-74XX Series ICs: COMBINATIONAL AND SEQUENTIAL CIRCUITS**

Decoders. Priority Encoders, Multiplexers, Arithmetic Circuit ICs-Parallel Binary Adder. Flip-flops- D flip-flop, JK flip-flop, T flip-flop and Master-slave JK flip-flop. Synchronous and Asynchronous Counters. Decade counters. Universal Shift Register.

**Applications: Design of Digital clock**

**TEXT BOOKS:**

1. D. Roy Chowdhary, *Linear Integrated Circuits*, New Age Publications (P) Ltd, 2nd Edition, 2003
2. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, PHI, 1987.
3. John F. Wakerly, *Digital Design Principles & Practices*, PHI/ Pearson Education Asia, 3rd Ed., 2005.

**REFERENCES:**

1. Sergio Franco, *Design with Operational Amplifiers & Analog Integrated Circuits*, McGraw Hill, 1988.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits*, PHI, 6th Edition.
3. K. Lal Kishore, *Linear Integrated Circuit Application*, Pearson Educations, 2005.
4. Millman, *Micro Electronics*, McGraw Hill, 1988.
5. C.G Clayton, *Operational Amplifiers*, Butterworth & Company Publ. Ltd. Elsevier, 1971.

**III year B.Tech – I Sem**  
**ELECTRICAL MACHINES - III**

Code: 4A508

			L		T		P		C			
			4		1				4			
a	b	c	d	e	f	g	h	i	j	k	l	
x	x			x				x				

**Course Objective:**

This subject is an extension of previous machines courses. It deals with the detailed analysis of Synchronous generators and motors which are the prime source of electrical power generation and its utilities. Also concerns about the different types of single phase motors which are having significant applications in house hold appliances and control systems.

**Course Outcomes:**

- 1) To Understand the Principal of operation and constructional features of different types of synchronous generator also to Understand the winding literature for development of various types of n-phase windings also to compute pitch and distribution factor for different types of windings and deduce and solve problems related to E.M.F equation
- 2) II Summaries the causes for generation of harmonics in generated voltage, comprehend the effects and to analyse the remedial measures for elimination of harmonics. Illustration of Armature reaction, its reliance on nature of load, its Consequence effects and accountability of armature reaction, leakage reactance on generated voltage. Computing synchronous reactance experimentally by conducting OC and SC test and also developing phasor diagram for different natures of load.
- 3) To compute and discriminate different methods of voltage regulation of non salient pole synchronous machine. Analyzing and evaluating the performance of salient pole synchronous machine by two reaction theory also developing phasor diagram and obtaining the parameters by conducting slip test.
- 4) Summarize the advantages and knowing the methods of synchronization of alternators. Comprehend the significance of synchronizing power and torque for auto synchronizing also to understand the basis for load sharing during parallel operation and governing factors like change in excitation and prime mover speed for control of real and reactive power through phasor diagrams
- 5) To Understand the Principal of operation, constructional features and significance of synchronous motors. To deduce the phasor diagram of synchronous Motor for analyzing the impact of varying excitation and mechanical load for evaluating the performance .Asses the Significance of synchronous condenser for power factor improvement .Comprehend why synchronous motor is not self starting and interpret the different methods of starting synchronous motor and advantages
- 6) To Understand the Principal of operation, constructional features and significance of different types of single phase induction motors. To analyse the operation of single phase IM by double field revolving theory and cross field theory. To understand the Principal of operation, constructional features of shaded pole motor, A.C Series motor, universal motor, reluctance motor and permanent magnet motor with relevant applications

**UNIT – I CONSTRUCTION AND PRINCIPLE OF OPERATION OF SYNCHRONOUS GENERATOR:**

Constructional Features, Armature windings, Integral slot and fractional slot windings, Distributed and concentrated windings, Distribution, Pitch and winding factors, E.M.F Equation.

**UNIT-II SYNCHRONOUS GENERATOR CHARACTERISTICS:**

Harmonics in generated E.M.F., Suppression of harmonics, Armature reaction, Leakage reactance, Synchronous reactance and impedance, Experimental determination, Phasor diagram, Load characteristics.

**UNIT – III REGULATION OF SYNCHRONOUS GENERATOR:**

Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods, Salient pole alternators, Two reaction analysis, Experimental determination of  $X_d$  and  $X_q$  (Slip test) Phasor diagrams, Regulation of salient pole alternators.

**UNIT – IV PARALLEL OPERATION OF SYNCHRONOUS GENERATOR:**

Synchronizing alternators with infinite bus bars, synchronizing power torque, parallel operation and load sharing, Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form, Determination of sub-transient, Transient and steady state reactance's.

**UNIT – V SYNCHRONOUS MOTORS:**

Principal of operation, Phasor diagram, Power flow equation, Variation of current and power factor with excitation, Power circles, Synchronous condenser, Hunting and its suppression, Methods of starting.

**UNIT – VI SINGLE PHASE AND SPECIAL MOTORS:**

Single phase induction motor, constructional features, double revolving field theory, elementary idea of cross, Field theory, Split-phase motors, and Shaded pole motor.

Principle & performance of A.C. Series motor, Universal motor, Stepper motor and reluctance motor.

**Text Books**

1. Electric Machines –I.J.Nagrath & D.P.Kothari, Tata Mc Graw-Hill Publishers, 7<sup>th</sup> Edition.
2. Electrical Machines - P.S. Bimbra, Khanna Publishers.

**Reference Books:**

1. The Performance and Design of A.C.Machines – M.G.Say, ELBS and Ptiman & Sons.
2. Electric Machinery – A.E. Fitzgerald, C.Kingsley and S.Umans, Mc Graw-Hill Companies, 5<sup>th</sup> edition.
3. Theory of Alternating Current Machinery - Langsdorf, Tata Mc Graw-Hill, 2<sup>nd</sup> edition.
4. Electromechanics-III (Synchronous and single phase machines) -S.Kamakashiah, Right Publishers.

Code: 4A509

**III year B.Tech – I Sem  
POWER ELECTRONICS**

			L			T			P			C		
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a	b	c	d	e	f	g	h	i	j	k	l			
x														

**Course Objective:**

With the advent of semiconductor devices, Revolution is taking place in the power transmission distribution and utilization. This course introduces the basic concepts of power semiconductor devices, Converters and choppers and their analysis.

**Course Outcomes:**

- 1) Understand the construction and operation of Silicon Controlled Rectifier and different power semiconductor devices like BJT, Power MOSFET and power IGBT and their characteristics. Explain the role of various semiconductor devices in power electronics
- 2) Define the basic requirements for the successful firing of thyristor; Understand the two transistor analogy of SCR; Design a snubber circuit for SCR, explain the operation of UJT firing circuits, Recommend the appropriate device for Low, medium and high power converters; Identify the mechanism for proper series and parallel operation of SCRs, Compute string efficiency and derating factor.
- 3) Understand the classification of converter circuits and analyze the operation of different configurations of converts with different types of loads with and without freewheeling diode.
- 4) Understand the working of an AC voltage controller and analyze the AC voltage controller for different types of loads with anti parallel combination of SCRs and TRIAC. Understand the operation of different configurations of Cyclo-Converter for different types of loads.
- 5) Understand the Principle of operation of chopper and analyze the operation of different types of choppers for different types of loads with and without freewheeling diodes.
- 6) Understand the principle of inverter and applications of inverters and analyze working of different configurations for different types of loads.

**UNIT – I POWER SEMI CONDUCTOR DEVICES:**

Thyristors, Silicon Controlled Rectifiers (SCR’s), BJT, Power MOSFET, Power IGBT, DIAC, TRIAC, GTO and their characteristics. Basic theory of operation of SCR, Static characteristics, Turn on and turn off methods, Dynamic characteristics of SCR, Turn on and Turn off times, Salient points.

**UNIT – II DEVICES AND COMMUTATION CIRCUITS:**

Two transistor analogy, SCR, UJT firing circuit, Series and parallel connections of SCR’s, Snubber circuit details, Specifications and Ratings of SCR’s, BJT, IGBT.

**UNIT – III SINGLE PHASE AND THREE PHASE CONTROLLED CONVERTERS:**

Phase control technique, Single Phase Line commutated converters, Midpoint and Bridge connections; Half controlled and Fully controlled converters, Derivation of average load voltage and current with R and RL loads, Three phase half controlled and fully controlled bridge converters with R and RL loads, Effect of Source inductance, Waveforms, Numerical Problems.

**UNIT –IV AC VOLTAGE CONTROLLERS & CYCLO CONVERTERS:**

AC voltage controllers, Single phase two SCR’s in anti parallel with R and RL loads, Derivation of RMS load voltage, current and power factor wave forms, Firing circuits, Numerical problems, Cyclo converters, Single phase midpoint cyclo converters with Resistive and inductive load (Principle of operation only), Bridge configuration of single phase cyclo converter (Principle of operation only), Waveforms

**UNIT – V CHOPPERS:**

Choppers, Time ratio control and Current limit control strategies, Step down choppers Derivation of load voltage and currents with R, RL and RLE loads, Step up Chopper, load voltage expression Morgan’s chopper, Jones chopper and waveforms, AC Chopper, Problems.

**UNIT – VI INVERTERS:**

Inverters, Single phase inverter, Basic series inverter, Basic parallel Capacitor inverter bridge inverter, Waveforms, Simple forced commutation circuits for bridge inverters, Voltage control techniques for inverters, Pulse width modulation techniques (Multiple Pulse and Sinusoidal), Numerical problems.

**TEXT BOOKS:**

1. Power Electronics - M. D. Singh & K. B. Kanchandhani, Tata Mc Graw Hill Publishing Company.
2. Power Electronics Circuits, Devices and Applications - M. H. Rashid, Prentice Hall of India, 2<sup>nd</sup> edition.

**REFERENCE BOOKS:**

1. Power Electronics - Vedam Subramanyam, New Age International (P) Limited, Publishers.
2. Power Electronics - V.R.Murthy 1st edition, OXFORD University Press.
3. Power Electronics - P.C.Sen, Tata Mc Graw Hill Publishing.
4. Thyristorised Power Controllers - G. K. Dubey, S. R. Doradra, A. Joshi and R. M. K. Sinha, New Age International (P) Limited Publishers.
5. Power Electronics - P.S.Bimbhra, Khanna Publishers.

**III YEAR B.TECH – I SEM  
POWER SYSTEMS-II**

**CODE: 4A510**

		<b>L</b>			<b>T</b>			<b>P</b>			<b>C</b>
		<b>3</b>				<b>1</b>				<b>3</b>	
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>		<b>x</b>	<b>x</b>					<b>x</b>			

**Course Objective:**

This course introduces all varieties of Circuit Breakers and Relays for protection of Generators, Transformers and feeder bus bars from over voltages and other hazards.

**Course Outcomes:**

- 1) Understand about power system transients and its effects.
- 2) Learn about protection against over voltages.
- 3) Learn about different types of circuit breakers and its importance.
- 4) Learn about different types of electromagnet relays.
- 5) Learn about different types of static relays.
- 6) Learn about generator, transformer and feeder protection.

**UNIT –I POWER SYSTEM TRANSIENTS**

**Power system transients:**

Types of System Transients - Traveling or Propagation of Surges - Attenuation, Distortion, Reflection and Refraction Coefficients - Termination of lines with different types of conditions - Open Circuited Line, Short Circuited Line, T-Junction, Lumped Reactive Junctions (Numerical Problems). Bewley's Lattice Diagrams (for all the cases mentioned with numerical examples).

**UNIT – II PROTECTION AGAINST OVER VOLTAGES:**

Generation of Over Voltages in Power Systems, Protection against Lightning Over Voltages ,Valve type and Zinc-Oxide Lighting Arresters, Insulation Coordination -BIL, Impulse Ratio, Standard Impulse Test Wave, Volt-Time Characteristics.

**UNIT – III CIRCUIT BREAKERS:**

Elementary principles of arc interruption, Restriking Voltage and Recovery voltages, Restriking Phenomenon, Average and Max. RRRV, Numerical Problems, Current Chopping and Resistance Switching, Types and Numerical Problems, Auto recloser's.

Description and Operation of following types of circuit breakers: Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers. CB ratings and Specifications.

**UNIT – IV ELECTROMAGNETIC RELAYS:**

Principle of Operation and Construction of Attracted armature, Balanced Beam, Induction Disc and Induction Cup relays. Relays Classification, Instantaneous, DMT and IDMT types, Application of relays, over current, under voltage relays, Directional relays, Differential relays and Percentage Differential Relays.

Universal torque equation, Distance relays, Impedance, Reactance, Mho and Off-Set Mho relays, Characteristics of Distance Relays and Comparison

**UNIT – V STATIC RELAYS:**

Static Relays, Static Relays verses Electromagnetic Relays. Amplitude and phase comparators, coincidence type phase comparators, static over current relay, definite over current relay, static directional over current relay, static impedance relay, static reactance relay, advantages and disadvantages of static relays, Microprocessor based relays.

**UNIT – VI GENERATOR, TRANSFORMER, FEEDER AND BUS-BAR PROTECTION:**

Protection of generators against Stator faults, Rotor faults, and Abnormal Conditions. Restricted Earth fault and Inter turn fault Protection. Numerical Problems on % Winding Unprotected.

Protection of transformers, Percentage Differential Protection, Numerical Problem on Design of CT s Ratio, Buchholtz relay Protection.

Protection of Lines, Over Current, Carrier Current and Three-zone distance relay protection using Impedance relays. Translay Relay. Protection of Bus bars, Differential protection.

**TEXT BOOKS:**

1. Switchgear and Protection – Sunil S Rao, Khanna Publishers.
2. Power System Protection and Switchgear – Badri Ram, D.N Viswakarma, TMH Publications.

**REFERENCE BOOKS:**

1. Fundamentals of Power System Protection –Paithankar and S.R.Bhide.,PHI.
2. Art & Science of Protective Relaying – C R Mason, Wiley Eastern Ltd.
3. Electrical Power Systems – C.L.Wadhwa, New Age international (P) Limited, Publishers, 3<sup>rd</sup> edition.
4. A Text book on Power System Engineering – B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co.

**III Year, B. Tech – I - Sem.**  
**CODE: 4CC04 SIGNALS AND SYSTEMS**  
**(OPEN ELECTIVE-I)**

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After studying this course, the students will be able to

1. Understand the concepts of Signals, Classification of Signals, Signal Approximation and Orthogonal Functions.
2. Understand the concepts of Fourier series. Properties of Fourier series, Fourier Transforms and Properties of Fourier Transforms.
3. Understand the concepts of Systems, Classification of Systems, Filter Characteristics of Linear Systems, Ideal LPF, HPF and BPF Characteristics and Relationship between Bandwidth and Rise Time.
4. Understand the Concept of Convolution in Time Domain and Frequency Domain, Convolution Properties., Cross Correlation and Auto Correlation of Functions, Laplace Transforms, inverse Laplace Transforms and Region of Convergence (ROC) for Laplace Transforms.
5. Understand the concept of Sampling Theorem, Aliasing and Effect of Under Sampling.
6. Understand the Concept of Z- Transform of a Discrete Sequence, Distinction Between Laplace, Fourier and Z Transforms and Region of Convergence in Z-Transform

**UNIT I**  
**SIGNALS**

Signals. Classification of Signals. Periodic. Non-periodic. Energy and Power Signals. Exponential and Sinusoidal Signals. Concepts of Impulse Function. Unit Step Function. Signum Function.

**SIGNAL ANALYSIS** - Analogy between Vectors and Signals. Orthogonal Signal Space. Signal Approximation using Orthogonal Functions. Mean Square Error. Closed or Complete Set of Orthogonal Functions. Orthogonality in Complex Functions.

**UNIT-II**  
**FOURIER REPRESENTATION OF CONTINUOUS TIME SIGNALS**

**PERIODIC SIGNALS** - Fourier series. Properties of Fourier series. Dirichlet's Conditions. Trigonometric. Exponential & Compact (Cosine) Fourier series. Fourier Spectrum.

**NON- PERIODIC SIGNALS** - Fourier Transforms. Deriving Fourier Transform from Fourier Series. Fourier Transform of Arbitrary Signal. Standard Signals. Fourier Transform of Periodic Signals. Properties of Fourier Transforms. Fourier Transforms Involving Impulse and Signum Functions. Introduction to Hilbert Transform.

*Applications: Implementation of Signum function in Matlab.*

**UNIT-III**  
**SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS**

Systems. Classification of Systems. Linear System. Impulse Response (IR) of a Linear System. Linear Time Invariant (LTI) System. Linear Time Variant (LTV) System. Transfer Function of a LTI System. Filter Characteristics of Linear Systems. Distortion Less Transmission Through a System. Signal Bandwidth. System Bandwidth. Ideal LPF, HPF and BPF Characteristics. Causality and Poly-Wiener Criterion for Physical Realization. Relationship between Bandwidth and Rise Time.

**UNIT-IV**  
**CONVOLUTION AND CORRELATION OF SIGNALS**

Concept of Convolution in Time Domain and Frequency Domain. Graphical Representation of Convolution. Convolution Properties. Cross Correlation and Auto Correlation of Functions. Properties of Correlation Function. Energy Density Spectrum. Parseval's Theorem. Power Density Spectrum. Relation between Auto Correlation Function and Energy/Power Spectral Density Function. Relation between Convolution and Correlation.



**LAPLACE TRANSFORMS** - Review of Laplace Transforms. Partial Fraction Expansion. Inverse Laplace Transform. Concept of Region of Convergence (ROC) for Laplace Transforms. Constraints on ROC for Various Classes of Signals. Properties of LT. Relation between LT and FT of a Signal. Laplace Transform of Certain Signals using Waveform Synthesis. Laplace Transform of a Periodic Signals.

**Applications:** *Pole-zero calculation of 1 KHz Butterworth filter.*

#### **UNIT-V**

##### **SAMPLING**

Sampling Theorem. Graphical and Analytical Proof for Band Limited Signals. Impulse(Ideal) Sampling. Natural(Chopped) Sampling and Flat Top(S&H) Sampling. Reconstruction of Signal from its Samples. Effect of Under Sampling . Aliasing. Introduction to Band Pass Sampling.

**Applications:** *Design of a 8 KHz audio sampler*

#### **UNIT-VI**

##### **Z-TRANSFORMS**

Fundamental Difference between Continuous and Discrete Time Signals. Discrete Time Signal Representation using Complex Exponential and Sinusoidal Components. Periodicity of Discrete Time using Complex Exponential Signal. Concept of Z- Transform of a Discrete Sequence. Distinction Between Laplace, Fourier and Z Transforms. Region of Convergence in Z-Transform. Constraints on ROC for Various Classes of Signals. Inverse Z-Transform. Properties of Z-Transforms. Introduction to Discrete Time Systems.

**Applications:** **DT Systems Analysis and Synthesis.**

##### **TEXT BOOKS:**

1. Linear Systems and Signal Processing – B.P Lathi Oxford Publications.
2. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2<sup>nd</sup> Edn.

##### **REFERENCE BOOKS:**

1. Signals & Systems – Simon Haykin and Van Veen, Wiley, 2<sup>nd</sup> Edition.

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**B. Tech. III Year I semester**  
**Code: 4FC21**      **Fundamentals of Database Management Systems**  
**(Open Elective – I)**

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**Course Objective:**

Fundamentals to Database Management Systems will concentrate on the principles, design, implementation and applications of database management systems.

**Course Outcomes:**

- Students will learn basics of databases and understand the architecture of database management systems.
- Students will learn about good database design techniques and database theories behind.
- Understand conceptual database designs, and functional dependencies and normalization.
- Students will understand the Mathematical foundation for relational databases.
- Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
- Learn transaction management, concurrency controls.

**Unit – I:** Introduction to Databases and Transactions What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management

**Unit- II:** Data Models the importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction.

**Unit-III:** Database Design, ER-Diagram and Unified Modeling Language Database design and ER Model: overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML Relational database model: Logical view of data, keys, integrity rules. Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).

**Unit- IV:** Relational Algebra and Calculus Relational algebra: introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.

**Unit- V :** Constraints, Views and SQL What is constraints, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.

**Unit-VI:** Transaction management and Concurrency control Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management.

**TEXT BOOKS:**

1. A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", fifth Edition McGraw-Hill , Rob, Coronel, "Database Systems", Seventh Edition, Cengage Learning.

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**III Year B.Tech EEE - I Sem**  
**CODE: 4DC01      DISCRETE STRUCTURES AND GRAPH THEORY**  
**(Common to ECM & EEE)**  
**(OPEN ELECTIVE-I)**

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**Course Objectives:** In this course the student will learn

- Statements and their truth value and constructing truth tables
- The use of Universal and Existential quantifiers to describe predicates
- Different algebraic structures and their use in mathematics.
- To solve problems by permutations and combinations. Study of pigeonhole principle and inclusion exclusion principles.
- To solve various recurrence relations by using different techniques.
- The basics of graph theory, different ways of traversing the graph and different types of graphs and circuits

**Course Outcomes:** After completing this course, student should be able to

- Apply Discrete Mathematics concepts for Computer Science applications.
- Develop effective algorithms for computing systems.

**UNIT-I**

**Propositional Logic:** Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalences, implications, Arguments, Normal forms, proof of contradiction, Conditional proof.

**UNIT-II**

**First order logic:** Predicates, Quantifiers, Free & Bound variables, Rules of inference, Consistency, Automatic Theorem Proving.

**UNIT-III**

**Relations:** Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Hasse diagrams, Lattices, Boolean algebras. Functions: Inverse Function, Composition of functions, recursive Functions

**Algebraic structures:** Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, homomorphism, Isomorphism.

**UNIT-IV**

**Elementary Combinatory :** Basics of counting, Combinations & Permutations with and without repetitions, Constrained repetitions, Binomial Coefficients, Binomial & Multinomial theorems, Euler function, Derangements, Principles of Inclusion – Exclusion, Pigeon hole principle and its applications

**UNIT-V**

**Recurrence Relations :** Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating functions. Characteristics roots, Solution of in-homogeneous recurrence Relations.

**UNIT-VI**

**Graph Theory :** Basic Concepts, Representation of Graph, DFS, BFS, Spanning trees, Planar graphs, Coloring, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers, Connectivity, Cut vertices, cut edges, Matchings and coverings, Independent sets.

**TEXT BOOKS:**

1. Elements of Discrete mathematics – A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata Mc-Graw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.
3. Discrete mathematics with applications to computer science, J.P.Tremblay and R.Manohar, TMH

**REFERENCES:**

1. Discrete and Combinational Mathematics- An Applied Introduction-5<sup>th</sup> Edition – Ralph. P.Grimaldi.Pearson Education
2. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
3. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.

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**III Year B.Tech EEE - I Sem****CODE: 4DC07****VLSI DESIGN  
(OPEN ELECTIVE-I)**

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**Course Objective** - In this course the student will learn about

1. IC fabrication process of various technologies and to understand the electrical properties of
2. MOS transistor
3. To draw stick diagrams and layout with verifying design rules and how scaling impacts Performance.
4. Will be able to design digital systems using MOS circuits
5. Design of various combinational and sequential circuits using MOS transistors and about CMOS testing

**Course Outcomes** - After completing this course, student should be able to

1. Understand the design of complex digital VLSI circuits.
2. Ability to draw stick diagrams and layouts for a digital circuit and verify design rules.
3. Ability to test the circuit various level.

**UNIT I****INTRODUCTION:** Introduction to IC Technology & Fabrication Process – Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.**UNIT II****BASIC ELECTRICAL PROPERTIES :** Basic Electrical Properties of MOS, PMOS, NMOS, CMOS & BiCMOS Circuits and their comparisons, Pass transistor.**INVERTERS:** NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.**UNIT III****VLSI CIRCUIT DESIGN PROCESSES:** VLSI Design Flow introduction (Abstraction levels, Simulation and synthesis, Physical Design, DRC, LVS, Extraction, verification and fabrication), MOS Layers, Stick Diagrams, Design Rules and Layout (Design rules for wires, Contacts and Transistors)  
Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.**UNIT IV****DELAYS :** Sheet Resistance  $R_S$  and its concept to MOS, Area Capacitance Units, Calculations - □□- Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers**UNIT V****GATE & SUBSYSTEM DESIGN:** Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters, High Density Memory Elements.**UNIT VI****INTRODUCTION TO SEMICONDUCTOR ICs :** Programmable devices – PALs, PLAs, FPGAs, CPLDs, Custom & Semi-custom design, Standard Cells.**CMOS TESTING :** CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chip level Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

**TEXTBOOKS:**

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition.
2. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 1999.

**REFERENCES:**

1. Chip Design for Submicron VLSI: CMOS Layout & Simulation, - John P. Uyemura, Thomson Learning.
2. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
3. Digital Integrated Circuits - John M. Rabaey, PHI, EEE, 1997.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI Technology – S.M. SZE, 2<sup>nd</sup> Edition, TMH, 2003.

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**III Year B.Tech EEE - I Sem**  
**CODE: 4DC06      EMBEDDED & REAL TIME SYSTEMS**  
**(OPEN ELECTIVE-I)**

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**Course Objective** - In this course the student will learn about

- i. Embedded System design process using ARM Processor
- ii. ARM Architecture and Programming (Assembly and C)
- iii. ARM interfacing with various bus protocols
- iv. Concepts and constraints related to real-time systems

**Course Outcomes** - After completing this course, student should be able to

- i. Identify and summarize the characteristics and challenges of designing an embedded system
- ii. Utilize and apply ARM architecture for Embedded System Design
- iii. Design simple input output hardware interfaces using ARM
- iv. Explain the concepts and design requirements related to a real time systems

**UNIT – I**

**Introduction to Embedded Systems:** Introduction, Complex Systems and Microprocessor, Embedded System Design Process, Formalisms for System Design (Ch 1 of Wolf) Design challenge, processor technology, IC technology, Design Technology, Trade-offs. (Ch 1 Frank)

**UNIT – II**

**8051 Programming and Interfacing:** 8051 Architecture, features, LCD Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM. (Ch 1, 10, 11 Mazidi)

**UNIT – III**

**Introduction to Advanced Architecture:** ARM Processor and Memory Organization, Programmer's Model, Instruction set, Instruction level Parallelism, Programming Input and output, Supervisor Mode, exceptions and Traps. (Ch2, 3 Wolf)

**UNIT – IV**

**Interfacing with ARM:** LCD Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM, I<sup>2</sup>C and SPI protocol.

**Networked Embedded Systems:** Bus Protocols, I<sup>2</sup>C bus, CAN bus, Ethernet Enabled Systems, Design Example- Elevator Controller. (Ch8 Wolf)

**UNIT – V**

**Introduction to Real-Time Systems:** Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in and RTOS Environment. (Ch6 & 7 Simon).

**UNIT – VI**

**Basic Design Using a Real-Time Operating System:** Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS uC-OS / Vx-Works / RT Linux; Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine (Ch 8, 9 & 10 Simon).

**TEXT BOOKS:**

1. Computers and Components: principles of embedded *computing* system design, Wayne Wolf, Elseveir.
2. Embedded System Design – A Unifies Hardware/Software introduction - Frank Vahid, Tony D. Givargis, John Wiley, 2002.
3. The 8051 Microcontroller And Embedded Systems Using Assembly And C – Mazidi, Pearson Education India, 2<sup>nd</sup> edition, 2008.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. ARM reference manual.

**REFERENCES:**

1. Embedded Systems, Raj Kamal, TMH.
2. LPC2148 ARM7 Microcontroller Manual.
3. ARM Microcontroller Interfacing Hardware and Software, Warwick A Smith, Elkator
4. ARM Microcontroller Part1: 35 Projects for Beginners, Bert Van Dam, Elkator
5. 8051 Application Notes by Atmel.



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**III Year B.Tech EEE - I Sem**  
**CODE:4BC15**                      **PRODUCT AND SERVICE DESIGN**  
**(OPEN ELECTIVE-I)**

**Course Objective :**

1. The students will understand Importance of Design and Entrepreneurship as a career.
2. Learn elements of product design, models with experimentation its manufacturing and use modern tools.

**Course Outcome:**

At the end of the course the student will be able to:

1. Describe design primitives, role and significance of Design and Technology Entrepreneurship, and IPR issues in Industrial Designs.
2. Explain Service Design needs Process and Tools for Service Design, Innovation and Attributes of a Good Design in terms of Usability, Aesthetics, Functionality.
3. Discuss Product Design modalities including Product Suites, Product Development, Value Engineering and Product Design Specifications.
4. Design products for Environment suitability keeping in view Reliability Robustness, Safety, Quality Aspects and Serviceability.
5. Design physical Models and Prototypes and to discuss Interface of Materials and Codes & Standards.
6. Design Structure, Matrix Modeling, Product Metrics, Concurrent Engineering, CAD/CAM and Design Review.

**Unit I: Introduction to Design Thinking::**

Product Research, Art, Design and Society - Creativity and Brain-storming for Design – Nature of Technology Entrepreneurship, Characteristics/Qualities, Skills of Technology Entrepreneur, IPR relating to Designs and Registration of Industrial Designs

**Unit II: Introduction to Service Design:**

Challenges & Critical Success Factors, Requirements Engineering, Service Design Process, Tools for Service Design, Mapping the Customer Journey; Tools for Innovation, Conjoint Analysis, Voice of Customer Methods. Product Features, Attributes of a Good Design, Design Elements: Usability, Aesthetics, Functionality

**Unit III: Introduction to Product Design:**

Product Architecture and Modularity, Product Innovation, Products and Product Suites, Product Development, Process Development, Value Engineering, Product Design Specifications, Principles of Ergonomics.

**Unit IV: Design for Manufacturing**

Re-manufacturing, Sustainability, Design for Environment, Reliability and Robustness, Safety Considerations, Quality Aspects, Design for Serviceability.

**Unit V: System & Engg Design:**

Physical Models and Experimentation, Prototype development, Bill of Materials, Interface of Materials, Processes and Designs, Codes & Standards

**Unit VI: Design Methodology**

Live Design & Design Tools – Design Structure, Matrix Modeling, Product Metrics, Concurrent Engineering, CAD/CAM, Design Review

**TEXT BOOKS:**

- 1) Kevin Otto & Kristie Wood, "Product Design", Peason Education, 2011
- 2) Prashant Kumar, "Creativity, Concepts and Usability", PHI, 2012

**REFERENCES:**

- 1) Yousef Haik, "Engg Design Process" Thomson Brodes / Codel.
- 2) N F M Roozenburg I.Eekels, "Product Design Fundamentals and Methods" Wiley Publications.
- 3) Nigel Cross, "Engineering Design Methods: Strategies for Product Design", Wiley, 2008.

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**III Year B.Tech EEE - I Sem**  
**ENTREPRENEURSHIP**  
 (OPEN ELECTIVE-I)

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**Course Objective:** The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up's

**UNIT I**

**INTRODUCTION TO ENTREPRENEURSHIP:** Definition of entrepreneurship, Evolution of entrepreneurship, Classification of Entrepreneurs, Entrepreneurship as a Process, Entrepreneurial Propensity, Benefits and Drawbacks of Entrepreneurship. Characteristics of entrepreneur, Qualities and skills, functions of entrepreneur. Women Entrepreneurs, Problems and opportunities.

**UNIT II**

**FORMS OF ENTREPRENEURSHIP:** Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, Joint Stock Company, Important features of Various types of businesses, corporate entrepreneurship, entrepreneurship, Role of Government in the promotion of Entrepreneur, State Enterprises in India.

**UNIT III**

**EXPLORING OPPORTUNITIES AND STRATEGIES:** Opportunity Analysis, SWOT Analysis, Internal and External Environment. First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness, Marketing strategies for start-ups, Pitfalls in start-up analysis. Taxes as bottlenecks for the growth of new start-up's, subsidies and incentives given to save taxes .

**UNIT IV**

**BUSINESS PLAN AND FEASIBILITY STUDIES:** Preparation of an Effective Business Plan, Contents of a Business Plan, Detailed discussion of the business plan. Model Business, Feasibility study, Environmental scanning, Economic Analysis, Industry Analysis, Competitive Analysis. Write Up for an effective feasible and bankable report.

**UNIT V**

**INNOVATIONS AND PROTECTION OF IDEAS:** Creativity process in developing Innovation, breakthrough innovations and its consequences on the society. Inspiring innovations. New product ideas, Idea generation methods, quality gates, prototype building, Test marketing. Protecting the ideas, Applying for Intellectual Property rights, Patents, Copyrights, Trademarks, Geographical Indicators. Introduction to World Intellectual Property Organization (WIPO).

**UNIT VI**

**FINANCIAL ASPECTS OF THE ENTREPRENEURSHIP:** Sources of Capital, Debt and Equity, Commercial Banks, Angel Investors, Venture capitalist, IDBI, ICICI, IFCI, SFC's. Government Grants and Subsidies. Registration Process and the documentation required. Government Agencies helping in Registration Process. DIC, NSIC and other Central and State Institutions.

**REFERENCES:**

- H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
- Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
- Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
- Madhurima Lall, Shikha Sahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
- S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.

- Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
- S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth And A key to Business Success, New Age International Publishers, First Edition, (formerly Wiley Eastern Limited), New Delhi, 2007

## III Year B.Tech. I semester

## SAP-I

## Open Elective – I

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## SAP ABAP Workbench Fundamentals

Course Objective		
<ol style="list-style-type: none"> <li>Understand the SAP NetWeaver AS fundamentals</li> <li>Work with the ABAP Workbench tools</li> <li>Write simple ABAP programs</li> <li>Understand the ABAP Dictionary</li> </ol>		
Course Outcomes		
<ol style="list-style-type: none"> <li>To acquire through knowledge of SAP Net weaver architecture, ABAP fundamentals (like language elements, modularization, ABAP dictionary)</li> <li>To write simple ABAP programs and reports</li> <li>To be able to debug and analyze errors and performance of programs</li> </ol>		
Unit	Content	Hours
1	<b>Introduction to enterprise resource planning(ERP)</b> <ol style="list-style-type: none"> <li>ERP explained</li> <li>System wide concepts</li> <li>SAP applications and components</li> <li>Sample end to end business process</li> </ol>	4
2	<b>SAP Net weaver application server fundamentals</b> <ol style="list-style-type: none"> <li>SAP systems and SAP applications portfolio</li> <li>SAP Graphical User Interface and Navigation in AS ABAP systems</li> <li>System core</li> <li>Communication and integration technologies</li> </ol>	8
3	<b>ABAP Work bench foundations - Part 1</b> <ol style="list-style-type: none"> <li>ABAP Program processing</li> <li>ABAP Work bench tools</li> <li>ABAP Language basics, open SQL</li> <li>Modularization techniques</li> </ol>	10
4	<b>ABAP Work bench foundations - Part 2</b> <ol style="list-style-type: none"> <li>Complex data objects, structures and internal tables</li> <li>Data modeling and Data retrieval</li> <li>Classic ABAP reports</li> <li>Program analysis tools</li> <li>Program calls and memory management</li> </ol>	10
5	<b>ABAP Dictionary</b> <ol style="list-style-type: none"> <li>Domains, Data elements and structures</li> <li>Transparent tables, Pool tables and cluster tables</li> <li>Input Checks</li> <li>Dictionary object dependencies</li> <li>Changes in table structure</li> <li>Views</li> <li>Search Helps</li> </ol>	10
6	<b>Classical UI Programming</b> <ol style="list-style-type: none"> <li>Selection Screens</li> <li>Screens ( Dynpros)</li> </ol>	10



Code: 4A574

**B. Tech. III Year I semester  
GROUP PROJECT**

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<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**Course Outcomes:** After studying this course, the students will be able to

CO1	Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
CO2	They also exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
CO3	They also inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
CO4	Through this course, communicative skills and team skills largely improve.
CO5	The students learn the ability to work as an individual and in a team.

A group project shall be carried out by a group of students consisting of 2 to 3 in number in third year first semester. This work shall be carried out under the guidance of the teacher and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also. There will be 75 marks in total with 25 marks of internal evaluation.

The **internal evaluation** shall consist of:

Day to day work	10 marks
Report	05 marks
Demonstration / presentation	10 marks
End examination	50 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

**III year B.Tech – I Sem**  
**LINEAR AND DIGITAL IC APPLICATIONS LAB**

Code: 4CC76

**L      T      P      C**  
**3      2**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**Course Objectives:**

The objectives of this course are

- To Design and analyze the various circuits and systems using IC 741 op-amp.
- To Design and analyze the various circuits and systems using Digital ICs.

**Course Outcomes:** After studying this course, the students will be able to

CO1	An ability to explore the applications of IC 741 OP-AMP.
CO2	An ability to understand and implement generate square and Triangular waveforms using 555 Timers
CO3	An ability to design D to A converters and its applications
CO4	An ability to implement combinational designs using TTL Ics.
CO5	An ability to understand and implement sequential designs using TTL Ics

**Part A (Linear IC Application Lab):** (At least Six Experiments)**Design and testing of**

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order)
3. Function Generator using OP AMPs.
4. 4 bit DAC using OP AMP.
5. IC 555 Timer – Monostable and Astable Operation Circuit.
6. IC 566 – VCO Applications.
7. Phase Locked Loop

**Part B (Digital IC Application Lab):** (At least Six Experiments)

Verify the operations of the Digital ICs (Hardware) in the Laboratory

8. 3x8 Decoder using IC 74x138
9. 8 x1 Multiplexer using IC 74x151
10. 4-bit Binary Adder using IC 74x283
11. Priority encoder using 74x148
12. D Flip-Flop IC 74x74
13. Decade counter using IC74x90
14. Shift registers using 74x194



Code: 4A575

**III year B.Tech – I Sem**  
**CONTROL SYSTEMS AND SIMULATION LAB**

**L      T      P      C**  
**3      2**

a	b	c	d	e	f	g	h	i	j	k	l
	x	x	x					x			

**The following experiments are to be conducted:**

1. Time response of Second order system
2. Characteristics of Synchro
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Lag and lead compensation – Magnitude and phase plot
7. Characteristics of magnetic amplifiers
8. Characteristics of AC servo motor
9. PSPICE simulation of Op-Amp based Integrator and Differentiator circuits.
10. Linear system analysis (Time domain analysis, Error analysis) using MATLAB and State space model for classical transfer function using MATLAB
11. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB

**REFERENCE BOOKS:**

1. Simulation of Electrical and electronics Circuits using PSPICE –M.H.Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. MATLAB and its Tool Books user's manual and – Mathworks, USA.

L	T	P/D	C
0	0	2	1

a	b	c	d	e	f	g	h	i	j	k	l
								X	X		

### III Year B.Tech – I Sem

**Code: 4A589**

### TECHNICAL PAPER WRITING AND SEMINAR-V

**Course Outcomes:** After studying this course, the students will be able to

CO1	Evaluate a topic from the current technical topics of their choice in the electronics & communications engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Estimate to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Explain the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Discuss the questions posed by the panel with audience and panel to answer them.
CO5	Estimate his/her weak points with suggestions of panels and re-present if necessary.
CO6	Evaluate his/her status in technical presentation.

There shall be a technical seminar evaluated for 25 marks in third year first semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defence before a departmental committee Consisting of Head, a senior faculty and supervisor	15 marks

**III year B.Tech – II Sem**  
**Code: 4ZC01 MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

**L T P C**  
**4 1 4**

a	b	c	d	e	f	g	h	i	j	k	l
	x	x						x			

**UNIT – I: INTRODUCTION TO MANAGERIAL ECONOMICS:**

Definition, Nature and Scope of Business Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Elasticity of Demand and Demand Forecasting.

**UNIT – II: THEORY OF PRODUCTION AND COST ANALYSIS:**

Production Function – Isoquants and Isocosts, Internal and External Economies of Scale, Laws of returns. Cost Analysis: Cost concepts, different types of costs, cost control and cost efficiency. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems).

**UNIT – III: INTRODUCTION TO MARKETS:**

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Pricing strategies, transfer pricing and performance measurement, Price-Output Determination in case of Perfect Competition and Monopoly. Business Environment: forms of Business organization, Features of Joint Stock Company, Public Enterprises and their types. Liberalization, Globalization and Privatization (LPG).

**UNIT – IV: FUNDAMENTALS OF FINANCIAL ACCOUNTING:**

Concepts and conventions, principles of Double-Entry, Book Keeping, Journal, Ledger, Trial Balance, Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

**UNIT – V: CAPITAL BUDGETING TECHNIQUES:**

Nature and scope of Capital Budgeting, Methods of Capital Budgeting: Traditional methods and Discounting Cash Flow methods.

**UNIT – VI: RATIO ANALYSIS:**

Introduction to Ratio analysis – Leverage ratios – Liquidity ratios – Turnover ratios – Profitability ratios, Du-point chart. (Simple problems).

**REFERENCES:**

1. Amrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
3. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
4. Suma Damodaran, Managerial Economics, Oxford University Press.
5. Lipsey & Chrystel, Economics, Oxford University Press.

**III year B.Tech – II Sem**  
**Code: 4DC05      MICROPROCESSORS AND MICROCONTROLLERS**

			L		T		P		C		
		3		1			3				
a	b	c	d	e	f	g	h	i	j	k	l
x	x		x	x				x			

**Course Objective:** The objective of this course is to develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques

**Course Outcomes:** After studying this course, the students will be able to

CO1	Demonstrate the concepts of the Architecture of 8086.
CO2	Explore to write the Assembly Language Programs using 8086 instruction set and DOS interrupts.
CO3	Demonstrate interface of I/O devices with 8086
CO4	Demonstrate the concepts of the Architecture of 8051.
CO5	Demonstrate the Programs using 8051 instructions and SFRs.
CO6	Explore the interface of I/O devices with 8051.

**UNIT – I -8086 ARCHITECTURE**

An over view of 8085, Architecture of 8086 Microprocessor. Special functions of General Purpose registers. 8086 flag register and function of 8086 Flags. Addressing modes of 8086. Instruction set of 8086. Assembler directives, simple programs, procedures, and macros.

**UNIT- II-Assembly language programming and Hardware features of 8086**

Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation. Pin diagram of 8086-Minimum mode and maximum mode of operation. Timing diagram. Memory interfacing to 8086 (Static RAM & EPROM).

**UNIT – III I/O interfacing**

8255 PPI – various modes of operation and interfacing to 8086. D/A and A/D converter interfacing. Interfacing Keyboard, Displays, Stepper Motor and control of high power devices.

**UNIT – IV-Interrupts and serial data communication devices and interfacing**

Interrupt structure of 8086. Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts. 8259 PIC Architecture and interfacing. Serial Data Communication. 8251 USART Architecture and interfacing RS.232.

**UNIT – V-THE 8051 ARCHITECTURE & Programming:**

Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Addressing modes, The Assembly Language programming- Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions

**UNIT – VI-8051 Interrupts communication & industrial applications**

Counter and Timers, Serial data communication, Interrupts and programming. Industrial applications: Interfacing 8051 to LED, push button, Relay, Solid state relay, DC motor and PWM, Seven Segment display, ADC and DAC ,keyboard interfacing.

**TEXT BOOKS:**

1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Microprocessors and interfacing – Douglas V. Hall, TMH, 2<sup>nd</sup> Edition, 1999.
3. 8051 Microcontroller – Kenneth J. Ayala, Penram International/ Thomson, 3<sup>rd</sup> Edition, 2005.

**REFERENCES:**

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design – Y.Liu and G.A. Gibson, PHI, 2<sup>nd</sup> Edition.
2. 8051 Micro Controllers and Embedded Systems – Dr. Rajiv Kapadia, Jaico Publishers.

a	b	c	d	e	f	g	h	i	j	k	l
x			x								

### III Year B.Tech – II Sem

**CODE: 4A616**

### UTILIZATION OF ELECTRICAL ENERGY

L            T            P/D    C  
3        1            0        3

#### Course Objective:

This subject deals with the fundamentals of illumination and its classification and the electric heating and welding. It gives the detailed study of all varieties of Electric drives and their applications to electrical engineering.

#### Course Outcomes:

1. Know the importance of different type of electric drives, selection of motor based on starting and running characteristics, required speed control, tolerance of temperature rise, Particular applications of electric drives, and understands different types of industrial loads, Continuous, Intermittent and variable loads etc
2. Know the importance of advantages and methods of electric heating, and applications of resistance heating induction heating and dielectric heating. Also the student gets basic knowledge of A.C. and D.C types of electric welding, resistance and arc welding, electric welding equipment, and their applications.
3. Identify the core areas of illumination, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, and their applications & sources of light.
4. By the end of the unit the student will able to: Differentiate Discharge lamps of MV and SV lamps, tungsten filament lamps and fluorescent tubes, understands basic principles of light control, Types and design of lighting and flood lighting.
5. Understands System of electric traction and track electrification. Knows of existing electric traction systems in India. Gets knowledge of Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking. Knows mechanics of train movement. Solves problems on Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.
6. Understand and Calculations of tractive effort, power, specific energy consumption for a given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

#### UNIT – I DRIVE APPLICATIONS:

Type of electric drives, Choice of motor, starting and running characteristics, Speed control, Temperature rise, Particular applications of electric drives, Types of industrial loads, Continuous, Intermittent and variable loads, Load equalization.

#### UNIT – II ELECTRIC HEATING:

Advantages and methods of electric heating, Resistance heating induction heating and dielectric heating.

##### Electric welding:

Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

#### UNIT – III ILLUMINATION FUNDAMENTALS:

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

#### UNIT – IV VARIOUS ILLUMINATION METHODS

Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

#### UNIT – V ELECTRIC TRACTION - I:

System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking.

Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

**UNIT – VI ELECTRIC TRACTION - II:**

Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

**TEXT BOOKS:**

1. Utilization of Electric Power & Electric Traction - J.B. Gupta, S.K.Kataria & Sons, 9<sup>th</sup> edition.
2. Utilization of Electric Energy - E.Open Shaw Taylor Orient Longman, 2<sup>nd</sup> edition.
3. Art & Science of Utilization of electrical Energy - Partab, Dhanpat Rai & Sons, 2<sup>nd</sup> edition.

**REFERENCE BOOKS:**

1. Utilization of Electrical Power including Electric drives and Electric traction - N.V. Suryanarayana, New Age International (P) Limited, 1<sup>st</sup> edition.
2. Generation, Distribution and Utilization of electrical Energy - C.L. Wadhwa, New Age International (P) Limited, 1<sup>st</sup> revised edition.

Code: 4A611

**III year B.Tech – II Sem  
POWER SYSTEMS-III**

		L 3		T 1		P		C 3			
a	b	c	d	e	f	g	h	i	j	k	l
x		x	x					x			

**OBJECTIVE:**

This course concerns the distribution of power along with the economic aspects. It also deals about important requirements of power system like reactive power control, power factor and voltage control.

**Course Outcomes:**

- 1) Understand the importance of reactive power and analyze the different methods of reactive power control and power factor.
- 2) Analyze the factors affecting the economic aspects of power generation and tariff, different methods of tariff.
- 3) Learn about components of substation and different methods of grounding.
- 4) Understand about the power system stability and methods of analysis.
- 5) Learn about symmetrical components and sequence impedances.
- 6) Analyze different types of distribution systems.

**UNIT – I REACTIVE POWER CONTROL**

Overview of Reactive Power control, Reactive Power compensation in transmission systems, advantages and disadvantages of different types of compensating equipment for transmission systems, load compensation, Specifications of load compensator, Uncompensated and compensated transmission lines: shunt and Series Compensation.

**POWER FACTOR AND VOLTAGE CONTROL:**

Causes of low p.f, Methods of Improving p.f, Phase advancing and generation of reactive KVAR using static Capacitors, Most economical p.f. for constant KW load and constant KVA type loads, Numerical Problems. Dependency of Voltage on Reactive Power flow, Methods of Voltage Control, Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers

**UNIT-II ECONOMIC ASPECTS OF POWER GENERATION AND TARIFF METHODS:**

Load curve, Load duration and integrated load duration curves, Load, Demand, Diversity, Capacity, Utilization and plant use factors, Numerical Problems.

Costs of Generation and their division into Fixed, Semi - fixed and Running Costs.

Desirable Characteristics of a Tariff Method, Tariff Methods, Flat Rate, Block-Rate, Two-part, Three –part and power factor tariff methods and Numerical Problems.

**UNIT - III SUBSTATIONS & GROUNDING:**

Classification of Substations, Air insulated substations, Indoor & Outdoor substations, Substations layout showing the location of all the substation equipment. Bus bar arrangements in the sub-stations, Simple arrangements like single bus bar, sectionalized single bus bar, Main and transfer bus bar system with relevant diagrams.

**Gas insulated substations (GIS):** Advantages of Gas insulated substations, Different types of gas insulated substations, Single line diagram of gas insulated substations, Bus bar, Construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

**NEUTRAL GROUNDING:**

Grounded and Ungrounded Neutral Systems, Effects of Ungrounded Neutral on system performance. Methods of Neutral Grounding, Solid, Resistance, Reactance, Arcing Grounds.

**UNIT –IV POWER SYSTEM STATE STABILITY ANALYSIS:**

Elementary concepts of Steady State, Dynamic and Transient Stabilities.

Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to improve steady state stability.

Derivation of Swing Equation, Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation - Solution of Swing Equation: Point-by-Point Method. Methods to improve Stability, Application of Auto Reclosing and Fast Operating Circuit Breakers.

**UNIT-V SYMMETRICAL COMPONENT THEORY:**

Symmetrical Component Transformation, Positive, Negative and Zero sequence components: Voltages, Currents and Impedances.

Sequence Networks: Positive, Negative and Zero sequence Networks, Numerical Problems.

**UNIT-VI -GENERAL ASPECTS OF DISTRIBUTION SYSTEMS:**

**D.C. DISTRIBUTION SYSTEMS:**

Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over - Head Distribution Systems- Requirements and Design features of Distribution Systems-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

**A.C. DISTRIBUTION SYSTEMS:**

Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factor referred to receiving end voltage and with respect to respective load voltages.

**TEXT BOOKS**

1. A Text Book on Power System Engineering - M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, Dhanpat Rai & Co. Pvt. Ltd.
2. Principles of Power Systems - V.K Mehta and Rohit Mehta S.CHAND& COMPANY LTD., New Delhi.

**REFERENCE BOOKS**

1. Elements of Power Station design and practice - M.V. Deshpande, Wheeler Publishing.
2. Electrical Power Systems - C.L.Wadhawa New Age International (P) Limited, Publishers.
3. Electrical Power Generation, Transmission and Distribution - S.N.Singh., PHI.
4. Gas turbine performance - PP Wals, P.Fletcher, Blackwell Publisher.



**III year B.Tech – II Sem**  
**MEASUREMENTS & INSTRUMENTATION**

Code: 4A612

		<b>L</b>			<b>T</b>			<b>P</b>			<b>C</b>		
		<b>3</b>			<b>1</b>						<b>3</b>		
<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>		
	<b>x</b>	<b>x</b>	<b>x</b>					<b>x</b>				<b>x</b>	

**OBJECTIVE:**

Electrical measurements course introduces the basic principles of all measuring instruments. It also deals with the measurement of RLC parameters voltage, current Power factor, power, energy and magnetic measurements. Instrumentation is essential in monitoring and analysis of any Physical system and its control. This course deals with different types of transducers, digital voltmeters, oscilloscopes and measurement of non electrical quantities.

**Course Outcomes:****UNIT-I MEASURING INSTRUMENTS- INSTRUMENT TRANSFORMERS:**

Classification - Deflecting, Control and Damping torques, Ammeters and Voltmeters, PMMC, Moving iron type instruments, Expression for the Deflecting torque and Control torque, Errors and Compensations, Extension of range using Shunts and Series resistance. CT and PT, Ratio and phase angle errors, Design considerations Type of P.F. Meters, Dynamometer and Moving iron type, 1- ph and 3-ph meters.

**UNIT –II MEASUREMENT OF POWER& ENERGY:**

Single phase dynamometer wattmeter-LPF and UPF-Double element and three element dynamometer wattmeter, Expression for deflecting and control torques, Extension of range of wattmeter using instrument transformers, Measurement of active and reactive powers in balanced and unbalanced systems, Single phase induction type energy meter, Driving and braking torques, Testing by phantom loading, Three phase energy meter .

**UNIT - III MEASUREMENT OF RESISTANCE - MAGNETIC MEASUREMENTS- A.C. BRIDGES:**

Principle and operation of D.C. Crompton's potentiometer, Standardization, Measurement of unknown resistance, current, voltage. Method of measuring low- Medium and High resistance, sensitivity of Wheatstone's bridge, Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, Measurement of high resistance, loss of charge method, Measurement of inductance, Quality Factor, Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge. Measurement of capacitance and loss angle, Desauty bridge, Wien's bridge, Schering Bridge.

**UNIT-IV SIGNALS AND THEIR REPRESENTATION- CHARACTERISTICS:**

Measuring Systems, Performance Characteristics, Static characteristics, Dynamic Characteristics, Errors in Measurement, Gross Errors-Systematic Errors, Statistical Analysis of Random Errors.  
 Signal and their representation, Standard Test, periodic, a periodic, modulated signal, sampled data, pulse modulation and pulse code modulation.

**UNIT-V DIGITAL VOLTMETERS- SIGNAL ANALYZERS- TRANSDUCERS:**

Digital voltmeters, Successive approximation, Ramp, Dual slope integration continuous balance type, Micro processor based ramp type DVM digital frequency meter, Digital phase angle meter, Wave Analyzers, Frequency selective analyzers, Heterodyne, Application of Wave analyzers, Harmonic Analyzers, Total Harmonic distortion, spectrum analyzers, Basic spectrum analyzers, Spectral displays, Q meter and RMS voltmeters .

**UNIT-VI MEASUREMENT OF NON-ELECTRICAL QUANTITIES:**

Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers, Principle operation of Resistor, Inductor, LVDT and Capacitor transducers, LVDT Applications, Strain gauge and its principle of operation, Gauge factor- Thermistors, Thermocouples, Piezo electric transducers, Photovoltaic, Photo conductive cells. Measurement of strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque, Measurement of Temperature.

**TEXT BOOKS:**

1. Electrical Measurements and measuring Instruments – E.W. Golding and F.C. Widdis, 5<sup>th</sup> Edition, Wheeler Publishing.
2. Transducers and Instrumentation– D.V.S Murthy, Prentice Hall of India, 2<sup>nd</sup> Edition.
3. A course in Electrical and Electronic Measurements and Instrumentation -A.K. Sawhney, Dhanpatrai & Co. 18<sup>th</sup> Edition.

**REFERENCE BOOKS:**

1. Measurements Systems, Applications and Design – D O Doebelin- Tata MC Graw-Hill.
2. Principles of Measurement and Instrumentation – A.S Morris, Pearson /Prentice Hall of India.
3. Electronic Instrumentation- H.S.Kalsi Tata MC Graw – Hill Edition, 3<sup>rd</sup> Edition.
4. Modern Electronic Instrumentation and Measurement techniques – A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

Code: 4HC51

**III year B.Tech – II Sem**  
**(open Elective – II)**  
**Basic Spanish Language**

**L T P/D C**  
**3 - 3**

a	b	c	d	e	f	g	h	i	j	k	l
x											

- Unit-I**
- Functional Aspects**  
 Greetings, introductions, identifying others; tools to ask meaning, pronunciation and spellings; different nationalities and their languages; Hispanic names, family relations and professions; days of the week, Months.
- Grammatical Aspects**  
 Basic structure of spelling and pronunciation; present indicative of the regular verbs ('ar/er/ir) and 'querer'; subject pronouns; interrogative sentences with 'Por que', and 'quien'; causal phrase with 'porque'; 'ser' and 'estar'; negative sentences; adjectives of nationality.
- Unit-II**
- Functional Aspects**  
 Ordinal and cardinal numbers; quantities; to go shopping, identifying Material, color, size etc; to go to a restaurant, food habits of Spanish and Latin American people.
- Grammatical Aspects**  
 Gender and number of nouns and adjectives; the verb 'tener'; interrogative Sentences; demonstrative and qualitative adjectives.
- Unit-III**
- Functional Aspects**  
 To express opinions on something contradict someone in modest ways; Suggest something, to value things aesthetically and intellectually; Expression of likes and dislikes; expression and reaction to certain things, (agreement or disagreement)
- Grammatical Aspects**  
 Qualitative adjectives, forms and usage, gradations, superlative adjectives, Exclamatory sentences; the verb 'gustar', forms and syntax; personal Pro0nouns; definite and indefinite pronouns, direct object pronouns Prepositions; verbs like 'parecer' and 'encontrar and preferir, their form And syntax, interrogative pronouns.
- Unit-IV**
- Functional Aspects**  
 Invitations; accepting and rejecting invitations; how to fix an appointment; Inviting through e-mail or telephone
- Grammatical Aspects**  
 Present indicative of irregular verbes, expressions with 'tener' and estar Prepositional pronouns; interrogative sentences
- Unit-V**
- Functional Aspects**  
 Expression of time; Spanish and Latin American time tables and Comparison with Indian time tables, festivals Indian and Hispanic
- Grammatical Aspects**  
 Time with 'ser', expression s relating to festivals.
- Unit-VI**
- Functional Aspects**  
 Expressions relating to climate, weather of the day seasons, vacations, planning of holiday and brochers, hotel reservations, offers
- Grammatical Aspects**  
 Expressions with verbs, 'ser' and 'hacer' and other verbs.

**Text Book:**

1. NOUVEAU ELE INICIAL 1

**Reference Books:**

1. Espanol sin Fronteras, A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997
2. Entre Nosotros A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997

**Code: 4HC41**

**III year B.Tech – II Sem  
(Open Elective – II)  
Basic French Language**

**L T P/D C  
3 - 3**

a	b	c	d	e	f	g	h	i	j	k	l
x											

**UNITÉ – I :**

Professions et nationalités, vie quotidienne et loisirs, descriptions physiques et psychologiques, nombres cardinaux.

Articles définis et indéfinis, genre et nombre des noms et des adjectifs, interrogation et négation, conjugaison du présent.

**UNITÉ – II**

Intonation, liaison, voyelles orales et nasales.

Faire connaissance, inviter et répondre à une invitation, décrire les personnes.

**UNITÉ – III**

Paris, monuments et lieux publics. La vie de quatre parisiens de professions différentes.

Logement et nourriture, vêtements et couleurs, fêtes et faits divers, nombres ordinaux.

**UNITÉ – IV**

Articles partitifs, adjectifs démonstratifs et possessifs, prépositions et adverbes de quantité et de lieu, pronoms toniques, l'impératif, verbes pronominaux.

Intonation, semi-voyelles, liaison, consonnes sonores et sourdes.

**UNITÉ – V**

Exprimer l'ordre et l'obligation, demander et commander, évaluer et apprécier, féliciter et remercier.

Une région de France: la Bourgogne, vie quotidienne à la campagne.

**UNITÉ – VI**

*Teaching passé composé through the above lessons.*

**Text Book:**

1. Dominique, Philippe, *et al.* 1999. *Le Nouveau sans Frontières -I* (Including Exercise Book). Paris: Clé, International (Indian Edition).

**Reference Books:**

1. Alter Ego I & II. Published by Hachette
2. Connexion I & II. Published by Didier
3. Echo I & II. Clé International publishers
4. Latitude I & II. Published by Didier

**Code: 4HC46**

**III year B.Tech – II Sem  
(Open Elective – II)  
Basic German Language**

**L T P/D C**  
**3 - 3**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
<b>x</b>											

**Unit –I**

- Definite and Indefinite articles(including negation)
- Noun: Gender and Plural forms, cases (nominative, accusative, dative & genitive)

**Unit –II**

- Verb: Strong and Weak verbs, Verbs with separable and inseparable prefixes, modal verbs, position of verb in the main and subordinate clauses, auxiliary verbs, reflexive verbs in accusative and dative cases, imperative constructions

**Unit –III**

- Pronouns: personal, possessive, reflexive, interrogative and demonstrative
- Prepositions: with the accusative, dative and with both these cases

**Unit –IV**

- Adjective :declension with the
  - Indefinite article
  - Definite article
  - Without article
  - With the indefinite pronoun
  - Degrees of comparison (also adverbs),ordinal numbers, adjectives as nouns
- Conjunctions: subordinating and coordinating with respect to the position of the verb

**Unit –V**

- Pretaritim of sein and haben
- Perfect tense

**Unit –VI**

- Negatin: of a sentence and words therein.
- Sentence structure: general principles observed in German Language.

**Text Book**

1. Hermann Funk, Christina Kuhn, Oliver Bayerlein., Studio d A 1.2005 Comelsen Verlag, Berlin.

**Reference Books**

1. Rosa –Marie Dallapiazza, Eduard von Jan, Till Schonherr,unter Mitarbeit von Jutta Orth-Chambah  
Tangram aktuell 1 –Lektion 1-4, Lektion 5 - 8  
Max Hueber Verlag. Munchen. 2009
2. Jutta Muller, Thomas Storz, 2006. Laguna. Heuber Veerlag, Ismaning. Deutschland

**III year B.Tech – II Sem**  
**CODE: 4ZC05      GENERAL MANAGEMENT & ENTREPRENEURSHIP**  
**(OPEN ELECTIVE-II)**

**L   T   P/D   C**  
**3   0   0   3**

a	b	c	d	e	f	g	h	i	j	k	l
	x	x						x			

**Course Objective:** The course is designed to impart the necessary managerial skills and tactics required for an emerging Entrepreneur for the Engineering students to enhance their career prospects and ambitions of starting a new Enterprise.

**Pre-requisites:** This course shall require a student to have knowledge in Managerial Economics and Financial analysis, Management Science, Operations management.

**UNIT I**

**INTRODUCTION TO MANAGEMENT AND ENTREPRENEURSHIP:** Changing Face of Management-Entrepreneurship, Modern Management with Entrepreneurial Orientation. Meaning of Entrepreneurship. Benefits and Drawbacks of Entrepreneurship Reasons feeding the Entrepreneurial fire. Understanding Entrepreneurship as a Process. Multiple roles of Entrepreneur: Intrapreneur, Inventor, Coordinator, Manager and Controller. Psychological and behavioral aspects of First-Generation Entrepreneur. Case Studies

**UNIT II**

**PROCESS DEVELOPMENT AND INNOVATION PROJECT MANAGEMENT:** Business Process Model, Value chain for Manufacturing industries and Service Industries. Frugal Innovation. Creativity process in developing Innovation. Types of New Products, Forecasting of New Products, Stages in the New Product Development, Prototype building and pitching Going ahead with ideas, killing the ideas through Stage Gate Models, pitching of full fledged idea. Choosing the Start-Up Team.

**UNIT III**

**PROJECT MANAGEMENT & FEASIBILITY REPORT:** Project Inception, Project Implementation, and Project control. Analyzing the project by employing capital budgeting techniques, Risk Management, tools and techniques. Methods of Appraising the Project. Industry Analysis pertaining to the Product, Competitive Analysis and Market analysis. Preparation of feasibility report, Contents of Feasibility Report. Exercise to write an effective Feasibility report. Case Studies.

**UNIT IV**

**PROTECTION OF IDEAS AND MECHANISM:** Exposure to intellectual property rights to the entrepreneur in the Indian and the World context. Registration process for Patents, Copyrights, Trademarks, Geographical indicators. Legal Framework in administration of Intellectual property rights. Meaning of Infringement, consequences of Infringement. Cases on Infringement. Case Studies.

**UNIT V**

**VENTURE FINANCING AND ISSUES RELATED TO PRICING:** Meaning of Venture Capitalist, Process of Venture Capital, Seed Funding, First Phase Funding, Second Phase Funding and Final Phase funding. Cost analysis, Preparation of standard costing, Finalizing the output, fixing the pricing based on market structure, Monopoly, oligopoly market structures and marketing pricing practices for attracting customers. Case Studies

**UNIT VI**

**MANUFACTURING AND QUALITY MANAGEMENT:** Plant Layout, Process and Product Layout, Service Factory. Introduction to Quality Circles, Quality inspection, ISO Certification, process of certification and exposure to the entrepreneurs of the need for certification. Quality certification for Manufacturing industrial. Case Studies

**TEXT BOOKS:**

- "Projects: Planning, Analysis, Selection, Financing, Implementation, and Review", Prasanna Chandra, TMH, New Delhi, 2012
- "Project Management", Jeffrey K. Pinto, Pearson, 2011
- Small Scale industries and Entrepreneurship Vasanth Desai "Himalya publishing 2012

**REFERENCE BOOKS:**

- Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
- Entrepreneurship Rajeev Roy , oxford ,2012
- Fundamentals of Entrepreneurship Nandan H, PHI, 2013
- Entrepreneurship Development Khanka, ,S.Chand 2012
- Robert Hisrich et al "enterpreneruship TMH 2012
- Entrepreneurship Development B.Janikairam and M Rizwana



a	b	c	d	e	f	g	h	i	j	k	l
			x		x						

## III year B.Tech – II Sem

**CODE: 4ZC07      FUNDAMENTALS OF DISASTER MANAGEMENT  
(OPEN ELECTIVE-II)**

**L   T   P/D   C**  
**3   0   0   3**

**Course Objectives:**

1. To provide students an exposure to disasters, their significance and types.
2. To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
3. To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
4. To enhance awareness of institutional processes in the country
5. To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I**

**INTRODUCTION TO DISASTERS:** Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks) Disasters – Classification, Causes, Impacts (including social, economic, political, environmental, health, psychosocial, etc.). Differential impacts – in terms of caste, class, gender, age, location, disability.

**UNIT II****GLOBAL TRENDS IN DISASTERS:**

Urban disasters, pandemics, complex emergencies, Climate change Case Study on Climate Change.

**UNIT III**

**APPROACHES TO DISASTER RISK REDUCTION:** Disaster cycle – its Analysis, Phases. Culture of safety, prevention, mitigation and preparedness; Community-based DRR: Structural and nonstructural measures, roles and responsibilities of community, Panchayati Raj Institutions / Urban Local Bodies (PRIs / ULBs), district administration, states, centre, and other stakeholders; Case studies.

**UNIT IV**

**INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT:** Factors affecting Vulnerabilities, differential impacts; Impact of Development projects such as dams, embankments, changes in land-use etc; Climate change adaptation; Relevance of indigenous knowledge, appropriate technology and local resources; Case studies.

**UNIT V**

**DISASTER MANAGEMENT IN INDIA:** Hazard and vulnerability profile of India. Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management; Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programs and legislation); Case studies.

**UNIT VI**

**APPLICATION OF TECHNOLOGY IN DISASTER MANAGEMENT:** IT in Disaster Management – Databases – RDBMS – Management information systems – Decision support systems – GIS – Intranets and Extranets – Video Conferencing, Trigger Mechanism – Remote Sensing – Contribution of remote sensing and GIS. Case Studies and Global Initiatives.

**TEXT BOOKS:**

1. B. K. Khanna: **“Disasters: All you wanted to know about”**, New India Publishing Agency, New Delhi
2. Pradeep sanhi, Madhavi malalgoda and arya bandhu, “Disaster risk reduction in south asia “PHI
3. Amita sinval, “Understanding earthquake disasters” TMH, 2010

**REFERENCE BOOKS:**

1. Natural Hazards and Disaster Management: R.B. Singh, Rawat Publications
2. Remote Sensing and GIS by A.M. Chandra and S.K. Ghosh, Narosa Publishing house
3. GIS – Fundamentals, Applications and Implementations: Dr. K. Elangovan, New India publishing agency

**Suggested Reading List:**

1. Alexander David, Introduction in ‘Confronting Catastrophe’, Oxford University Press
2. Andharia J., Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008
3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples’ Vulnerability and Disasters, Routledge.
4. Coppola P Damon, 2007. Introduction to International Disaster Management
5. Carter, Nick 1991. Disaster Management: A Disaster Manager’s Handbook. Asian Development Bank, Manila Philippines.
6. Cuny, F. 1983. Development and Disasters, Oxford University Press. Document on World Summit on Sustainable Development 2002.
7. Govt. of India: Disaster Management Act 2005, Government of India, New Delhi.
8. Government of India, 2009. National Disaster Management Policy
9. Gupta Anil K, Sreeja S. Nair. 2011 Environmental Knowledge for Disaster Risk Management, N 1DM, New Delhi
10. Indian Journal of Social Work 2002. Special Issue on Psychosocial Aspects of Disasters, Volume 63, Issue 2, April.
11. Kapur, Mu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers
12. Kapur Anu 2010: Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi.
13. Pelling Mark, 2003 The Vulnerability of Cities: Natural Disaster and Social Resilience Earthscan publishers, London
14. Reducing risk of disasters in our communities, Disaster theory, Tearfund, 2006.
15. UNISDR, Natural Disasters and Sustainable Development: Understanding the links between Development, Environment and Natural Disasters, Background Paper No. 5. 2002.
16. IFRC. 2005. World Disaster Report: Focus on Information in Disaster, pp. 182-225.

a	b	c	d	e	f	g	h	i	j	k	l
		x		x		x			x	x	

**III year B.Tech – II Sem**

**CODE: 4ZC12      PROJECT MANAGEMENT & FINANCE  
(OPEN ELECTIVE-II)**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**Course Objective:** The course has been designed to create an awareness of the need for systematic management of projects. This application-oriented course provides the skills in project planning, financing, implementing and controlling, starting from project identification, till project termination.

**UNIT I**

**PROJECT MANAGEMENT CONCEPTS:** Concept and characteristics of a project, objectives of project management, types of projects, project organizational structure, project life cycle, qualities & functions of a project manager, challenges and problems of project management.

**UNIT II**

**PROJECT FORMULATION:** Generation and Screening of Project Ideas, Project Identification, Project Rating Preliminary, Analysis, Market, Technical, Financial, Economic and Ecological Pre-Feasibility Report, Project Estimates and Techno- Economic Feasibility Report, Detailed Project Report, Different Project Clearance procedure.

**UNIT III**

**PROJECT IMPLEMENTATION AND CONTROL:** Monitor and assess project performance, performance measurement, Methods to monitor, evaluate and control planned cost and schedule performance, quality management tools and techniques at different stages of project.

**UNIT IV**

**PROJECT FINANCING:** Source of capital, Debt-Equity Financing, Formal & Informal Agencies in Financing, Government grants and Subsidies, Seed, Angel & Venture Capital, DCF Techniques: NPV, IRR, PI and Non DCF Methods: BP, ARR for Project evaluation.

**UNIT V**

**PROJECT RISK ASSESSMENT:** Probabilistic cash flow approaches, sources, measures and perspectives of standalone risk analysis, Sensitivity Analysis, Scenario Analysis, Break-Even-Analysis, Simulation managing risk, Project selection Analysis.

**UNIT VI**

**PROJECT CLOSEOUT AND TERMINATION:** Introduction, Types of Project Termination, Natural Termination – The Closeout Process: Finishing the work, Handling over the project, Gaining acceptance for the Project, Harvesting the Benefits, Project Reviewing.

**TEXT BOOKS:**

1. Clifford F Gray, Erik W Larson, “Project Management-The Managerial Process”, Tata McGraw-Hill Publishing Co. Ltd
2. Financial Management by I M Pandey, Vikas Publishing House

**REFERENCE BOOKS:**

1. Jack Meredith, Samuel J. Mantel Jr, “Project Management-A Managerial Approach”, John Wiley Sons
2. John M Nicholas “Project Management for Business and Technology” Prentice Hall of India Pvt. Ltd.
3. James P Lewis “Project Planning, Scheduling and Control Tata McGraw-Hill Publishing Co. Ltd
4. Financial Management: M Y Khan & P K Jain, Text, Problem and Cases 6/e Tata McGraw-Hill Publishing Co. Ltd
5. Project Management: Engineering, Technology and Implementation, Shtub, Bard and Globerson, PH Inc.
6. Project Management Handbook, Lock, Gower.
7. Project Management Handbook, Cleland and King, VNR

8. Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
9. Project Scheduling and Monitoring in Practice, S. Choudhury, SAP.
10. Total Project Management: The Indian Context, P. K. Joy, Macmillan India Ltd.

**B. Tech. III Year I semester**  
**OPERATING SYSTEMS CONCEPTS**  
**(Open Elective-II)**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>	<b>m</b>
	<b>x</b>		<b>x</b>					<b>x</b>	<b>x</b>			

**Code: 4E607**

**L      T    P/D    C**  
**3      -    -      3**

**COURSE OUTCOMES:**

1. Describe the basic functionalities and structure of the Operating System
2. Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
3. Comprehend the concepts of Synchronization and Deadlocks in the Operating System
4. Discuss the concepts of Memory Management(Physical and Virtual memory)
5. Explain the concepts of File System with regard to directory and disk management algorithms.
6. Students understand the concepts of I/O systems, protection and security in a case study given

**UNIT I**

Introduction to Operating System, Computer System Architecture: Single Processor System, Multiprocessor System, Clustered System, Multiprogramming System, Multitasking (Time sharing) system, Operating System Services, System Calls, Types of System Calls, System Programs, Operating System Structure: single structure, layered approach, micro kernels, modules.

**UNIT II**

Process Management: Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling.  
 Engg. Applications – Process scheduling in Windows, Linux.

**UNIT III**

Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; Monitors; Deadlock Characterization, methods for handling deadlocks-deadlock prevention, Avoidance & Detection; Deadlock recovery.

**UNIT IV**

Memory Management: Logical & Physical Address Space, swapping, Contiguous memory allocation, Paging and Segmentation techniques, Segmentation with paging;  
 Virtual memory: Demand Paging, Page-Replacement Algorithms, Thrashing.  
 Engg. Applications – Memory management in Windows, Linux.

**UNIT V**

File System: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms.

**UNIT VI**

I/O Systems: I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues.  
 Protection and Security: Goals of protection, Principles of protection, Access matrix, Access control list, Capability List. Security Attacks, Program threats.

**TEXT BOOKS:**

1. Operating System Concepts by Silberchatz Galvin, 8<sup>th</sup> edition.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings, 4<sup>th</sup> edition, 2001, Prentice-Hall

**REFERENCES:**

1. Operating System By Peterson , 1985, AW.
2. Operating System By Milankovic, 1990, TMH.
3. Operating System Incorporating With Unix & Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik & Donovan, TMH
5. Operating Systems By Deitel, 1990, AWL.
6. Operating Systems – Advanced Concepts By Mukesh Singhal , N.G. Shivaratri, 2003, T.M.H

**B. Tech. III Year II semester**  
**SAP – II**  
**Open Elective – II**

a	b	c	d	e	f	g	h	i	j	k
x	x	x	x				x	x		

**Code: 4EC27**

**L      T      P/D      C**  
**3      -      -      3**

**SAP ABAP Workbench Concepts**

**Course Objectives**

1. Write object oriented programs with ABAP
2. Understand the techniques in enhancements and modifications
3. Create simple Web Dynpro for ABAP applications

**Course Outcomes**

1. To carry out enhancements and modifications to SAP standard, in future proof manner
2. To develop simple Web Dynpro for ABAP applications
3. To be able to understand Functional Specifications and write Technical Specifications

**Unit      Content**

- |          |  |
|----------|--|
| <b>1</b> | <p><b>ABAP Objects-Part 1</b></p> <ol style="list-style-type: none"> <li>1. Object-Oriented Programming (OOPS Programming)</li> <li>2. Fundamentals Object-Oriented syntax</li> <li>3. Inheritance and casting</li> <li>4. Interfaces and casting</li> <li>5. Events</li> </ol>  |
| <b>2</b> | <p><b>ABAP Objects-Part2</b></p> <ol style="list-style-type: none"> <li>1. Global Classes and Interfaces</li> <li>2. Exception handling</li> <li>3. ABAP Object-Oriented examples-ALV and BADls</li> <li>4. Abstract classes, factory methods, singletons</li> </ol>   |
| <b>3</b> | <p><b>Shared Objects and shared Memory Areas</b></p> <ol style="list-style-type: none"> <li>1. Shared Objects</li> <li>2. Shared Memory Access</li> </ol>  |
| <b>4</b> | <p><b>Dynamic Programming</b></p> <ol style="list-style-type: none"> <li>1. Generic data types</li> <li>2. Field symbols and data references</li> <li>3. Runtime Type Identifications (RTTI)</li> <li>4. Runtime Type Creation (RTTC)</li> </ol>   |
| <b>5</b> | <p><b>Enhancements and Modifications</b></p> <ol style="list-style-type: none"> <li>1. Adjustment of SAP Standard Software</li> <li>2. Enhancing Dictionary elements</li> <li>3. Customers Exits</li> <li>4. Business Add Ins (BADls)</li> <li>5. Modifications of the SAP standard applications</li> <li>6. Implicit and Explicit Enhancements</li> </ol> |
| <b>6</b> | <p><b>Fundamentals of Webdynpro for ABAP</b></p> <ol style="list-style-type: none"> <li>1. Web Dynpro Components, Windows and Views</li> <li>2. Web Dynpro Controllers</li> <li>3. Web Dynpro Context</li> <li>4. Web Dynpro User Interface</li> <li>5. Controller and Context programming</li> </ol>  |

Code: 4HC77

**III year B.Tech – I Sem  
LOGICAL REASONING**

**L T P C  
3 2**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
	x	x						x			

**UNIT I**

Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.

**UNIT II**

Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.

**UNIT III**

Classification / Odd One Out: Word Classification, Number Classification, Letter Classification.

**UNIT IV**

Coding – Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding.

**UNIT V**

Blood Relations: Deciphering Jumbled up Descriptions, Relation Puzzle – Direction sense test.

**UNIT VI**

Number, Ranking & Time Sequence Test – Arithmetical Reasoning – Mathematical Operations.

**TEXT BOOKS**

Verbal and Non Verbal Reasoning - R.S.Agarwal.



Code: 4A676

**Syllabus for B. Tech. III Year II semester**  
**COMPREHENSIVE VIVA II**

**L      T      P/D    C**  
-      -      -      **1**

a	b	c	d	e	f	g	h	i	j	k	l
x	x							x			

**Course Outcomes:** After studying this course, the students will be able to

CO1	Explain the skills in the courses, undergone till the completion of that academic year.
CO2	Comprehend the concepts in the core subjects.
CO3	Elaborate his practical awareness earned in laboratories.
CO4	Discuss about elective subjects, Included in due course.
CO5	Evaluate the readiness to face the interview, if any.
CO6	Estimate the Employability skill with the help of responses to above

There shall be a Comprehensive Viva-Voce in III year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an external examiner, Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech. Course of study up to III Year. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

**III year B.Tech – II Sem**  
**ELECTRICAL MACHINES LAB – II**

Code: 4A677

			L		T		P 3		C 2			
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	x	x		x		x			x	x		

**The following experiments are required to be conducted:**

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner's test on a pair of single phase transformers
3. Scott connection of transformers
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by synchronous impedance & m.m.f. methods
6. V and Inverted V curves of a three—phase synchronous motor.
7. Equivalent Circuit of a single phase induction motor
8. Determination of  $X_d$  and  $X_q$  of a salient pole synchronous machine
9. Brake test on three phase Induction Motor
10. Regulation of three-phase alternator by Z.P.F. and A.S.A methods

**III year B.Tech – II Sem**

**Code: 4A678**

**POWER ELECTRONICS AND SIMULATION LAB**

		L			T			P			C		
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a	b	c	d	e	f	g	h	i	j	k	l		
	x	x	x			x		x		x			

**The Experiments in Power Electronics Lab**

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. DC Jones chopper with R and RL Loads
5. Single Phase Parallel, inverter with R and RL loads
6. Single Phase Cycloconverter with R and RL loads
7. Three Phase half controlled bridge converter with R-load
8. Single Phase series inverter with R and RL loads
9. PSPICE simulation of single-phase full converter using RLE loads and single-phase AC voltage controller using RLE loads.
10. PSPICE simulation of resonant pulse commutation circuit and Buck chopper.
11. PSPICE simulation of single phase Inverter with PWM control.

**REFERENCE BOOKS:**

1. Simulation of Electric and Electronic circuits using PSPICE – by M.H.Rashid, M/s PHI Publications.
2. PSPICE A/D user's manual – Microsim, USA.
3. PSPICE reference guide – Microsim, USA.
4. MATLAB and its Tool Books user's manual and – Mathworks, USA.

a	b	c	d	e	f	g	h	i	j	k	l
x	x				x		x	x	x		x

**III Year B.Tech – II Sem**

**CODE: 3A690**

**TECHNICAL PAPER WRITTING AND SEMINAR - VI**

**L      T      P/D      C**  
**0      0      2      1**

**Course Outcomes:** After studying this course, the students will be able to

CO1	Evaluate a topic from the current technical topics of their choice in the electronics & communications engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Estimate to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Explain the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Discuss the questions posed by the panel with audience and panel to answer them.
CO5	Estimate his/her weak points with suggestions of panels and re-present if necessary.
CO6	Evaluate his/her status in technical presentation.

There shall be a technical seminar evaluated for 25 marks in third year second semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defence before a departmental committee Consisting of Head, a senior faculty and supervisor	15 marks

a	b	c	d	e	f	g	h	i	j	k	l
					x		x				

## IV Year B.Tech – I Sem

**CODE : 4GC33 CULTURE, VALUES, PROFESSIONAL ETHICS & IPR**  
**(Common to all branches)**

<b>L</b>	<b>T</b>	<b>P/D</b>	<b>C</b>
<b>2</b>	<b>1</b>	<b>0</b>	<b>2</b>

**Objectives of the Course:** By studying this subject student will be able to know the importance of value education, values, morals, ethics, Indian culture and IPR and how valuable they are for each every individual in their day to day life and to mould themselves as real human being.

**Course Outcomes:**

1. To understand the importance of Indian culture. Present its relevance in present age. And analyze the ancient wisdom. Apply core wisdom for professionals in modern age.
2. To analyze the importance of value system and its importance in present life.
3. To evaluate the core areas of ethics. Apply ethics in their professional and student life.
4. To Evaluate between organization and profession and List out professional ethics. Work towards techniques of implementing professional ethics in future
5. To Comprehend Invention and Creativity Appreciate the concept of intellectual property (IP) vis-à-vis physical property; Recognize the different kinds of intellectual property; Differentiate Industrial Property vs Copyrights Differentiate between types of IP Appreciate the rationale behind IP, and the underlying premises; Understand how a balance is sought to be achieved between the rights of the owner of IP on one hand and the rights of other individuals and the society in general on the other;

**UNIT-1 INDIAN CULTURE:** A Introduction to Culture Values and Ethics, Bharata, The Indian Concept of Human Life, Indian Civilization, Sanskrit and Indian Languages, Festivals, Sculpture, Music, Dance, Drama, Ayurveda, Family and its Importance, Indian Marriage System, Status of Women in Indian Society, Education, Purpose, Ancient System, Value Education, Interfaith Understanding, Happiness, Modernism and its Effect on Lifestyle, Mind and its Operation, Control of Mind, Yoga, Exemplary Life Sketches-Albert Einstein, Abraham Lincoln

**UNIT-II VALUE SYSTEM:** Human Value System, Truthfulness, Righteousness, Peace, Non-Violence, Love, Kindness and Compassion, Humility, Faith, Courage, Optimism, Forgiveness, Ceiling on Desires (Control of Sense organs), Exemplary Life Sketches-M K Gandhi, Abdul Kalam

**UNIT-III ETHICS:** Ethics in Ancient India, Ethics, Morals, Ethics and Human Life, Core Areas for Ethics, Values, Morality, Integrity, Honesty, Character, Loyalty, Trustworthiness, Courage and Confidence, Confidentiality, Secrecy and Transparency, Justification, Contracts and Spirit Promises and Schedules, Quarrels, Selfishness, Obstacles, Supporting Measures, Reputation and its sale, Decision Making in Ethics, Exemplary Life Sketches-Vishveshwaraiah, Jagadeesh Chandra Bose, Meghanad Saha

**UNIT- IV PROFESSIONAL ETHICS:** Occupation, Profession, Professional, Professional Organization, Obligations Of a Professional, Temptations, Aptitude, Importance of Professional Ethics for Engineers, Code of Ethics, Need for a Code, Impact of Ethical Behavior, The Code of Ethics for Engineers, Fundamental Principles and Canons, Commerce and Ethics, Marketing Ethics, Finance and Ethics, Science, Religion and Ethics, Medical Ethics, Genetics and Ethics, Politics and Ethics, Genders and Ethics, Media and Ethics, Computer Ethics, Exemplary Life Sketches- Narayan Murthy, Homi Jahangir Bhabha

**UNIT -V INTELLECTUAL PROPERTY RIGHTS (IPR):** Invention and Creativity, Basic Types of Property, Need for Protection of IPR, IP Types Industrial Property (Patents, Trade Marks, Trade Secrets, Industrial Designs and Integrated Circuits), Copyrights and Related Rights, Geographical Indications.

**UNIT-VI WIPO Mission and Activities, GATT & Trips, Indian Position on WTO and strategies, Indian IPR legislations-commitments to WTO-Patent Ordinance and the Bill, Draft of a National Intellectual Property Policy, Case Studies on IP**

**REFERENCES:**

1. The ABCs of Ethics by Michael. L. Buckner, Universe. Inc, New York Lincoln, Shangahai
2. Science, Faith and Ethics by Denis Alexander and Robert.S.White, Hendrickson Publishers, Massachusetts, USA, March 2006
3. Vedic Science Primer by PSR Murthy, BS Publications, Hyderabad
4. Medical Ethics-Global View Points, Edited by Diane Andrews, Hennig Feld, Green Haven Press
5. Divine Stories, Human Value Stories, Volume I and II, Sri Satya Sai Books and Publications
6. IPR, Nalsar Law University Course modules

Code: 4A714

**IV year B.Tech – I Sem**  
**POWER SYSTEMS - IV**

	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>							
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<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>
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**OBJECTIVE:**

This subject deals with Economic operation of Power Systems, Hydrothermal scheduling and modeling of turbines, generators and automatic controllers. It emphasizes on single area and two area load frequency control and reactive power control.

**Course outcomes:**

- 1) Understand about importance of network matrices and usefulness in power system analysis.
- 2) Analyze the power system under different types of faults.
- 3) Analyze the power system under steady state condition for voltage and power flow calculations.
- 4) Analyze the power system for maintain constant frequency in single area.
- 5) Analyze the power system for maintain constant frequency in two area.
- 6) Analyze the power system for maintaining steady state and transient stability.

**UNIT -I POWER SYSTEM NETWORK MATRICES:**

Graph Theory: Definitions, Bus Incidence Matrix,  $Y_{BUS}$  formation by Direct and Singular Transformation Methods, Numerical Problems.

**FORMATION OF  $Z_{BUS}$ :** Partial network, Algorithm for the Modification of  $Z_{BUS}$  Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems), Modification of  $Z_{BUS}$  for the changes in network (Problems).

**UNIT – I SHORT CIRCUIT ANALYSIS:**

Per Unit System of Representation, Per Unit equivalent reactance network of a three phase Power System, Numerical Problems.

**SYMMETRICAL FAULT ANALYSIS**

Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems.

**UNSYMMETRICAL FAULT ANALYSIS:**

LG, LL, LLG faults with and without fault impedance, Numerical Problems.

**UNIT –III POWER FLOW STUDIES:**

Necessity of Power Flow Studies, Derivation of Static load flow equations, Load flow solutions using Gauss Seidel Method, Acceleration Factor, Load flow solution with and without P-V buses, Algorithm and Flowchart. Numerical Load flow Solution for Simple Power Systems (Max. 3-Buses), Determination of Bus Voltages, Injected Active and Reactive Powers (Sample One Iteration only) and finding Line Flows/Losses for the given Bus Voltages.

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form, Load Flow Solution with or without PV Buses, Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods, Comparison of Different Methods, DC load Flow.

**UNIT – IV LOAD FREQUENCY CONTROL SINGLE AREA:**

Speed governor, turbine, generator and power system simplified models, excitation system model, Necessity of keeping frequency constant. Definitions of Control area, Single area control, Block diagram representation of an isolated power system, Steady state analysis, Dynamic response, uncontrolled case.

**UNIT – V LOAD FREQUENCY CONTROL TWO AREA:**

Load frequency control of 2-area system, uncontrolled case and controlled case, tie-line bias control. Proportional plus Integral control of single area and its block diagram representation, steady state response, Load Frequency Control and Economic dispatch control.

**UNIT-VI ECONOMIC OPERATION OF POWER SYSTEMS:**

Optimal operation of Generators in Thermal Power Stations, Heat rate Curve, Cost Curve, Incremental fuel and Production costs, Input-output characteristics, Optimum generation allocation with line losses neglected. Optimum generation allocation including the effect of transmission line losses, Loss Coefficients, General transmission line loss formula. Hydrothermal scheduling.

**TEXT BOOKS:**

1. Electrical Power Systems – C.L.Wadhwa, Newage International, 3rd Edition.
2. Modern Power System Analysis –I.J.Nagrath & D.P.Kothari, Tata Mc Graw Hill Publishing Company Ltd, 2<sup>nd</sup> edition.

**REFERENCE BOOKS:**

1. Power System Analysis and Design – J.Duncan Glover and M.S.Sarma., THOMPSON, 3<sup>rd</sup> Edition.
2. Electric Energy systems Theory – O.I.Elgerd, Tata Mc Graw Hill Publishing Company Ltd., Second edition.
3. Power System Analysis – Grainger and Stevenson, Tata McGraw Hill.
4. Power System Analysis – Hadi Saadat, Tata Mc Graw Hill Publishing Edition.



**IV year B.Tech – I Sem**  
**NON-CONVENTIONAL ENERGY SOURCES**

Code: 4A715

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**OBJECTIVE:**

It introduces solar energy its radiation, Collection, storage and application. It also introduces the Wind energy, Biomass energy, geothermal energy and ocean energy as alternative energy sources.

**UNIT – I -PRINCIPLES OF SOLAR RADIATION:**

Role and potential of new and renewable source, The solar energy option, Environmental impact of solar power, Physics of the sun, the solar constant, Extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, Solar radiation data.

**UNIT-II- SOLAR ENERGY COLLECTION STORAGE AND APPLICATIONS:** Flat plate and concentrating collectors, Classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Different methods, Sensible, Latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

**UNIT – III WIND ENERGY:**

Sources and potentials, Horizontal and vertical axis windmills, Performance characteristics, Betz criteria

**BIO-MASS:** Principles of Bio-Conversion, Anaerobic/aerobic digestion, Types of Bio-gas digesters, Gas yield, Combustion characteristics of bio-gas, Utilization for cooking, I.C.Engine operation and economic aspects.

**UNIT – IV GEOTHERMAL ENERGY:**

Resources, types of wells, methods of harnessing the energy, Potential in India.

**UNIT-V OCEAN ENERGY:**

OTEC, Principles utilization, Setting of OTEC plants, Thermodynamic cycles. Tidal and wave energy, Potential and conversion techniques, Mini-hydel power plants and their economics.

**UNIT-VI DIRECT ENERGY CONVERSION:**

Need for DEC, Carnot cycle, Limitations, principles of DEC. Thermoelectric generators, seebeck, Peltier and joul Thomson effects, Figure of merit, materials, Applications, MHD generators, Principles, Dissociation and ionization, Hall effect, Magnetic flux, MHD accelerator, MHD Engine, Power generation systems, Electron gas dynamic conversion, economic aspects. Fuel cells – principles - Faraday's law's - Thermodynamic aspects - selection of fuels and operating conditions.

**TEXT BOOKS:**

1. Non-Conventional Energy Sources - G.D. Rai
2. Renewable Energy Technologies - Ramesh & Kumar /Narosa.

**REFERENCE BOOKS:**

1. Renewable energy resources - Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy - Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems - K Mittal /Wheeler
4. Solar Energy - Sukhame

**IV year B.Tech – I Sem**  
**POWER SEMICONDUCTOR DRIVES**

Code: 4A713

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**Course Objective:**

This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are presented.

**Course Outcomes:**

- 1) Identify the necessity of drive; understand the operation of different converters connected to D.C separately excited motors and series motors derive the Speed - Torque expressions and draw the Characteristics and solve problems.
- 2) Understand four Quadrant operations of dc drives and analyze electric braking.
- 3) Understand four Quadrant operations of Chopper fed dc drives.
- 4) Describe the operation of Induction motor with its equivalent circuit the student should be able to describe the speed control of Induction motor with V/ F control and its speed torque Characteristics- Constant torque and constant power modes, Understand the operation of Voltage source and current source Inverter fed Induction motor in closed loop.
- 5) Explain the concept of slip power and deduce an expression for speed variation with slip power
- 6) Analyze the working of different Synchronous Motor drives.

**UNIT – I CONTROL OF DC MOTORS BY SINGLE PHASE AND THREE PHASE CONVERTERS:**

Introduction to Thyristor controlled Drives, Single Phase and three phase semi and Fully controlled converters connected to d.c separately excited and d.c series motors, Continuous current operation, Output voltage and current waveforms, Speed and Torque expressions, Speed, Torque Characteristics, Problems on Converter fed d.c motors.

**UNIT – II FOUR QUADRANT OPERATION OF DC DRIVES:**

Introduction to Four quadrant operation, Motoring operations, Electric Braking, Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters, Closed loop operation of DC motor (Block Diagram Only).

**UNIT-III CONTROL OF DC MOTORS BY CHOPPERS:**

Single quadrant, Two - quadrant and four quadrant chopper fed dc separately excited and series excited motors, Continuous current operation, Output voltage and current wave forms, Speed torque expressions, speed torque characteristics, Problems on Chopper fed D.C Motors, Closed Loop operation ( Block Diagram Only).

**UNIT – IV CONTROL OF INDUCTION MOTOR ON STATOR SIDE:**

Variable voltage characteristics, Control of Induction Motor by AC Voltage Controllers, Waveforms, speed torque characteristics, Variable frequency characteristics, Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters, PWM control, Comparison of VSI and CSI operations, Speed torque characteristics, numerical problems on induction motor drives, Closed loop operation of induction motor drives (Block Diagram Only).

**UNIT –V CONTROL OF INDUCTION MOTOR ON ROTOR SIDE:**

Static rotor resistance control, Slip power recovery, Static Scherbius drive, Static Kramer Drive, Their performance and speed torque characteristics, Advantages applications, problems.

**UNIT – VI CONTROL OF SYNCHRONOUS MOTORS:**

Separate control & self control of synchronous motors, Operation of self controlled synchronous motors by VSI and CSI cyclo converters. Load commutated CSI fed Synchronous Motor, Operation, Waveforms, Speed torque characteristics, Applications Advantages and Numerical Problems, Closed Loop control operation of synchronous motor drives (Block Diagram Only), Variable frequency control, Cyclo converter, PWM, VFI, CSI.

**TEXT BOOKS:**

1. Fundamentals of Electric Drives – G K Dubey, Narosa Publications

2. Power Electronic Circuits, Devices and applications – M.H.Rashid, PHI.

**REFERENCE BOOKS:**

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing Company.
2. Modern Power Electronics and AC Drives – B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
4. A First course on Electrical Drives – S K Pillai New Age International (P) Ltd, 2<sup>nd</sup> Edition.

Code: 4ZC02

**IV year B.Tech – I Sem  
MANAGEMENT SCIENCE**

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After going through the course, the student will be able to

1. Understand the significance of management, basic concepts and applicability of management principles in changing paradigms.
2. Demonstrate the procedures of the work study method and work measurement, Project management.
3. Infer the need to understand the importance of materials management and quality control techniques.
4. Relate the knowledge of two functional areas of business, human resource management and marketing management.
5. Explain the different dimensions of behaviour, personality, perception, attitudes overall to gain insights into organizational behaviour.
6. Distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors.

**UNIT – I: INTRODUCTION TO MANAGEMENT:**

Management- Definitions, Levels of Management, functions of management Planning: types of planning, planning process; Organizing: Organizational Design and structure, staffing; Directing; Maslow's Motivational theory, Leadership styles, Controlling: Basic control process.

**UNIT – II: INTRODUCTION TO OPERATIONS MANAGEMENT:**

Plant Location, plant layout, types of production, Work Study, Method study and Work Measurement, Basic Procedures, Project Management: Network Analysis - Programme Evaluation and Review Techniques, Critical Path Method, Crashing of Simple Networks.

**UNIT – III: MATERIALS MANAGEMENT:**

Objectives of Materials, Need for Inventory Control, Economic Order Quantity, ABC Analysis, Inventory Control Systems, Just In Time, Introduction to LSCM, Quality Control Techniques – Inspection, ISO standards, Six Sigma.

**UNIT - IV:**

**(i) Human Resources Management:** Objectives of HRM, Challenges of HRM, HR Planning process, HR functions and policies – Recruitment, Selection, Training and Development, Performance Appraisal, Assessment of HR requirements.

**(ii) Marketing Management:** Concept of Marketing, Functions, Marketing Mix, Product Life Cycle, Marketing Strategies, Channels of Distribution, Differences between products and services

**UNIT – V: INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR:**

Definition, Nature and Scope, Perception – Perceptual selectivity and organization, Personality and Attitudes - Personality as a continuum – Meaning of personality, Communication – types - interactive communication in organizations –barriers to communication and strategies to improve the follow of communication.

**UNIT - VI: STRATEGY AND MANAGEMENT CONTROL SYSTEM:**

Concepts in Strategic Management, Vision, Mission, Objectives, SWOT Analysis, Concept of Strategic Planning, Competitive Advantage, Concept of Core Competence. An overview, Process and its Implementation, Target Setting, Balanced Score Card, Management Control in Empowered Organization – Conflict between Creativity and Control.

**REFERENCES:**

- 1 Dr. Y. Satyanarayana: Management control systems in competitive environment, ICFAI books.
2. A R Aryasri: Management Science, Tata Mc Graw Hill
3. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005
4. Kotler Philip & Keller Kevin Lane: Market Management 12/e, PHI, 2005
5. Strategic Management, Text and Cases, VSP Rao, V Hari Krishna
6. Thomas N Duening & John M. Ivancevich Management – Principles and Guidelines, Biztantra, 2003.

Code: 4A717

**IV year B.Tech – I Sem**  
**HIGH VOLTAGE ENGINEERING**  
**(PROFESSIONAL ELECTIVE-II)**

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**Course Objective :**

This subject deals with the detailed analysis of Breakdown occur in gaseous, Liquids and solid dielectrics. Information about generation and measurement of High voltage and current. In addition the High voltage testing methods are also discussed.

**Course Outcomes:**

- 1) Learn about applications of different insulating materials.
- 2) Learn about breakdown in gas, liquid and solid insulating materials.
- 3) Analyze different methods of generation and measurement of high voltages.
- 4) Study about high voltage phenomenon and insulation coordination.
- 5) Study about non destructive testing of material and electrical apparatus.
- 6) Learn about different tests done on different electrical equipments.

**UNIT - I INTRODUCTION TO HIGH VOLTAGE TECHNOLOGY AND APPLICATIONS:**

Electric Field Stresses, Gas / Vacuum as Insulator, Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress, Numerical methods for electric field computation, Surge voltages, their distribution and control, Applications of insulating materials in transformers, Rotating machines, Circuit breakers, Cable power capacitors and bushings.

**UNIT – II BREAK DOWN IN GASEOUS, LIQUID AND SOLID DIELECTRICS:**

Gases as insulating media, Collision process, Ionization process, Townsend's criteria of breakdown in gases, Paschen's law. Liquid as Insulator, Pure and commercial liquids, Breakdown in pure and commercial liquids. Intrinsic breakdown, electromechanical breakdown, Thermal breakdown, Breakdown of solid dielectrics in practice, Breakdown in composite dielectrics, Solid dielectrics used in practice.

**UNIT – III GENERATION AND MEASUREMENT OF HIGH VOLTAGES AND CURRENTS:**

Generation of High Direct Current Voltages, Generation of High alternating voltages, Generation of Impulse Voltages, Generation of Impulse currents, Tripping and control of impulse generators. Measurement of High Direct Current voltages, Measurement of High Voltages Alternating and impulse, Measurement of High Currents-direct, alternating and Impulse, Oscilloscope for impulse voltage and current measurements.

**UNIT – IV OVER VOLTAGE PHENOMENON AND INSULATION CO-ORDINATION:**

Natural causes for over voltages, Lightning phenomenon, Over voltage due to switching surges, system faults and other abnormal conditions, Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.

**UNIT – V NON-DSTRUCTIVE TESTING OF MATERIAL AND ELECTRICAL APPARATUS:**

Measurement of D.C Resistively, Measurement of Dielectric Constant and loss factor, Partial discharge measurements.

**UNIT – VI HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS:**

Testing of Insulators and bushings, Testing of Isolators and circuit breakers, Testing of cables, Testing of Transformers, Testing of Surge Arresters, Radio Interference measurements.

**TEXT BOOKS:**

1. High Voltage Engineering – M.S.Naidu and V. Kamaraju, TMH Publications, 3<sup>rd</sup> Edition.
2. High Voltage Engineering Fundamentals – E.Kuffel, W.S.Zaengl, J.Kuffel by Elsevier, 2<sup>nd</sup> Edition.

**REFERENCE BOOKS:**

1. High Voltage Engineering – C.L.Wadhwa, New Age Internationals (P) Limited.
2. High Voltage Insulation Engineering – Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited.

**IV year B.Tech – I Sem**  
**DIGITAL SIGNAL PROCESSING**  
**(PROFESSIONAL ELECTIVE-II)**

Code: 4CC12

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**Course Objectives:**

The objective of this course is to make the students familiar with the most important methods in DSP, including digital filter design, transform-domain processing and introduction of DSP Processors. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.

**Course Outcomes:** After studying this course, the students will be able to

1	Represent frequency domain of discrete time signals and systems and can find linearity, time invariant stability and causality.
2	Represent periodic signals using Fourier series and compute DFT
3	Compute the Fourier Transform of DT signals using the FFT algorithms.
4	Realize structures of Digital IIR and FIR filters in several forms and also familiar with applications of Z transforms.
5	Design IIR and FIR filters for the given specifications.
6	Understand the concepts of Decimation, Interpolation and sampling rate conversion.

**UNIT-I**

**INTRODUCTION:** Introduction to Digital Signal Processing: Discrete time signals & sequences, Linear shift invariant systems, Stability and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

**UNIT-II DISCRETE FOURIER SERIES:**

Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS.

**UNIT-III FAST FOURIER TRANSFORMS:**

Fast Fourier transforms (FFT), Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT and FFT for composite N.

**UNIT-IV REALIZATION OF DIGITAL FILTERS:**

Review of Z-transforms, Applications of Z – transforms, Solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function.

**UNIT-V IIR AND FIR DIGITAL FILTERS:**

Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations. **FIR DIGITAL FILTERS:** Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

**UNIT-VI MULTIRATE DIGITAL SIGNAL PROCESSING:**

Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion, Applications of Multi rate signal processing: Sub-band coding, Filter banks, Design of Phase Shifters.

**WAVELET TRANSFORMS-** Wavelet Transforms, Applications of Wavelets.

**TEXT BOOKS:**

- Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education, PHI, 2007.
- Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
- S.J. Orfanidis, Optimum Signal Processing, McGraw Hill, 1989.

**REFERENCE BOOKS:**

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill, 2006.
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata Mc-Graw Hill, 2005.
4. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
5. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Edition, 2006.



Code: 4A718

**IV year B.Tech – I Sem**  
**OPTIMIZATION TECHNIQUES**  
**(PROFESSIONAL ELECTIVE-II)**

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**UNIT – I INTRODUCTION AND CLASSICAL OPTIMIZATION TECHNIQUES:**

Statement of an Optimization problem – design vector – design constraints – constraint surface-objective function – objective function surfaces – classification of Optimization problems.

**UNIT – II CLASSICAL OPTIMIZATION TECHNIQUES:**

Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

**LINEAR PROGRAMMING**

Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm.

**UNIT – III TRANSPORTATION PROBLEM**

Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems.

**UNIT – IV UNCONSTRAINED NONLINEAR PROGRAMMING:**

One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method  
**Unconstrained Optimization Techniques** Univariate method, Powell's method and steepest descent method.

**UNIT – V CONSTRAINED NONLINEAR PROGRAMMING:**

Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.

**UNIT – VI DYNAMIC PROGRAMMING:**

Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.

**TEXT BOOKS:**

1. Engineering optimization: Theory and practice - S. S.Rao, New Age International (P) Limited, 3<sup>rd</sup> edition, 1998.
2. Introductory Operations Research - H.S. Kasene & K.D. Kumar, Springer (India), Pvt .LTd.

**REFERENCE BOOKS:**

- 1 Optimization Methods in Operations Research and systems Analysis – K.V. Mital and C. Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Operations Research – Dr. S.D.Sharma.
3. Operations Research: An Introduction – H.A. Taha, PHI Pvt. Ltd., 6<sup>th</sup> edition.
4. Linear Programming – by G. Hadley.

Code: 4FC10

**IV year B.Tech – I Sem**  
**NEURAL NETWORKS AND FUZZY SYSTEMS**  
**(PROFESSIONAL ELECTIVE – II)**

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**UNIT - I**

**Characteristics of Neural Networks**, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units.

**UNIT II**

**Feed-forward Neural Networks**: Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

**UNIT III**

**Feedback Neural Networks**: Introduction, Analysis of Linear Auto-associative FF Networks, Analysis of Pattern Storage Networks.

**UNIT IV**

**From Classical Sets to Fuzzy Sets: A Grand Paradigm Shift**: Introduction, Crisp Sets: An Overview, Fuzzy Sets: Basic Types, Fuzzy Sets: Basic Concepts, Characteristics and Significance of the paradigm Shift.

**Fuzzy Sets Vs Crisp Sets**: Additional properties of  $\alpha$ - Cuts, Representations of Fuzzy Sets, Extension Principle for Fuzzy Sets

**UNIT V**

**Operations on Fuzzy Sets**: Types of operations, Fuzzy Complements, Fuzzy intersections: t- Norms, Fuzzy Unions: t- Conorms, Combinations of Operations, Aggregation Operations.

**Fuzzy Arithmetic**: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals, Arithmetic Operations on Fuzzy Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

**UNIT VI**

**Fuzzy Logic**: Classical Logic: An Over View, Multivalued Logic, Fuzzy Prepositions, Fuzzy Quantifiers, Linguistic Hedges, Inference from Conditional Fuzzy Prepositions, Inference from Conditional and Quantified Prepositions, Inference from Quantified Prepositions,

**TEXT BOOKS**

1. Fuzzy Sets and Fuzzy Logic by George J. Klir/ Bo Yuan, Printice Hall of India P Ltd.
2. Artificial Neural Networks by B. Vegnanarayana, Printice Hall of India P Ltd.

**REFERENCES**

1. Artificial Intelligence 2nd Edition by E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems by Patterson, PHI.
3. Expert Systems: Principles and Programming- Fourth Edn by Giarrantana/ Riley, Thomson.
4. PROLOG Programming for Artificial Intelligence - Third Edition by Ivan Bratka, Pearson Education.
5. Neural Networks by Simon Haykin PHI
6. Artificial Intelligence - 3rd Edition by Patrick Henry Winston, Pearson Edition.

**B. Tech. IV Year I semester**  
**FUNDAMENTAL OF COMPUTER NETWORKS**

<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	<b>i</b>	<b>j</b>	<b>k</b>	<b>l</b>	<b>m</b>
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**Course Outcomes:**

- 1 Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
- 2 Discuss design issues of data link layer and solve problems on Checksum and flow control.
- 3 Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA.CD and MAC addresses with IEEE 802.X and wireless lans.
- 4 Discuss network layer design issues, routing algorithms and Internetworking concepts.
- 5 Discuss network layer sub netting concepts, its protocols of control and congestion and QOS.
6. Describe concepts and services and protocols of transport, Application layers along with the network security issues and block ciphers.

**UNIT I**

**Introduction:** OSI, TCP/IP and other Networks models, Examples of Networks: Novell Networks, Arpaent, Internet, Network Topologies WAN, LAN, MAN

**Physical Layer:** Transmission media, magnetic media, twisted pair, coaxial cable, fiber optics, wireless transmissions.

**UNIT II**

**Data link layer:** Design issues in data link layer: Logical Link layer, Logical Link control, framing flow control, Protocol-stop and wait, Sliding, Error detection and correction, CRC, HDLC, ATM.

**UNIT III**

**Medium Access sub layer:** ALOHA, MAC addresses, carrier sense multiple access, ISDN, IEEE 802 X Standard Ethernet, Wireless LANS, Bridges.

**UNIT IV**

**Network Layer:** Virtual circuit and Datagram subnets-Routing algorithm: Shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing

**UNIT V**

Congestion Control and Algorithm: General Principles of Congestion, Congestion Prevention Policies. Internetworking: The Network layer in the Internet and in the ATM Networks.

**UNIT VI**

**Transport Layer:** Transport Services, Connection management, TCP and UDP protocols; ATM AAM Protocol layer.

**Application Layer:** Network Threats, confidentiality, authenticity, DES and RSA algorithms. Domain name system, Electronic Mail, WWW, Multimedia.

**TEXT BOOKS**

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

**REFERENCES**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

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**CODE: 4A779**

**B. Tech. IV Year I Semester  
PROJECT PHASE - I**

**L      T      P/D      C**  
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**Course Outcomes:** After studying this course, the students will be able to

CO1	Students identify a topic from the current technical topics of their choice in the electronics and communication domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Students also face the questions posed by the panel and the students and answer them.

A project phase - I seminar in fourth year first semester will be evaluated for 50 marks as follows. This is aimed at the students to identify a project on which they are likely to continue for their project in the fourth year second semester.

Preliminary report on progress of work	10 marks
Mid semester presentation	10 marks
Final report	10 marks
Final presentation and defense before a departmental committee consisting of Head, a senior faculty and supervisor	20 marks

There shall be no external evaluation in project phase – I.

CODE: 4A780

**B. Tech. IV Year I Semester**  
**INDUSTRY ORIENTED MINI PROJECT**

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**Course Objectives:** After studying this course, the students will be able to

CO1	Familiarize with surveying in the internet resources, journals and technical magazines in the library
CO2	Identify a topic from the current technical topics of their choice in the electronics and communication domain and the allied fields
CO3	Familiarize with arranging the contents of the presentation and scope of the topic, in an effective manner.
CO4	Ability to present the technical topic
CO5	Ability to face the questions posed
CO6	Ability to design a circuit

There shall be an industry-oriented mini-Project in their specialization that may be carried out in collaboration with an industry / R & B organization / Academic Institution, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated during IV year I Semester. The industry oriented mini project shall be evaluated for a total of 75 marks with 25 marks for internal assessment and 50 marks for end examination. The mini project must be submitted in report form and should be presented before a committee, consisting of an external examiner, head of the department, a senior faculty member of the department and supervisor of the mini project.

**The pattern of internal evaluation** is as follows:

Work in progress as evaluated by internal guide	:	05 marks
Work in progress as evaluated by External guide	:	10 marks
Report	:	05 marks
Seminar presentation and defense of project	:	05 marks

If the mini project is conducted within the college, the work in progress is evaluated by the supervisor for 15 marks.

**IV year B.Tech – I Sem  
ELECTRICAL WORKSHOP**

**Code: 4A781**

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**Course Outcomes:**

1. Ability to understand how a power contactor works and basic control circuit.
2. Ability to connect properly a basic interlocking circuit
3. Ability to analyze importance of star- Delta Starter
4. Ability to develop an inching circuit.
5. Ability to analyze role and importance of interlocking of group of drives
6. Ability to Study different protections to a motor..
7. Ability to know various parts in a three-phase motor
8. Ability to analyze single phase motors.
9. Ability to Differentiate protections given as under voltage and over voltage to a DOL starter..
10. Ability to test transformer oil and know its usefulness as insulator and as heat absorber.

**The list of Experiments:**

1. Direct On-Line Starter
2. Forward And Reverse Starter Wiring And Testing
3. Star-Delta Starter Wiring and Testing Suitable For 5 Ho Motor
4. Inching (Jogging) Circuit for Ac Motor
5. Interlocking Of Group of Drives
6. Study of Phase Failure Relay (Single Phase Preventer)
7. 3-Phase Squirrel Cage Induction Motor Dismantling, Assembling and Testing
8. 1-Phase Capacitor Start Capacitor Run Induction Motor Dis-Mantling, Assembling and Testing
9. Wiring Undervoltage Relay To A Dol Starter
10. Testing Of Dielectric Strength of Transformer Oil



**IV year B.Tech – I Sem**  
**Code: 4A782      MEASUREMENTS AND INSTRUMENTATION LAB**

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**Objectives of the Course:**

Energy can neither be created nor destroyed; it can be transformed from one form into another. Out of all the forms of energies (which are available) electrical energy occupies top position in the hierarchy. So measurement of electrical quantity plays a vital role in the field of Engineering and Technology. In this lab students will be able to measure practically different electrical parameters and calibrate the meters.

**Course Outcomes:**

1. To draw the graph between the distance and EMF for linear variable differential transformer and to measure the displacement.
2. To measure 3- $\Phi$  reactive power using single phase wattmeter.
3. To determine the value of given capacitor and to obtain its dissipation factor, and also the values of the resistance and inductance of a given coil.
4. To determine the percentage of error of a given single phase energy meter.
5. To measure the parameters of a choke coil using 3-voltmeter & 3-ammeter methods
6. To determine the percentage ratio error and the phase angle error of the given transformer by comparison with another current transformer whose errors are known.
7. To determine the value of the resistance of the given wire using Kelvin's double bridge.
8. To apply Crompton's DC potentiometer to, Calibrate a PMMC type ammeter. Voltmeter
9. To calibrate a given 1- $\Phi$  power factor meter by phantom loading.
10. To calibrate a given LPF watt meter by phantom loading.
11. To measure the 3-phase power with two number of CTs and a single wattmeter.

**The following experiments are required to be conducted:**

1. Calibration and Testing of single phase energy Meter
2. Calibration of dynamometer power factor meter
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Measurement of % ratio error and phase angle of given C.T. by comparison.
6. Schering bridge & Anderson bridge.
7. Measurement of 3 phase reactive power with single-phase wattmeter.
8. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
9. Calibration LPF wattmeter – by Phantom testing
10. Measurement of 3 phase power with single watt meter and 2 No's of C.T.
11. LVDT and capacitance pickup – characteristics and Calibration



**IV Year B.Tech – I Sem**  
**TECHNICAL PAPER WRITING AND SEMINAR - VII**

Code: 4A791

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**Course Outcomes:** After studying this course, the students will be able to

CO1	Evaluate a topic from the current technical topics of their choice in the electronics & communications engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Estimate to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Explain the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Discuss the questions posed by the panel with audience and panel to answer them.
CO5	Estimate his/her weak points with suggestions of panels and re-present if necessary.
CO6	Evaluate his/her status in technical presentation.

There shall be a technical seminar evaluated for 25 marks in fourth year first semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defence before a departmental committee Consisting of Head, a senior faculty and supervisor	15 marks

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**IV Year B.Tech – II Sem**  
**CODE: 4A820 ELECTRICAL DISTRIBUTION SYSTEM**

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**Course Objective:**

This course is an extension of Power System I & II. Knowledge of distribution system modeling, and understanding of various factors like coincidence factor, contribution factor, loss factor etc helps in how loads effects the system .Various models of feeders & substations and location of faults and protective devices gives awareness to students their usage in practical applications.

**Course Outcomes:**

- 1) By the end of the unit the student will be able to: Know the importance of terms used in distribution system such as load factor, loss factor etc and how these are interred related.
- 2) By the end of the unit the student will be able to: Know the importance of different voltages in primary & secondary distribution systems and types of feeders in our country.
- 3) By the end of the unit the student will be able to: Identify the importance of location of optimal sub – station through theoretical methods.
- 4) By the end of the unit the student will be able to: Calculate power loss and voltage drop in balanced lines and derivations connected with these.
- 5) By the end of the unit the student will be able to: Understand various types of protective devices and where and how these are used and the general procedure to coordinate protective devices.
- 6) By the end of the unit the student will be able to: Understand the importance of power factor voltage control and how to improve it with various types of correction equipments and best location for them in a system so as to give optimum results.

**UNIT – I GENERAL CONCEPT**

Introduction to distribution systems, Load modeling and characteristics. Coincidence factor, contribution factor loss factor - Relationship between the load factor and loss factor. Classification of loads (Residential, Commercial, Agricultural and Industrial) and their characteristics.

**UNIT – II DISTRIBUTION FEEDERS**

Design Considerations of Distribution Feeders: Radial and loop types of primary feeders, Voltage levels, Feeder loading; Basic design practice of the secondary distribution system.

**UNIT – III SUBSTATIONS**

Location of Substations: Rating of distribution substation, Service area within primary feeders. Benefits derived through optimal location of substations.

**UNIT – IV SYSTEM ANALYSIS** Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, Manual methods of solution for radial networks, Three phase balanced primary lines.

**UNIT – V PROTECTION & CO-ORDINATION**

Objectives of distribution system protection, Types of common faults and procedure for fault calculations. Protective Devices: Principle of operation of Fuses, Circuit Reclosures, line sectionalizes and circuit breakers. Coordination of Protective Devices: General coordination procedure.

**UNIT – VI POWER FACTOR IMPROVEMENT & VOLTAGE CONTROL**

Capacitive compensation for power-factor control. Different types of power capacitors, Shunt and series capacitors, Effect of shunt capacitors (Fixed and switched), Power factor correction, capacitor allocation - Economic justification - Procedure to determine the best capacitor location.

Voltage Control: Equipment for voltage control, Effect of series capacitors, Effect of AVB / AVR, line drop compensation.

**TEXT BOOK:**

1. “Electric Power Distribution system, Engineering” – Turan Gonen, Mc Graw-hill 2<sup>nd</sup> edition.

2. Electric Power Distribution – A.S. Pabla, Tata Mc Graw-hill, 4<sup>th</sup> edition.

**REFERENCE BOOK:**

1. Electrical Power Distribution and Automation – S.Sivanagaraju, V.Sankar, Dhanpat Rai publishers. Rai & Co, 1<sup>st</sup> edition.
2. Electrical Power Distribution Systems – V.Kamaraju, Right Publishers, 2<sup>nd</sup> edition.

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**IV Year B.Tech – II Sem**  
**ENVIRONMENTAL STUDIES**  
 (Common to all branches)

**CODE : 4GC06**

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**UNIT I: ECOSYSTEMS**

Ecosystem definition, concept, Structure and Function, food chain and food web, Ecological pyramids, Biogeochemical cycles, Ecological niche and succession, Classification (Forest, Grassland, Desert, Pond, River, Marine, Estuarine, Wetlands), ecosystem value, services and carrying capacity.

**UNIT II: NATURAL RESOURCES**

Definition, classification, Forest resources-use and over-exploitation, deforestation, Forest Conservation Act, Energy resources-energy demand, renewable and non-renewable energy resources, alternate energy resources, Case studies. Food Resources-World Food problems, effects of modern agriculture, fertilizer-pesticide problems, Mineral resources: Use and exploitation environmental effects of extracting and using mineral resources, case studies.

**UNIT III: ENVIRONMENTAL COMPONENTS**

Atmosphere- Definition, layers, state (weather and climate) acid rain, green house effect, ozone layer depletion, Seasons in India, Global warming, Kyoto protocol, Montreal protocol, Carbon trading, Hydrosphere-Definition, Types (surface and groundwater), distribution, Water conservation, use and over-exploitation, floods, drought, dams-benefits and problems, conflicts over water, Lithosphere- Chemical composition of the earth (core, mantle, crust), mineral resources-environmental effects of mining, Rocks and soils, Plate tectonics

**UNIT IV: BIO DIVERSITY AND ITS CONSERVATION**

Introduction, Definition, Genetic species and Eco system diversity, Value of bio diversity, Hot spots, Threats to bio diversity, Conservation strategies: Insitu and Exsitu conservation, Biological Diversity Act 2002, Wild life Protection Act.

**UNIT V: ENVIRONMENTAL POLLUTION AND CONTROL**

Air pollution: Definition, causes, effects and Control measures, Environment Protection Act, Air (Prevention and Control of Pollution) Act, 1981, Case study: Bhopal Gas Tragedy, London smog, Chernobyl disaster, Water Pollution- Definition, types, characteristics of domestic and industrial effluents – Water quality parameters, Drinking water treatment and standards, Waste water treatment, Case studies: Ganga Water Pollution, Mercury pollution-Minamata Bay diseases, Water (Prevention and Control of Pollution) Act, 1974, Definition, causes, effects and Control measures: Soil Pollution, Noise Pollution and Marine Pollution, Waste Management- Solid Waste, Hazardous waste and E-waste management, Disaster Management-Floods, Earthquakes and Cyclones.

**UNIT VI: SUSTAINABLE DEVELOPMENT**

Concept of Sustainable development, Threats to sustainability-population explosion, urbanization, over-exploitation of resources, Strategies for Sustainable development- Wasteland reclamation, Role of IT (Remote sensing and GIS) in environmental management, green technologies, Environmental Impact Assessment-overview

**TEXT BOOKS:**

1. INTRODUCTION TO ENVIRONMENTAL SCIENCE –by Dr.Y. Anjaneyulu, B.S. Publications 2004.
2. ENVIRONMENTAL STUDIES by Erach bharucha 2005, University grants commission, University press.
3. ENVIRONMENTAL SCIENCES-A NEW APPROACH by Purohit, shammi and Agarwal, Agrobios (India) 2004.
4. ENVIRONMENTAL SCIENCES-A Text book for Undergraduate by Dr. K.Mukkanti, S. Chand & Company Ltd., 2010.



4FC22

**B. Tech. IV Year II semester  
BIG DATA ANALYTICS  
(PROFESSIONAL ELECTIVE – III)**

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**Course Objective:**

More and more organizations these days use their data a decision supporting tool and to build data-intensive products and services. This course will cover the basic concepts of big data, methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and the business needs.

**UNIT I**

**INTRODUCTION TO BIG DATA:** Introduction to BigData Platform – Traits of Big data -Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - ReSampling - Statistical Inference - Prediction Error.

**UNIT II**

**DATA ANALYSIS:** Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

**UNIT III**

**MINING DATA STREAMS :** Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT IV**

**FREQUENT ITEMSETS AND CLUSTERING :** Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in NonEuclidean Space – Clustering for Streams and Parallelism.

**UNIT V**

**FRAMEWORKS AND VISUALIZATION:** MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques;

**UNIT VI:**

Systems and Analytics Applications - Analytics using Statistical packages-Approaches to modeling in Analytics – correlation, regression, decision trees, classification, association Intelligence from unstructured information- Text analytics-Understanding of emerging trends and technologies-Industry challenges and application of Analytics

**TEXT BOOKS:**

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Jiawei Han, MichelineKamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

Code: 4A821

**IV year B.Tech – II Sem**  
**HIGH VOLTAGE D.C. TRANSMISSION**  
**(PROFESSIONAL ELECTIVE – III)**

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**OBJECTIVE:**

This subject deals with the importance of HVDC transmission, analysis of HVDC converters, Faults and protections, Harmonics and Filters. It also deals with Reactive power control and Power factor improvements of the system.

**UNIT – I BASIC CONCEPTS:**

Economics & Terminal equipment of HVDC transmission systems, Types of HVDC Links, Apparatus required for HVDC Systems, Comparison of AC & DC Transmission, Application of DC Transmission System, Planning & Modern trends in D.C. Transmission.

**UNIT – II ANALYSIS OF HVDC CONVERTERS:**

Choice of Converter configuration, analysis of Graetz, characteristics of 6 Pulse & 12 Pulse converters, Cases of two 3 phase converters in star, star mode, their performance.

**UNIT – III CONVERTER & HVDC SYSTEM CONTROL:**

Principal of DC Link Control, Converters Control Characteristics, Firing angle control, Current and extinction angle control, Effect of source inductance on the system, Starting and stopping of DC link, Power Control.

**UNIT-IV MULTI TERMINAL DC SYSTEM:**

Introduction, potential applications of MTDC systems, Types of MTDC systems, Series MTDC system, parallel MTDC system, comparison of series and parallel MTDC systems control and protection of MTDC system: current margin method, voltage limiting control, Decentralized current reference balancing, Two ACR method, protection of MTDC systems.

**REACTIVE POWER CONTROL IN HVDC**

Reactive Power Requirements in steady state, Conventional control strategies, Alternate control strategies, sources of reactive power, AC Filters, Shunt capacitors-synchronous condensers.

**UNIT-V CONVERTER FAULT & PROTECTION**

Converter faults, Protection against over current and over voltage in converter station, Surge arresters, Smoothing reactors, DC breakers, Audible noise-space charge field, corona effects on DC lines, Radio interference.

**UNIT – VI HARMONICS- FILTERS**

Generation of Harmonics, Characteristics harmonics, calculation of AC Harmonics, Non- Characteristics harmonics, Adverse effects of harmonics, Calculation of voltage & Current harmonics. Types of AC filters, Design of Single tuned filters.

**TEXT BOOKS:**

1. HVDC Power Transmission Systems Technology and system Interactions –K.R.Padiyar, New Age International (P) Limited, and Publishers.
2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.

**REFERENCE BOOKS:**

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – E.Uhlmann, B.S. Publications



CODE: 4A823

**IV Year B.Tech – II Sem**  
**CONTROL OF ELECTRIC DRIVES**  
**(PROFESSIONAL ELECTIVE – III)**

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**UNIT-I: Introduction of Electrical Control of Machines:**

Manual control – Magnetic control – Semi-automatic and Automatic control of Modern machinery – Development of Control Circuits – Two wires and three wire control – Remote control – Interlocking of drives.

**UNIT-II: Control Circuit Components:**

Symbols for control components – Fuses, Switches and Fuse Switch units – Moulded Case Circuit Breaker (MCCB) and Miniature Circuit Breaker (MCB) – Contactors – Types of contactors – Contactor ratings.

**UNIT-III: Relays:**

DC Series current relay – Frequency responsive relay – Latching relay – Over load relays – Bimetallic Thermal over load relay – time delay relay (Timers) – Motor drivers Electronic timer – Phase failure relay – Push button switches – Types, Limit switch – Float switch.

**UNIT-IV: Control of Three –Phase Induction Motors:**

Motor current at start and during acceleration – Automatic starters – Increment Resistor type starter – Automatic Auto-transformer starter – Open circuit and closed circuit transition – Par winding motor starters Two step and Three step starting – Automatic Star-Delta starters, Open circuit and closed circuit transition – Starters for multi-speed motors. Starters for Wound rotor motors – Control circuit using contactor and flux delay relays.

**UNIT-V: Control of DC Motors:**

Principles of acceleration – Types of starters for automatic acceleration – Control circuits for DCL, Current limit acceleration starters – Reviewing of DC Motors – Control circuit for direct reversing and forward stop reverse operation – Jugging operation of DC motor – Control circuits for braking action.

**UNIT-VI: Control of stepper motors:**

Control circuit for Stepper motor – Block diagram of typical step motor control – Types of drive circuits – simple power drive circuit – L/R drive Bi-level drive – Chopper drive – Linear constant current drive – Bipolar drives for Stepper motor – H type and L/R type bipolar drives – Bipolar Chopper drives. Trouble shooting in control circuits – Trouble spots – General procedure for trouble shooting.

**TEXT BOOKS:**

1. Bhattacharya S. K. and Brijider Singh, Control of Electrical Machines, New Age International Publishers, New Delhi, 1996.
2. Athani V. V. Stopper Motors – Fundamentals, Applications and Design, New Age International Publishers, New Delhi, 1997.

**REFERENCE BOOKS:**

1. Electric Drives by NK DE & PK SEN, Printice Hall of India Pvt. Ltd.,
2. Control of Electrical Drives by Werner Leonhard, 3rd Edition, Springer.

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**IV Year B.Tech II Semester  
(PROFESSIONAL ELECTIVE-III)**

**4ZC19**

**PROJECT MANAGEMENT & STRUCTURED FINANCE**

**Course Objective:** The course has been designed to create an awareness of the need for systematic management of projects; highlight the components of CMBS issuance and establish a framework for understanding the fundamentals of CMBS.

**Course Outcomes:**

After studying this subject, the student will be able to

1. Describe the need for systematic management of projects.
2. Explain the procedure of project formulation.
3. Demonstrate the skills required for project planning, implementing and controlling.
4. Illustrate the sources of finance for venturing a project.
5. Infer the risk assessment procedure and methods for a project.
6. Describe the methods and methodology of project termination.

**UNIT I**

**INTRODUCTION TO PROJECT MANAGEMENT:** Concept and characteristics of a project - types of projects - Objectives of project management - Project Organizational structure - Project life cycle - Challenges and problems of project management - Qualities & functions of a project manager.

**UNIT II**

**PROJECT FORMULATION:** Generation of Project Ideas; Monitoring the environment; Tools for identification of Investment Opportunities; Preliminary Screening of Projects; Detailed Project Report: Market, Technical, Financial, Economic and Ecological feasibility report; Project Estimates; Project Selection.

**UNIT III**

**PROJECT IMPLEMENTATION AND CONTROL:** Pre-requisites for Successful Project Implementation; Forms of Project Organizations; Project Planning; Human Aspects of Project Management; Control of in-progress Projects; Post-audit; Abandonment Analysis.

**UNIT IV**

**INTRODUCTION TO STRUCTURED FINANCE AND CMBS:** Nature and Scope of Structured finance - Definition and characteristics of Commercial Mortgage Backed Securities (CMBS) – CMBS Vs other mortgage backed securities – Phases in development of CMBS market: Design, Engineering, Manufacturing and Recycle phases, CMBS securitization market: Property level - Loan level - Bond level - Subordination level.

**UNIT V**

**CMBS – SERVICING BUSINESS OVERVIEW:** Servicing overview - History of Servicing – The securitization process – Originations and Refinancing overview, CMBS – Multifamily servicing – Role of servicer – Servicing approaches — Ethics in commercial servicing – Servicer Specialization – Servicer Compensation.

**UNIT VI**

**LIFE CYCLE OF COMMERCIAL REAL ESTATE (CRE) AND MULTIFAMILY LOAN:** History of Commercial Real Estate - The loan cycle – Key Players in loan cycle – Property types & Characteristics – Property Performance - CMBS – Servicing Agreements and loan documents pooling – Servicing aspects – Sub Servicing Agreement - Borrower Lender loan documents – Property Related Documents.

**BOOKS RECOMMENDED:**

11. Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
12. Mortgage Valuation Models - Embedded options, Risk and Uncertainty - 1 Edition by Andrew Davidson – Alexander Levin (Author)
13. Mortgage – Based Securities: Products, Structuring & Analytical Technique - Frank J Fabozzi (Author)
14. Commercial Real Estate for Beginners : The Basics of Commercial Real Estate Inventory - By Peter Harris (Author)
15. An Introduction to Real Estate Investment Deal Analysis - By J. Scott (Author)
16. Mortgage Loan Servicing - By Lawrence V. Conway (Author)
17. Foundation of Real Estate Financial Modeling By Roger STAIGER
18. The State Mortgage Loan Originator National Exam Study Guide - Second Edition by PATRICIA O CONNOR

**REFERENCES:**

1. Jack Meredith, Samuel J. Mantel Jr, “Project Management-A Managerial Approach”, John Wiley Sons
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CODE: 4A883

**IV Year B.Tech – II Sem  
PROJECT PHASE - II**

L      T      P/D      C  
0      0      15      12

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x	x	x	x	x	x	x	x	x

**Course Outcomes:** After studying this course, the students will be able to

CO1	Students identify a topic from the current technical topics of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Students also face the questions posed by the panel and the students and answer them.

Out of total 200 marks for project work (in the final year second semester), 50 marks shall be for Internal Evaluation and 150 marks for the External Evaluation at the end of the Semester.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the chief superintendent. The committee consists of an external examiner, HoD, a senior faculty member and internal guide.

**The pattern of Internal Evaluation is as follows:**

**Division of marks for internal assessment – 50 marks**

- Progress of Project work and the corresponding interim report as evaluated by internal guides at the end of 5 weeks : 05 Marks
- Seminar at the end of 5 weeks : 05 Marks
- Progress of Project work as evaluated by guides at the end of 10 weeks : 05 Marks
- Seminar at the end of 10 weeks : 05 Marks
- Evaluation by the Guides ( at the end of 15 weeks) : 10 Marks
- Project Report : 05 Marks
- Final presentation and defense of the project : 15 Marks

If the project is conducted internally the marks supposed to be given by external guide will be given by internal guide himself.

**Division of Marks for External Evaluation – 150 Marks**

**Pattern of External Evaluation for Project**

- Final Project Report : 30 Marks
- Presentation : 20 Marks
- Demonstration / Defense of Project : 100 Marks

CODE: 4A884

**IV Year B.Tech – II Sem**  
**COMPREHENSIVE VIVA - III**

				L		T		P/D		C	
				0		0		0		1	
a	b	c	d	e	f	g	h	i	j	k	l
x	x							x			

**Course Outcomes:** After studying this course, the students will be able to

CO1	Explain the skills in the courses, undergone till the completion of that academic year.
CO2	Comprehend the concepts in the core subjects.
CO3	Elaborate his practical awareness earned in laboratories.
CO4	Discuss about elective subjects, Included in due course.
CO5	Evaluate the readiness to face the interview, if any.
CO6	Estimate the Employability skill with the help of responses to above

There shall be a Comprehensive Viva-Voce in IV year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an external examiner, Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech. course of study up to IV Year. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

IV Year B.Tech – II Sem

CODE: 4A892

TECHNICAL PAPER WRITING AND SEMINAR - VIII

L T P/D C  
0 0 2 1

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x		x		x	x	x		x

**Course Outcomes:** After studying this course, the students will be able to

CO1	Evaluate a topic from the current technical topics of their choice in the electronics & communications engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
CO2	Estimate to arrange the contents of the presentation and scope of the topic, in an effective manner.
CO3	Explain the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
CO4	Discuss the questions posed by the panel with audience and panel to answer them.
CO5	Estimate his/her weak points with suggestions of panels and re-present if necessary.
CO6	Evaluate his/her status in technical presentation.

There shall be a technical seminar evaluated for 25 marks in fourth year second semester. The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defence before a departmental committee consisting of Head, a senior faculty and supervisor	15 marks

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