ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABUS

for

B.Tech Four Year Degree Course

in

ELECTRICAL AND ELECTRONICS ENGINEERING

(EEE)

(Applicable for the batches admitted from 2018-19)

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

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

(Accredited by NAAC with 'A' Grade and Accredited by NBA of AICTE)

Yamnampet, Ghatkesar, Malkajigiri Medchal District -501 301.

SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)

B.Tech in Electrical & Electronics Engineering

Course structure for B. Tech I Year I Semester EEE (2018-19)

Sl.No	Course code	Name of the Course	L	T	P	C	Max Marks	
							CIE	SEE
1.	7HC05	Engineering Physics	3	1	0	4	30	70
2.	7FC01	Problem Solving using C	3	0	0	3	30	70
3.	7HC06	Engineering Mathematics – I	3	1	0	4	30	70
4.	7BC02	Engineering Graphics & Design	1	0	4	3	30	70
5.	7HC02	English (Oral communication skills)	1	0	0	1	30	70
6	7HC20 (Mandatory)	Human Values and Professional Ethics in Higher Studies	2	0	0	0	30	70
7	7HC65	Engineering Physics lab	0	0	3	1.5	30	70
8	7FC71	Problem Solving using C Lab	0	0	3	1.5	30	70
9	7HC62	English (Oral communication skills) Lab	0	0	2	1	30	70
10	7A191	Technical Seminar - I	0	0	2	1	100	--
		Total	11	2	14	20		

Course structure for B.Tech I Year II Semester EEE (2018-19)

Sl.No	Course Code	Name of the Course	L	T	P	C	Max Marks	
							CIE	SEE
1.	7HC03	Chemistry	3	1	0	4	30	70
2.	7A201	Electrical Circuits and Networks-I	3	0	0	3	30	70
3.	7HC08	Engineering Mathematics – II	3	1	0	4	30	70
4.	7BC01	Workshop/Manufacturing practices(Theory)	1	0	0	1	30	70
5.	7HC63	Chemistry lab	0	0	3	1.5	30	70
6.	7AC61	Electrical Circuits and Networks Analysis Lab	0	0	2	1	30	70
7	7HC01	English (Reading, Listening and writing)	1	0	0	1	30	70
8	7BC61	Workshop/Manufacturing practices Lab	0	0	3	1.5	30	70
9	7HC61	English (Reading, Listening and writing) Lab	0	0	2	1	30	70
10	7A292	Technical Seminar - II	0	0	2	1	100	--
		Total	11	2	12	19		

II Year – I Semester

S. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7HC13	Transformation Techniques and Numerical methods	2	---	---	2	30	70
2	7C302	Digital Logic Design	2	1	---	3	30	70
3	7C301	Electronic Devices and Circuits	3	---	---	3	30	70
4	7A302	Electro Magnetic Fields	4	---	---	4	30	70
5	7A303	Electrical Machines – I	3	---	---	3	30	70
6	7A304	Electrical Circuits & Networks – II	3	---	---	3	30	70
7	7BC04	Elements of Mechanical Engineering	2	---	---	2	30	70
8	7HC21	Environmental Science and Ecology	2	---	---	---	30	70
9	7C371	Electronic Devices and Circuits Lab	---	---	2	1	30	70
10	7A373	Electrical Machines Lab – I	---	---	2	1	30	70
11	7A393	Technical Seminar - III	---	---	2	1	100	--
Total						**23**		

II Year – II Semester

S. No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7HC15	Probability Theory and Statistics	2	--	---	2	30	70
2	7A405	Electrical Machines – II	3	--	---	3	30	70
3	7A406	Power System – I	3	--	---	3	30	70
4	7AC07	Control Systems	3	--	---	3	30	70
5	7C405	Analog Circuits	3	--	---	3	30	70
6	7ZC01	Management Science and Financial Accounting	2	--	---	2	30	70
7	7A475	Control Systems & Simulation Lab	--	--	2	1	30	70
8	7C474	Analog Circuits Lab	---	---	2	1	30	70
9	7A494	Technical Seminar - IV	---	---	2	1	100	--
10	7A472	Comprehensive Viva - I	---	---	--	1	50	50
11		Summer Industry Internship - I	Evaluated in III-year I-Semester					
Total						**20**		

III Year – I Semester

S. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7C508	IC Applications	3	--	---	3	30	70
2	7A508	Electrical Machines – III	3	--	--	3	30	70
3	7A509	Power Electronics	3	1	--	4	30	70
4	7A510	Power Systems – II	3	1	--	4	30	70
5		Open Elective – I	3	--	--	3	30	70
6	7H518	Quantitative Aptitude	1	1	--	2	30	70
7	7CC76	IC Applications Lab	-	-	4	2	30	70
8	7A578	Power Electronics & Simulation Lab	--	--	2	1	30	70
9	7A577	Electrical Machines Lab – II	--	--	2	1	30	70
10	7A586	Summer Industry Internship – I	--	--	--	1	30	70
11	7A595	Technical Seminar - V	---	---	2	1	100	--
Total			**16**	**3**	**10**	**25**	**400**	**700**

Open Elective – I

Subject Code	Name of the subject	Stream
7EC01	Data Structures	Computer
7ZC22	Basics of Entrepreneurship	Entrepreneurship
7ZC05	Banking Operations, Insurance and Risk Management	Finance
7ZC25	Basics of Indian Economy	Social Sciences

III Year – II Semester

S. No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7DC05	Microprocessors and Microcontrollers	3	--	--	3	30	70
2	7A611	Switch Gear and Protection	3	--	---	3	30	70
3	7A612	Measurements & Instrumentation	3	1	--	4	30	70
4	7BC56	Elements of Fluid Mechanics and Hydraulic Machinery	2	1	---	3	30	70
5		Open Elective – II	3	--	---	3	30	70
6	7HC74	Soft Skills and Technical Communication	--	--	2	1	30	70
7	7H619	Logical Reasoning	1	1	--	2	30	70
8	7A681	Electrical workshop	--	--	2	1	30	70
9	7DC71	Microprocessors and Microcontrollers Lab	--	--	2	1	30	70
10	7BC82	FM and HM Lab	--	--	2	1	30	70
11	7A674	Group Project	---	---	4	2	30	70
12	7A676	Comprehensive Viva - II	---	---	---	1	30	70
13		Summer Industry Internship – II (IOMP)	To be evaluated in IV-year I-Sem					
Total			**15**	**3**	**12**	**25**	**360**	**840**

Open Elective – II

Subject Code	Name of the subject	Stream
7FC03	Python Programming	Computer
7ZC23	Advanced Entrepreneurship	Entrepreneurship
7ZC19	Entrepreneurship Project Management and Structured Finance	Finance
7ZC26	Basics of Polity and Ecology	Social Sciences
	SWAYAM MOOCS Course*	
*The department will identify the MOOCS Course from the available courses in SWAYAM portal for the semester		

IV Year – I Semester

S.No	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1	7A714	Power Systems Analysis and Control	3	1	--	4	30	70
2		Professional Elective -I	3	--	---	3	30	70
3		Professional Elective -II	3	--	---	3	30	70
4		Professional Elective -III	3	--	---	3	30	70
5		Open Elective - III	3	--	--	3	30	70
6		Project –I	--	--	4	2	30	70
7	7A787	Summer Industry Internship – II	--	--	--	1	30	70
8	7A782	Measurements & Instrumentation Lab	--	--	2	1	30	70
9	7A783	Power Systems Lab	--	--	2	1	30	70
10	7A784	Power Systems Simulation Lab	--	--	2	1	30	70
Total			**15**	**1**	**10**	**23**	**300**	**700**

Professional Elective –I

Subject Code	Name of the subject	Stream
7CC03	Signals And Systems	Electronics
7A725	Advanced Control Systems	Control Systems
7A716	Utilization of Electrical Energy	Power Systems
7A734	HVDC and FACTS	Power Electronics

Professional Elective –II

Subject Code	Name of the subject	Stream
7A715	Renewable Energy Sources	Power Systems
7CC11	Digital Signal Processing	Electronics
7A724	Digital Control Systems	Control Systems
7A737	Advanced Power Electronics	Power Electronics

Professional Elective – III

Subject Code	Name of the subject	Stream
7A729	Power System Deregulation	Power Systems
7A713	Power Semi Conductor Drives	Power Electronics
7A739	Optimal Control Systems	Control Systems
7CC34	Communication Theory	Electronics

Open Elective – III

Subject Code	Name of the subject	Stream
7FC23	Data Base Systems	Computer
7ZC24	Innovation and Design Thinking	Entrepreneurship
7ZC15	Financial Institutions, Markets and Services	Finance
7ZC27	Indian History, Culture and Geography	Social Sciences

IV Year – II Semester

S. No.	Subject Code	Subject	L	T	P/D	C	Max Marks	
							CIE	SEE
1		Professional Elective – IV	3	--	--	3	30	70
2		Professional Elective – V	3	--	--	3	30	70
3	7A883	Project –II	---	---	10	5	30	70
Total			**6**	**--**	**10**	**11**	**90**	**210**

Professional Elective – IV

Subject Code	Name of the subject	Stream
7A835	Electrical and Hybrid Vehicles	Power Electronics
7A817	High Voltage Engineering	Power Systems
7A827	Reactive Power Control & Management	Control Systems
7CC35	Fundamentals of VLSI and Embedded Systems	Electronics

Professional Elective – V

Subject Code	Name of the subject	Stream
7A820	Electrical Distribution Systems	Power Systems
7A826	Programmable Logic Controllers	Control Systems
7A833	Switched Mode Power Conversion	Power Electronics
7C831	Artificial Neural Networks	Electronics

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

Note: All End Examinations (Theory and Practical) are of **Three** hours duration.

B. Tech (Electrical & Electronics Engineering)
Program objective

B. Tech in Electrical and Electronics Engineering program emphasizes the fundamentals of electrical & electronics in daily life.

The first two years of this program begins with a set of introductory courses, like Mathematics, physics, English, computer languages (C, C++), circuits and networks, DC machines and introduction to power systems which provide students with a firm foundation in mathematics, Electrical, as well as communication skills. These courses include weekly labs in which students use state-of-the art techniques and equipments to create solutions to interesting problems.

The last two years of study focuses on the concepts and techniques used in the design and development of advanced systems in electrical and electronics. In addition, students choose from a rich set of electives, which covers skills in demand. These advanced courses give broad opening for research and help them to choose specialization in their higher studies. A generous allotment of open electives allows students to learn foreign languages like French, German, Spanish; and it includes computing with a business focus.

Students in this program pursue an inter-disciplinary course of study that combines strong foundation in electrical and electronics with a focus on interdisciplinary areas. This program is designed for students who seek to blend their abilities with skills in demand and skills specific to another domain to solve problems in that domain.

Having completed this course, a student is prepared to work independently within a well structured design frame work in the job and for higher studies.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

VISION

To emerge as a leading Electrical and Electronics Engineering Department in Technical Education and Research in India with focus to produce professionally competent and socially sensitive engineers capable of working in multidisciplinary global environment.

MISSION

1. To empower the students and provide the academic environment to pursue and attain competencies in their studies at undergraduate, post graduate level in Electrical & Electronics Engineering.
2. To develop liaison with academia, R&D institutions and electrical industry for hands-on training which enable the students to design and produce novel products for better society.
3. To inculcate interpersonal skills, team work, leadership qualities and professional ethics in students.
4. To enable the students to pursue higher studies and conduct research which will help them in developing the qualities for life-long learning and for a successful professional career.

Program Educational Objectives of B. Tech (Electrical and Electronics Engineering)

PEO-I: To empower the students by providing necessary knowledge, critical thinking and problem solving capabilities in the field of Electrical and Electronics Engineering so that they can excel in their profession, in industry, higher studies and Research & Development.

PEO-II: To develop competencies in core and allied fields, so as to conduct experiments, comprehend, analyze, design and apply appropriate techniques / tools to arrive at optimal solutions to face real time challenges.

PEO-III: To inculcate the sense of responsibility towards ethics, Intellectual Property rights, good communication skills and entrepreneurship with adequate knowledge of project / finance management skills for betterment of society at large.

PEO-IV: To motivate the students to be academically excellent and also to be sensitive to Professional ethics, to acquire leadership skills and to be life-long learners for a successful professional career.

Program outcomes (POs) of B.Tech(EEE)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

1. Able to demonstrate the applications of knowledge gained into the recent technologies in the areas of Power systems, Power electronics and allied fields.
2. Recognize the need of self learning and ability to get into the advanced fields such as renewable energy systems and smart grids.

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ENGINEERING PHYSICS

	L	T	P	C
Code: 7HC05	**3**	**1**	**0**	**4**

Course Objectives:

- To know about the semiconductors, types, carrier concentration, Thermistor, Hall effect and also to understand the concept of PN-junction, I-V Characteristics, LED, Solar Cell and Photo diode.
- Explain about the Quantum Mechanics to understand wave particle duality, necessity of quantum mechanics to explore the behavior of sub atomic particles. Schroedinger's Time Independent Wave Equation, Physical Significance of the Wave Function – Application of Schroedinger wave equation.
- To understand the basic concepts of normal light, Laser and its applications and to know about the fiber optics, principle (TIR), Numerical Aperture, Types of optical Fibers, Step index and graded index Fibers, attenuation in optical fibers. Applications: optical fiber communication system, fiber optic sensors, medical endoscopy.
- To study the concepts of magnetism and superconductivity, Bohr magneton, Hysteresis nature, domain structure, Meissner effect, types of superconductors, BCS theory and applications of superconductors.
- To understand the concepts of dielectrics, polarizations and its types, internal fields, Clausius-Mossitti equation, Frequency and temperature effect on dielectrics and its applications – Piezo-electricity, pyro-electricity and ferro-electricity.
- To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs and to know about the fundamentals of radioactivity and its applications.

Unit:1

Semiconductors

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.

Semiconductor devices

Formation of PN Junction and working of PN Junction, Energy Diagram of PN Diode, Diode equation (Quantitative treatment), I-V Characteristics of PN Junction, Application - LED, Solar Cell and Photo diode.

Unit:2

Wave nature of particles, Schroedinger equation and its application

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

Unit:3

Lasers

Characteristics of LASER, 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.

Fiber optics

Introduction, Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers, Step index and graded index Fibers Attenuation in Optical Fibers. Applications: Optical Fiber communication system, Fiber Optic Sensors, Medical Endoscopy.

Unit:4

Magnetic and Superconducting materials

Permeability, Field Intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton. Hysteresis behavior of Ferro Magnetic materials based on Domain theory. Hard and Soft Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications,

Super conductivity, effect of Magnetic Field, Critical current density, Meissner effect, Type-I and Type-II superconductors, BCS theory, applications of superconductors.

Unit:5

Dielectric materials and their properties

Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizability (Quantitative) Orientation Polarization (Qualitative), Internal fields in Solids, Clausius - Mossotti equation, Frequency and temperature effect on Dielectrics (Qualitative), Applications - Piezo-electricity, Pyro-electricity and Ferro-electricity.

Unit:6

Nanotechnology

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

Nuclear Energy: Radioactivity, Nuclear binding energy, Nuclear fission, Nuclear fusion, □, β, γ rays decay, Geiger-Muller counter and practical applications of nuclear physics.

Text Books:

1.B.K. Pandey & S. Chaturvedi Engineering Physics, Cengage Learning
2.D.K. Bhattacharya and Poonam Tandon, OXFORD university press.

Reference Books:

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
2. A.S. Vasudeva , Modern engineering Physics, S Chand
3. Dekker, Solid State Physics
4. Dr.M.N. Avadhanulu, Engineering Physics, S Chand
5. Dekker, Solid State Physics
6. Halliday and Resnick, Physics
7. S.O. Pillai, Solid State Physics
8. P K Palanisamy, Engineering Physics, Sitech Publications
9. A. Ghatak - Optics

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

- *Explain semiconductor behaviour, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.*
- *Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.*
- *Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)*
- *Reveals about the magnetism-its origin and types, Hysteresis, domain theory, Anti-ferro and ferri magnetism superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.*
- *Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).*
- *Summarize nano & bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.*

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

PROBLEM SOLVING USING C
(Common to All Branches)

Code: 7FC01	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Outcomes: After completion of this course student will learn

1. *To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)*
2. *To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion*
3. *To decompose a problem into functions and synthesize a complete program using divide and conquer approach.*
4. *To use arrays, pointers and structures to formulate algorithms and programs.*
5. *To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.*
6. *To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.*

UNIT I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)
Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.
From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

UNIT II

History of C language, Characteristics of C language, Structure of C Language, C Tokens
Arithmetic expressions, Operator Precedence & **Associativity**
Conditional Branching and Loops
Writing and evaluation of conditionals and consequent branching and **Jumping Constructs**
Pretest and Post test, Iteration and loops (3 lectures)

UNIT III

Function: Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**
Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

UNIT IV

Arrays: Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**
Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

UNIT V

Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions**.
Strings: String Handling Functions.

UNIT VI

Structure: Structures, Defining structures and Array of Structures,
Nested Structures enum, typedef
File handling (only if time is available, otherwise should be done as part of the lab)
File Handling Functions, File Modes, File Operations

Suggested Text Books

(i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

Reference Books

(i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

H: High M: Medium L: Low

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ENGINEERING MATHEMATICS -1
(Common to EEE, ECE, ME, CE)

	L	T	P/D	C
Code: 7HC06	**3**	**1**	**0**	**4**

Pre Requisites*: Mathematics Knowledge at Pre-University Level*
Course Objectives: *To make the students to understand and expected to learn*

1. *Special functions such as Beta & Gamma functions and their properties, evaluation of improper integrals and the applications of definite integrals.*
2. *Mean value theorems and their applications to the given functions, series expansions of a function.*
3. *To test the convergence of a series and expansion of a function in sine and cosine terms.*
4. *Basic concepts of multivariable differential calculus.*
5. *About the linear system and some analytical methods for solution.*
6. *Concept of Eigen values and Eigen vectors their properties and applications.*

Module 1: Calculus
Evolutes and involutes; Beta and Gamma functions and their properties; Evaluation of improper integrals, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Module 2: Calculus
Rolle's Theorem and Mean value theorems (Statements and Geometrical Interpretations if any); Taylor's and Maclaurin's theorems with remainders (without proof); Taylor's and Maclaurin's series expansion.

Module 3: Sequences and series
Convergence of sequence and series, tests for convergence; Power series. Fourier series, Half range sine and cosine series, Parseval's theorem (without proof).

Module 4: Multivariable Calculus (Differentiation):
Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, Tangent plane; Concepts of divergence and curl with physical significance.

Module 5: Matrices:
Inverse of a matrix by Gauss Jordan method, rank of a matrix; System of linear equations- Rank method/Gauss Elimination method. Symmetric, skew-symmetric and orthogonal matrices;

Module 6: Matrices:
Eigenvalues and Eigenvectors; Cayley - Hamilton Theorem, Diagonalization of matrices and Orthogonal transformation.

Text Books:

(i) R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
(ii) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Reference Books:

(i) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(ii) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
(iii) B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers
(iv) C Sankaraiah, A Text book of Engineering Mathematics – I, VGS Book Links
(v) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
(vi) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
(vii) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
(viii) Engineering mathematics, Ravish R.Singh, Mcgraw Hill Education.

Course Outcomes: *After the course completion the students will be able to*

1. *Solve the problems using special functions; evaluate surface areas and volumes of revolutions.*
2. *Verify the mean value theorems and also express the given function in series form using Taylor's theorem.*
3. *Determine the convergence, divergence or oscillating nature of a series and express the function as trigonometric series.*
4. *Compute the extreme values of a function defined with and without constraints.*
5. *Check the consistency or inconsistency of a linear system and ability to solve real time problems.*
6. *Calculate the Eigen values and Eigen vectors of a matrix and their application for orthogonal transformation.*

1	2	3	4	5	6	7	8	9	10	11	12
H											M

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ENGINEERING GRAPHICS & DESIGN
Common to B.Tech I year I sem (EEE, ECE & ME) and II sem (CSE, ECE, IT & CE)

Code : 7BC02

L	T	P	C
1	0	4	3

Course objectives:

1: To teach students the basic principles of Engineering graphics and instruments used
2: To introduce the concept of projections in drawing and its applications for simple drawing entities
3: To impart the knowledge of various types of solids and their projections in different position wrt principle planes
4: To teach the concept of sections of solids and their applications
5: To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
6: To train the students for the extraction of multiple views from a solid model using AutoCAD

Course outcomes

After completing this course, the student will able to:

1) *Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering*
2) *Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes*
3) *Draw projections of different types of regular solids in various positions wrt principal planes of projection*
4) *Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.*
5) *Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views*
6) *Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software*

UNIT – I

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

Curves used in Engineering Practice and their Constructions:

Conic Sections including Rectangular Hyperbola - General method, Cycloid, Epicyloid, and Involutes of circles.

UNIT – II

Orthographic Projection: Principles of Orthographic Projections – Conventions – First angle and third angle projections (however all drawing exercises must be in first angle only) - Projection of Points, Lines - Inclined to both planes, Projections of regular Plane, inclined planes - Auxiliary views.

UNIT – III

Projections of Regular Solids: Projections of Regular Solids: Prisms, Cylinders, Pyramids, Cones – Axis inclined to both planes, Auxiliary views.

UNIT – IV

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

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

UNIT – V

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane, Simple Solids. Conversion of isometric views to orthographic views.

UNIT –VI

Overview of Computer Graphics : Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects,2D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

Text/Reference Books:

(i) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
(ii) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
(iii) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
(iv) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
(v) AUTOCAD Software Theory and User Manuals

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ENGLISH - Oral Communication Skills

Common to I Year I Semester (ECE, EEE and MECH) and II Semester (ECM, CSE, IT and Civil)

Code: 7HC02 **L T P C**
1 0 0 1

Course Objectives : The course will develop the students' ability to

- *integrate listening and speaking skills*
- *communicate effectively*
- *speak effectively on a given topic*
- *master the art of presentation*
- *interact with peers in a group discussion*
- *get exposed to face interviews*

Course Outcomes : *After completing the course students will be able to*

- *understand, analyze and respond to the audience by listening effectively*
- *acquire the articulation of different types of sentences by practicing pause patterns and question tags.*
- *translate and demonstrate self, participate effectively in activities like JAM, extempore*
- *express and deliver a presentation on the given topic through role plays and situational dialogues*
- *implement English language to meet the standards of corporate and real world in a group.*
- *present and communicate effectively by facing mock interviews by experts from industry and academy.*

Unit-I: Listening Skills

1.1 Integrating Listening, Reading and Speaking
1.2 Introduction Integrated Speaking Skills

Unit-II: Oral Communication Skills -I

2.1 Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory
2.2 Difference between Pauses, Gaps
2.3 Question Tags
2.4 Introduction and Greetings
2.5 Asking and Giving Directions

Unit-III: Oral Communication Skills -II

3.1 Speaking on a particular topic
3.2 Content development using cohesive devices
3.3 Common Errors in Spoken English

Unit-IV: Presentation skills

4.1 Introduction to Presentation Skills
4.2 Role Plays & Situational Dialogues

Unit-V: Group Discussion

5.1 Importance of Group Discussion
5.2 Do's and Don'ts of Group Discussion

Unit-VI: Interview Skills

6.1 Introduction to Interview Skills
6.2 Types of Interviews
6.3 Pre-Interview Preparation
6.4 Interview Etiquette (Non-Verbal)

Suggested Readings:

(i) *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi Pearson Publishers

(ii) *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications

(iii) *English for technical Communication* by K.R. Lakshmi Narayan , Scitech Publications

(iv) *Practical English Usage.* Michael Swan. OUP. 1995.

(v) *Communication Skills.* Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

(vi) *Exercises in Spoken English.* Parts. I-III. CIEFL, Hyderabad. Oxford University Press

a	b	c	d	e	F	G	h	i	j	k	l
							X	X	X		X

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
HUMAN VALUES AND PROFESSIONAL ETHICS IN HIGHER EDUCATION
Common to All Branches

	L	T	P	C
Code: 7HC20	**3**	**-**	**-**	**-**

Orientation Programme for First Year B.Tech Students Syllabus

Course Duration: Three Weeks **Evaluation:** Is done based on the Grading.

Course Objectives This introductory course input is intended

1. To help the students appreciate the essential 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature. Thus, this course is intended to provide a much needed orientational input in value education to the young enquiring minds.

Course Outcomes: Student will be able to:

1. Learns Being a human, understands human values and purpose of education
2. Understands the importance of different harmony levels needed.
3. Understand self and being in the current moment are the sources of happiness.
4. Improves Learning capabilities and communication skills.
5. Understands and appreciate the importance of personality development and yoga for a holistic life.
6. Understands the essence of Morals, Ethics, Values and Social responsibilities for successful life.

UNIT – I: INTRODUCTION TO HUMAN VALUES: The current status of an individual, at the level of Individual, Family, Society and Nature. Basis of Human Beings' Conduct, Desire – Aim, Objective and Purpose. Rationale of Success. Role of Education - Sanskar. Definition of Human aspiration, Human Conduct, Human Being – Physical Facility and Relationships, Right Understanding for Human Being, Achievement of Prosperity.

UNIT – II: HARMONY AND HUMAN BEING: Understanding the co-existence of human being, Different Harmony levels –Harmony in the Human Being, Harmony in the Family, Harmony in the Society and Harmony in Nature / Existence. Understanding the Relationships, Harmony in the Family, Feelings in Relationship: Trust, Respect, Affection, Care Guidance, Reverence, Glory, Gratitude and Love.

UNIT – III: THE CYCLE OF HAPPINESS: Meaning of Happiness and Unhappiness, Sources of Happiness, Self Investigation, Five Dimensions of Human order – Education, Health, Production, Justice and Exchange. Harmony at the Individual Level and Family level, Concerns at Individual, Family and Nature level. Different approach of People behavior – Active, Reactive and Proactive. Resource depletion, Global Warming, Pollution, Harmony in Nature.

UNIT – IV: IMPROVING LEARNING CAPABILITIES: Principles of learning, Study skills and E-Learning, Listening skills, Soft skills and Employability skills, Effective Reading and Reviewing, Reading Comprehension, Textbook Reading strategies, Effective Communication in English, Test taking strategies.

UNIT – V: PERSONALITY DEVELOPMENT: Self Development, Goal Setting, Motivation, Time Management, Positive Attitude, Building Self Confidence, Decision Making, The Discovery Wheel, Some attributes of a good personality, Memory Management, Interpersonal Skills, Importance of Yoga and Meditation.

UNIT – VI: ROLES AND RESPONSIBILITIES OF STUDENTS: Responsibilities of the students in shaping themselves, Effective and Successful Habits, Difference between studying in a Professional college and High school / Junior college, Characteristics of a Successful Student, Morals, Ethics and Values, Some tips to students to do well in B.tech program and also later in Professional Career.

TEXT BOOK:

1. Improving Learning Capabilities and Personality Development – Manual prepared by SNIST for private circulation

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X		X									

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ENGINEERING PHYSICS LAB
Common to I-Year I-Sem (EEE & ECE) and II-Sem (CSE, IT & ECM)

	L	T	P	C
Code: 7HC65	-	-	3	1.5

Course Objectives:

- *To study the concepts (numerical aperture) of a optical fiber,*
- *To explain about magnetic induction, Biot-Savart principle.*
- *To discuss the energy gap (E_g) of a semiconductor diode.*
- *To understand the rigidity modulus, periodicity.*
- *Understand the concept of photo electric effect using photo voltaic cell.*
- *To understand about the ionizing radiation by using the Geiger–Muller counter.*
- *Discuss the dispersive power of prism-minimum deviation method.*
- *Explain the formation of Newton's rings-interference*
- *Study the frequency of AC mains using Sonometer.*
- *To study the LED characteristics and forward resistance*
- *Explaining about the electrical resonance by using the LCR circuit*
- *To know the time constant of RC circuit*

List of Experiments

1. Determination of a Numerical Aperture (NA) of an optical fiber – Fiber optics.
2. Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee's experiment - Magnetism.
3. Determination of the energy gap (E_g) of a given semiconductor-Temperature/semiconductor
4. Determination of rigidity modulus of a given wire material using the Torsional pendulum - Vibrations
5. Determination the Planck's constant using the photo voltaic cell - Photo voltaic cell
6. Studying the characteristics of Geiger–Muller counter and verifying the inverse square law - Nuclear physics
7. Calculation of dispersive power of a given material of prism by using Spectrometer in minimum deviation method - Light.
8. Determination of wavelength of a monochromatic light source by using Newton's rings experiment - Light
9. Calculating the frequency of AC supply by using the Sonometer – Electromagnetic/ Electrical
10. Studying the characteristics and calculating the forward resistance of a LED – Semiconductor/devices.
11. Study of series and parallel resonance of an LCR circuit – Electrical devices
12. Determination of time constant of an RC-circuit – Electrical/ Electronics

NOTE: Any **TEN** of the above experiments are to be conducted.

Course Outcomes:

After completing the experiment, students will be able to

- *Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications.*
- *Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.*
- *Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.*
- *Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.*

- *Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors (photo voltaic cell).*
- *Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law.*
- *Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.*
- *Understand the concepts of interference, conditions, formation of Newton's rings-reason.*
- *Know the difference between AC and DC fundamentals, magnetostriction, resonance, air column vibrations.*
- *Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.*
- *Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.*
- *Characterize the RC network, time constant, capacitor functioning and its application.*

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

PROBLEM SOLVING USING C LAB
(Common to All Branches)

Code: 7FC71	**L**	**T**	**P**	**C**
	0	**0**	**3**	**1.5**

Course Outcomes: After completion of this course student will learn

1. *To formulate the algorithms for simple problems*
2. *To translate given algorithms to a working and correct program*
3. *To be able to correct syntax errors as reported by the compilers*
4. *To be able to identify and correct logical errors encountered at run time*
5. *To be able to write iterative as well as recursive programs*
6. *To be able to represent data in arrays, strings and structures and manipulate them through a program*
7. *To be able to declare pointers of different types and use them in defining self referential structures.*
8. *To be able to create, read and write to and from simple text files.*

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given]

1. Unit I (Cycle 1)

1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.

2. Unit II (Cycle 2)

1. Write an algorithm, flowchart, and C program for:
2. Finding the area and circumference of a circle of given radius.
3. Finding the volume of a sphere of given radius.
4. Finding the lateral surface area of a right circular cone of given base radius and height.
5. Finding selling price of an item, given its cost price and profit percent.
6. Finding the interest on a given principal for a given period of time at a given rate of per year.
7. Write a C program to display all the sizes of data types in C.
8. 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)

1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
2. Write a C program for finding the largest of three given numbers.
3. 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)

1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
2. Write a C program to compute the sum of:
3. $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$, given x and n.
4. $1! + 2! + 3! + \ldots + n!$, given n.
5. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \ldots$ to n terms where the n^{th} term becomes less than 0.0001.

5. **Unit III (Cycle 5)**
   1. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
   2. Write a C program to find the largest and the least of some numbers given by the user.
   3. Write a C program to find the sum of the digits of a positive integer.
6. **Unit III (Cycle 6)**
   1. Write C functions for the following:
      - **a)** A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
      - **b)** A function that takes a real number x and a positive integer n as arguments and returns x^n.
      - **c)** A function that takes a positive integer n as an argument and returns the n^{th} Fibonacci number.
   2. Using recursion write C functions for the following:
      - **a)** Factorial of a non-negative integer n.
      - **b)** Number of combinations of n things taken r at a time.
      - **c)** Greatest Common Divisor of two integers.
      - **d)** Least Common Multiple of two integers.
7. **Unit III (Cycle 7)**
   - **a)** Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
   - **b)** 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.
   - **c)** Write a program to generate Pascal's triangle.
   - **d)** Write a program to count the number of letters, words, and lines in a given text.

8. **Unit IV (Cycle 8)**
   1. 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.
   2. 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.
   3. 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)**
   1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
   2. 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)**
    1. Write a function to swap two numbers.
    2. 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)**
    1. 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.
    2. Define a structure point. Write a program to find the distance between two points.
    3. 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)

1. Write a program to:
   - **a)** 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.
   - **b)** Open the file created above and display the contents of the file.
   - **c)** Copy a file into some other file, file names given by the user or by command line arguments.
   - **d)** Append a user mentioned file to another file.
   - **e)** Reverse the first n characters of a file.

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
ENGLISH LAB (Oral Communication Skills)
Common to I Year I Semester (ECE, EEE and MECH) & II Semester (ECM, CSE, IT and Civil)

Course code: 7HC62 **L T P C**
0 0 2 1

Course Objectives: The course will develop the students' ability to

- *integrate listening and speaking skills*
- *communicate effectively*
- *speak effectively on a given topic*
- *master the art of presentation*
- *interact with peers in a group discussion*
- *get exposed to face interviews*

Course Outcomes: After completing the course students will be able to

- *understand, analyze and respond to the audience by listening effectively*
- *acquire the articulation of different types of sentences by practicing pause patterns and question tags.*
- *translate and demonstrate self, participate effectively in activities like JAM, extempore*
- *express and deliver a presentation on the given topic through role plays and situational dialogues*
- *implement English language to meet the standards of corporate and real world in a group.*
- *present and communicate effectively by facing mock interviews by experts from industry and academy.*

Unit-I : Practice sessions on
Listen & Speak
Listen, Read, and Speak

Unit-II: Practice sessions on
Articulation of types of Sentences
Question Tags
Introduction and greeting
Asking for and Giving
Directions

Unit-III: Practice sessions on
JAM/Extempore/
Impromptu
Prepared talk on given topics

Unit-IV: Practice sessions on
Formal Presentation
Role Plays & Situational Dialogues

Unit-V : Practice sessions on
Group Discussion

Unit-VI: Practice sessions on
Mock Interviews

Suggested Readings:

(i) *Step by step learning language and life skills* by Niruparani, Jayasree Mohanraj, Indira, Sailakshmi Pearson Publishers
(ii) *Communication skills for technical students* by TM Farhathullah, Orient Black swan Publications
(iii) *English for technical Communication* by K.R. Lakshmi Narayan , Scitech Publications
(iv) *Practical English Usage.* Michael Swan. OUP. 1995.
(v) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(vi) *Exercises in Spoken English.* Parts. I-III. CIEFL, Hyderabad. Oxford University Press

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x	x	x									

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

TECHNICAL SEMINAR -I

Code: 7A191

L	T	P	C
-	-	2	1

Course Objectives:
To make the student to learn:

i. *To have good communication skill*
ii. *To have good presentation skill*
iii. *To independent learning*

Course Outcomes:

Students are able to understand about conventional and non conventional power plants

i. *Students are able to understand basics of electrical protection*
ii. *Students are able to understand about home appliances*
iii. *Students are able to understand overview of power system*

Topics for Technical Seminar

1. Basic knowledge about Hydro Power Plants
2. Basic knowledge about Thermal Power Plant
3. Basic knowledge about nuclear power plant
4. Knowledge about common protection devices like Fuse, HRC Fuse, MCB.
5. Basic knowledge about solar power plant.
6. Basic knowledge about Wind mill power plant.
7. Basic working knowledge Captive Power generation and its types of sources
8. Knowledge on working principle about home applications like Fan, Wet grinder, Mixer grinder, Fluorescent Lamp, Motor pump, Refrigerator, Air conditioner.

Procedure

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

CHEMISTRY
(Common to EEE, ME, ECE)

Code: 7HC03

L	T	P	C
3	1	0	4

***Course Objectives**:*

1. *To understand microscopic chemistry in terms of atomic and molecular orbitals*
2. *To learn the preparation and applications of commercial and conducting polymers and lubricant materials*
3. *To learn the industrial problems caused by water and municipal water treatment*
4. *To acquire knowledge about different types of batteries and their working mechanism*
5. *To develop the concepts and types of corrosion and the factors influence corrosion and to understand the control methods and protective coatings for metals*
6. *To learn the chemical reactions of drugs that are used in the synthesis of drug molecules*

UNIT – I: ATOMIC AND MOLECULAR STRUCTURE (6L)

Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

UNIT – II: ENGINEERING MATERIALS (8L)

Plastics – Thermosetting and Thermoplastics, preparation, properties and engineering applications of plastics: PVC, Teflon, Bakelite. **Fibers:** Nylon 6,6 and Dacron.

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

Lubricants

Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value. **Engineering applications:**

UNIT - III: WATER TECHNOLOGY (8L)

(a) **Introduction**:- Hardness of water – types of hardness (temporary and permanent), calculation of hardness-Numerical problems. Estimation of hardness of water by EDTA Method.

(b) **Water for Industrial purpose**: Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming &foaming),boiler corrosion, caustic embrittlement.

(c) **Water Treatment**: Internal conditioning- phosphate, carbonate & calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment-sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

UNIT – IV: ELECTROCHEMISTRY (8L)

Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.

Free energy and emf, cell potentials, electrode potential (oxidation and reduction). Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode.

Cell notation and cell reaction –Nernst equation and applications. **Engineering Applications: Batteries** : Types of batteries

(a) Primary batteries – Lechalanche cell (dry cell), Lithium cell

(b) Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery

(c) Fuel cells- $H_2 - O_2$ fuel cell and MeOH-O_2 fuel cell-advantages and applications.
Engineering applications – future water powered car, Hydrogen production and storage.

UNIT - V: CORROSION AND ITS PREVENTION (7L)
Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of O_2 and evolution of H_2). Types of electrochemical corrosion – galvanic corrosion, pitting corrosion- factors affecting the rate of corrosion.
Cathodic protection – sacrificial anodic protection and impressed current cathodic protection method. Methods of metallic coatings-hot dipping (**tinning and galvanizing**), metal cladding (**Al cladding**), electroplating (**copper plating**) and electroless plating (**nickel plating**).

UNIT-VI: ORGANIC REACTIONS AND DRUG MOLECULES (5L)
Introduction : reactions involving substitution(S_N1, S_N2) addition to double bond(C=C), elimination(E^1 and E^2), oxidation (using $KMnO_4$, CrO_3), reduction (Hydrogenation by Ni/H_2, Pd/C)
Drugs : Definition, classification structure and applications of commonly used drug molecules- paracetamol, aspirin, ibuprofen and diphenhydramine (Benadryl)
Principles of spectroscopy and selection rules: Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules-**Applications**.

TEXT BOOKS:

1. Engineering Chemistry: by Jain & Jain ,Dhanapathrai Publications (2015)
2. Engineering Chemistry: by Thirumala Chary & Laxminarayana, Scitech Publications (2016)
3. Engineering Chemistry: by & B.Rama Devi, Prsanta Rath & Ch. Venkata Ramana Reddy, Cengage Publications (2016)

REFERENCE BOOKS:

1. Fundamentals of Molecular Spectroscopy by C. N. Banwell
2. Drugs by David Krupadanam- Universities Press
3. University chemistry by B. H. Mahan
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes
After completion of the course, the student will be able to:
1. *Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.*
2. *Identify and differentiate conductivity of polymers, thermoplastic, thermosetting plastics and various lubricants.*
3. *Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.*
4. *Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.*
5. *Differentiate the types of corrosion and methods used to prevent the corrosion.*
6. *Learn and implement synthesis of drug molecules and learn fundamentals of analytical techniques like electronic, vibrational and rotational spectroscopy.*

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

ELECTRICAL CIRCUITS AND NETWORKS – I

Code: 7A201

L	T	P	C
3	-	-	3

Course Objectives :

To make the students to understand:

1. *The fundamentals of the basic elements and their application in electrical circuits.*
2. *The importance of network topology in analysis of electrical networks.*
3. *The basic concepts of magnetic circuits and their applications.*
4. *The concept of single phase circuits and their analysis.*
5. *The significance of resonance and its use*
6. *Verify the network theorem and their application in electrical networks.*

Course Outcomes:

After completion of the course work the student will be able to

1. *Apply Kirchhoff's laws for solving electrical circuits.*
2. *Draw the network graph and solve the problems of electrical networks.*
3. *Analyze and solve the problems of composite magnetic circuits.*
4. *Understand the basic concepts of single phase AC circuits and ability to solve the problems related to steady state analysis.*
5. *Compute for parameters like Q factor and bandwidth for resonance circuits.*
6. *Apply and solve the problem associated with electrical networks using network theorems*

UNIT – I: INTRODUCTION TO ELECTRICAL CIRCUITS:

Circuit concept, R – L – C parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Kirchhoff'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 cut-set and basic tie-set 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, 6th edition.
2. Circuits & Networks - A.Sudhakar and Shyamamohan S.Palli, Tata Mc Graw Hill, 3rd edition.

REFERENCES:

1. Network Analysis - M.E. Vanvalkenberg, Printice Hall of India, 3rd edition
2. Circuit theory (Analysis & Synthesis) - A.Chakravarthy, Dhanpath Rai & Co., 6th edition.
3. Circuits & Networks – M.S. Sukhija, T.K. Nagasarkar, Oxford University Press, 2nd edition.

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

H: High M: Medium L: Low

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
ENGINEERING MATHEMATICS -II
(Common to EEE, ECE, ME, CE)

	L	T	P/D	C
Code: 7HC08	**3**	**1**	**0**	**4**

Pre Requisites*: Engineering Mathematics-I*

Course Objectives: *To make the students to understand and expected to learn*

1. *Multiple integration and its applications also acquire knowledge on curvilinear coordinate system.*
2. *Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.*
3. *Methods to solve higher order ordinary differential equations.*
4. *Series solution of second order ordinary differential equations with variable coefficients.*
5. *Basic concepts of Complex Analysis and conformal mapping and their properties.*
6. *Series expansion of a function using Taylor's and Laurent's series. Evaluation of definite integrals and improper integrals.*

UNIT 1: MULTIVARIABLE CALCULUS (INTEGRATION):
Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Introduction to orthogonal curvilinear coordinates, Simple applications involving cubes; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes (without proofs).

UNIT 2: FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS:
Exact, linear and Bernoulli's equations; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT 3: ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDERS:
Higher order linear differential equations with constant coefficients, method of variation of parameters, Cauchy-Euler equation;

UNIT 4: SERIES SOLUTIONS TO SECOND ORDER ORDINARY DIFFERENTIAL EQUATIONS:
Power series solutions: Legendre polynomials, Bessel functions of the first kind and their properties.

UNIT 5: COMPLEX VARIABLE – DIFFERENTIATION:
Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

UNIT 6: COMPLEX VARIABLE – INTEGRATION:
Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

TEXT BOOKS:

(i) R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.

(ii) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

REFERENCE BOOKS:

(i) Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

(ii) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

(iii) B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers

(iv) Engineering Mathematics, Srimanta Pal, OXFORD university press.

(v) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

(vi) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

(vii) Engineering Mathematics, P. Sivaramakrishna Das, Pearson Publications.

***Course Outcomes:** After the course completion the students will be able to*

1. *Solve the problems of multiple integration and apply these concepts for finding the parameters like surface area, volume, center of mass and centre of gravity.*
2. *Find the solutions of first order first degree and not of first degree differential equations and their applications such as Newton's law of cooling, Natural growth and decay.*
3. *Identify and solve higher order ordinary differential equations with constant coefficients using some standard methods and also their applications in LCR circuits.*
4. *Write the solutions of Legendre and Bessel's equations s series.*
5. *Understand the concept of analyticity of a function; solve the problems on conformal mapping.*
6. *Express the functions of a complex variable in series form also able to evaluate definite and improper integrals using complex integration.*

1	2	3	4	5	6	7	8	9	10	11	12
H											M

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

WORKSHOP/MANUFACTURING PRACTICES (THEORY)
Common to I year I sem (CSE, IT & CE) II sem (EEE, ECE & ME)

Code: 7BC01

L	T	P	C
1	0	0	1

Course Objectives:

Upon completion of this course, the students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Course Outcomes:

1) *To understand various basic tools to perform simple joints using metal and wood.*
2) *To understand the principle of various electrical and electronic appliances and their applications.*
3) *To understand the manufacturing process of welding, casting and tin smithy and their applications.*
4) *To understand the operation of basic as well as advanced machines used for fabrication of Metals, Plastics and Glass.*

I: Theory: In theory classes the following syllabus is to be covered in 10hrs using PPTS and Videos (Elementary treatment only)

1. Fitting & Power Tools
2. Electrical & Electronics Appliances
3. Carpentry
4. Plastic molding & Glass Cutting
5. Metal Casting
6. Metal Joining: Arc & gas welding and brazing
7. Metal forming
8. Machining
9. Advanced manufacturing methods: (Micro machining, USM,ECM,EDM)
10. CNC machining & Additive Manufacturing

Suggested Text/Reference Books:

(1) Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
(2) Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

CHEMISTRY LABORATORY

Code: 7HC63

L	T	P	C
0	0	3	1.5

***Course Objectives**:*
The student will be able to learn:

1. *Preparation of coordination complex NiDMG Complex*
2. *Determination of surface tension*
3. *Determination of viscosity*
4. *Saponification /acid value of an oil*
5. *Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method*
6. *Determination of chloride content of water*
7. *Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)*
8. *Potentiometry - determination of redox potential and emf ($FeSO_4$ Vs $KMNO_4$ / HCl Vs NaOH)*
9. *Determination of the rate constant of acid catalyzed hydrolysis of methylacetete*
10. *Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin*
11. *Synthesis of a drug- Aspirin*
12. *Thin layer chromatography*

List of Experiments

1. Preparation of coordination complex NiDMG Complex
2. Determination of surface tension
3. Determination of viscosity
4. Saponification/acid value of an oil
5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method
6. Determination of chloride content of water
7. Determination of cell constant and conductance of solutions (HCl Vs NaOH / Mixture of acid Vs Strong base)
8. Potentiometry - determination of redox potential and emf ($FeSO_4$ Vs $KMNO_4$ / HCl Vs NaOH)
9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete
10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin
11. Synthesis of a drug- Aspirin
12. Thin layer chromatography

Course Outcomes
After completion of the course, the student will be able to learn:

1. *Methods to prepare inorganic complexes.*
2. *The process to determine surface tension of different liquids using stagnometer*
3. *The process to determine viscosity of lubricants by using redwood viscometer.*
4. *How to find acid value of an oil.*
5. *The principle and determination of Hardness of a water sample.*
6. *The methods to estimate amount of chlorine in water.*
7. *To determine unknown concentration of acid by using conductometric method.*
8. *To determine unknown concentration of acid by using potentiometric method.*
9. *Estimate rate constants of reactions from concentration of reactants/products as a function of time.*
10. *Methods to prepare industrially important polymers.*
11. *The method of preparation for organic compounds.*
12. *To separate the organic compounds from their mixture by using Thin layer chromatography.*

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
ELECTRICAL CIRCUITS AND NETWORKS ANALYSIS LAB
Common to (ECE I Year I Sem) (EEE & ECM I Year II Sem)

Code: 7AC61

L	T	P/D	C
-	-	2	1

Course Objectives:
To make the student to learn:

i. *Verification of network theorems experimentally.*
ii. *To measure frequency of RLC series and parallel circuits under resonance*
iii. *To determine self & mutual inductance and co-efficient of coupling for coupled circuits*
iv. *The construction of current locus diagram for a given parallel circuit.*
v. *Simulation for analysis of electrical networks*
vi. *Method for determining the parameters of a coil*

Course Outcomes:
At the end of the course, students will be able to

i. *Perform the test for verification of various network theorems*
ii. *Measure the frequency for a RLC series/parallel circuits under resonance.*
iii. *Conduct an experiment for determination of self & mutual inductance and coefficient of coupling*
iv. *Construct current locus diagram by performing a test on single phase parallel circuits*
v. *Simulate for analysis of electrical circuits.*
vi. *Determine the parameters of the coil*

List of Experiments (ANY 10 Experiments to be conducted)

1. Verification Thevenin's Theorem and Norton's Theorem
2. Verification of Maximum Power Transfer Theorem
3. Verification of Superposition Theorem
4. Verification of Compensation Theorem
5. Verification of Reciprocity Theorem and Millmann's Theorem
6. Finding resonant frequency in Series and Parallel circuits
7. Determination of Self Inductance, Mutual Inductance and Coefficient of coupling
8. Calculation of Z and Y Parameters
9. Construction of current locus diagram for RL and RC circuit
10. Mesh and Nodal Analysis by simulation
11. Determination of Average value and RMS value of a complex wave
12. Determination of parameters of a coil.
13. Determination of Time constant of RL and RC series circuit.

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
ENGLISH - Reading, Listening and Writing
Common to I Year I Semester (ECM, CSE, IT and Civil) & II Semester (ECE, EEE and MECH)

Code: 7HC01 **L T P C**
1 0 0 1

Course Objectives ***:*** *The students will*
- *acquire knowledge on various types of listening techniques, barriers and benefits of listening*
- *recognize the speech sounds and learn the intonation patterns*
- *learn various vocabulary patterns*
- *develop the ability to structure and punctuate the sentences*
- *learn different reading techniques*
- *learn different writing skills*

Course Outcomes ***:*** *At the end of the course the students will be able to*
- *understand and differentiate different types of listening techniques used to interact with real world problems*
- *differentiate the speech sounds and improve their accent and modulation while speaking*
- *understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections*
- *discriminate a variety of sentence types, their structure and use punctuations*
- *get acclimatized to reading strategies and note making.*
- *develop proficiency in writing and preparing resume*

Unit-I : Listening
1.1 Importance of Listening;
1.2 Types of listening
1.3 Barriers to Listening
1.4 Benefits of Listening

Unit-II: Basic Communication Skills
2.1 Introduction to Speech Sounds
2.2 Vowels, Diphthongs, Consonant Sounds
2.3 Significance of word accent
2.4.Intonation Patterns

Unit-III: Vocabulary
3.1 Word Roots - Affixes: Prefixes and Suffixes
3.2 Homophones, Homonyms, Homographs
3.3 Synonyms – Antonyms
3.4 One word substitutes
3.5 Idioms and Phrases

Unit-IV: Basic Writing Skills
4.1 Sentence Structure
4.2 Kinds of Sentences
4.3 Punctuation in Writing

Unit-V : Reading Comprehension
5.1 Skimming and Scanning
5.2 Prediction Techniques and Inferring
5.3 Note Making
5.4 Reading Comprehension

Unit-VI: Writing Skills

6.1 Paragraph Writing
6.2 Paraphrasing
6.3 Letter Writing
6.4 Resume Writing

Suggested Readings:

(i) *English grammar just for you* Rajeevan Karal, Oxford publications
(ii) *Practical English Usage.* Michael Swan. OUP. 1995.
(iii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007
(iv) *On Writing Well.* William Zinsser. Harper Resource Book. 2001
(v) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016
(viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

1	2	3	4	5	6	7	8	9	10	11	12
H											M

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
WORKSHOP/MANUFACTURING PRACTICES (LAB)
B.Tech I year I sem (CSE, ECM, IT & CE) II sem (EEE, ECE & ME)
Code: 7BC61

L	T	P	C
0	0	3	1.5

Course Objectives:

1) *To identify various basic tools to perform simple joints using metal and wood.*
2) *To recognize various electrical and electronic and their applications.*
3) *To understand the manufacturing process of welding, casting and tinsmith and apply the processes in making simple products.*
4) *To understand and operate basic machines for fabrication of Metals, Plastics and Glass.*
5) *To understand the functions and parts of commonly used domestic appliances.*

Course outcomes:

1. *After completion of the course, the student will be able to **fabricate** components with their own hands.*
2. *Assemble different components and produce small devices of their interest.*

Work shop and Manufacturing Practices

Minimum of 10 experiments out of twelve given here under is to be completed

S.No	Trades	List of Experiments
1	Fitting Shop	**1**. Preparation of T-Shape Work piece **2.** Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
2	Carpentry	3.Practice of Cross Half lap joint 4. Practice of Half lap Dovetail joint
3	Electrical & Electronics	5. One lamp one switch Practice 6. Stair case wiring: Practice
4	Welding shop (Arc & Gas)	Demonstration of Gas and Resistance welding 7. Practice of Lap and Butt joint using Arc welding
5	Casting	8.Preparation of mould by using split pattern 9. Mould preparation and pouring of molten metal.
6	Tin Smithy	10. Preparation of Rectangular Tray & Square box
7	Machine Shop	11. Demonstration of turning , Drilling and Reaming operations
8	Plastic molding & Glass Cutting	12 a) Demonstration of Injection Moulding b) Demonstration of Glass Cutting with hand tools
9	Domestic Appliances	13.Demonstration of Electric Iron, fan, Mixer, Hair Drier, Washing Machine etc.
10	Lab project	14. Making various components and / or assembling the components which can be useful in domestic / engineering applications

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)
ENGLISH LAB (Reading, Listening and Writing)

Common to I Year I Semester (ECM, CSE, IT and Civil) & II Semester (ECE, EEE and MECH)

Code: 7HC61 **L T P C**

0 0 2 1

Course Objectives ***:*** *The students will*

- *acquire knowledge on various types of listening techniques, barriers and benefits of listening*
- *recognize the speech sounds and learn the intonation patterns*
- *learn various vocabulary patterns*
- *develop the ability to structure and punctuate the sentences*
- *learn different reading techniques*
- *learn different writing skills*

Course Outcomes ***:*** *At the end of the course the students will be able to*

- *understand and differentiate different types of listening techniques used to interact with real world problems*
- *differentiate the speech sounds and improve their accent and modulation while speaking*
- *understand and illustrate different word roots, word derivatives – synonyms, antonyms and word inflections*
- *discriminate a variety of sentence types, their structure and use punctuations*
- *get acclimatized to reading strategies and note making.*
- *develop proficiency in writing and preparing resume*

Unit-I : Practice sessions on
Listening for Basic Vocabulary
Listening for General Information
Listen for specific information
Listening Comprehension

Unit-II: Practice sessions on Pronunciation
Articulation of Vowel and Consonant sounds
Listening for Word accent
Intonation Patterns

Unit-III: Exercises on Word Roots
Affixes: Prefixes and Suffixes
Identifying Homophones,
Homonyms, Homographs
Synonyms - Antonyms
One word substitutes
Idioms and Phrases

Unit-IV: Exercises on
Punctuation and Spelling
Error Identification in Sentences
Conversion of Sentences

Unit-V : Practice sessions on
Using passages for skimming and scanning
Note Making using Texts
Reading Comprehension using different techniques

Unit-VI: Exercises on
Paragraph Writing using hints/Guided Paragraphs
Writing Letters
Writing Resume

Suggested Readings:

(i) *English grammar just for you* Rajeevan Karal, Oxford publications
(ii) *Practical English Usage.* Michael Swan. OUP. 1995.
(iii) *Remedial English Grammar.* F.T. Wood. Macmillan.2007
(iv) *On Writing Well.* William Zinsser. Harper Resource Book. 2001
(v) *Study Writing.* Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
(vi) *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
(vii) *Learn to Write* by Dr. G. Varalakshmi, Kindle Edition 2016
(viii) *A practical course for developing writing skills in English* by J.K. Gangal, PHI Learning Pvt Ltd.

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

Syllabus for B. Tech I Year I semester
Electrical and Electronics Engineering (EEE)

Technical Seminar -II

Code: 7A292

L	T	P	C
-	-	2	1

Course Objectives:

To make the student to learn:

i. *To have good communication skill*
ii. *To have good presentation skill*
iii. *To independent learning*

Course Outcomes:

Students are able to understand about conventional and non conventional power plants

i. *Students are able to understand basics of electrical protection*
ii. *Students are able to understand about home appliances*
iii. *Students are able to understand overview of power system*

Topics for Technical Seminar

1. Overview of electrical Power generation and consumption scenario in Telangana state, India and world.
2. Working principle and operation of earthing / grounding with types
3. Different types of losses in generation, transmission and distribution electrical power system
4. Overview of power system and Electro Magnetic Field effect on power system.
5. Applications of different types of motors in electric vehicles
6. Overview of solar power generation in India
7. Overview of Wind power generation
8. Overview of HVDC transmission in India

Procedure

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

a	b	c	d	e	f	g	h	i	j	k	l
H	M	M								L	

II Year B.Tech I Semester

TRANSFORM TECHNIQUES AND NUMERICAL METHODS

(Common to ECE & EEE)

	L	T	P/D	C
Code: 7HC13	**2**	**0**	**0**	**2**

Pre Requisites: Engineering Mathematics – II

Objectives: *The students are expected to learn*

- *Concept, properties of Laplace transforms*
- *Solving ordinary differential equations using Laplace transforms techniques.*
- *Various methods to the find roots of an equation.*
- *Concept, properties of Z-Transforms, Solving Difference equations using Z-Transforms.*
- *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
- *Applications of PDE.*
- *Concept of finite differences and to estimate the value for the given data using interpolation.*
- *Evaluation of integrals using numerical techniques*
- *Solving ordinary differential equations using numerical techniques.*

UNIT - I: LAPLACE TRANSFORMATIONS:

Laplace transform of standard functions, shifting theorems, change of scale property, Laplace Transform of Derivatives and Integrals, Multiplication by powers of 't', Divison by 't' (without proofs). Laplace transform of unit step function, Impulse function. Inverse Laplace_transforms**:** properties, partial fraction method and convolution theorem (without proof). Solving ordinary differential equations with constant coefficients using Laplace Transforms.

UNIT - II: Z- TRANSFORMS:

Z- Transforms and Inverse Z-transforms, properties, damping rule, Shifting properties, Initial and final value theorems Convolution theorem (without proofs).

Applications-Solution of difference equation by Z- transforms

UNIT– III: PARTIAL DIFFERENTIAL EQUATIONS:

Formation of Partial Differential Equations by Elimination of Arbitrary Constants and Arbitrary Functions. Solutions to First order Linear and Non-linear Equations-Standard Forms, Equations Reducible to Standard Forms. Classification of partial differential equations. Method of Separation of Variables, Solution of One dimensional Heat Equation.

UNIT- IV: SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS AND NUMERICAL INTEGRATION:

The Bisection Method – The Method of False Position –Fixed point iteration Method – Newton-Raphson Method. Newton-Cotes Quadrature Formula, 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 of fourth order, Predictor-Corrector Methods-Milne's Method.

TEXT BOOKS:

1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
3. S. S. Sastry, Introductory methods of numerical analysis. PHI, 4th Edition, 2005.

REFERENCE BOOKS:

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
2. Engineering Mathematics, Srimanta Pal, OXFORD university press.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
4. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Course outcomes: *After learning the contents of this paper the student must be able to*

- *Use the Laplace transforms techniques for solving ODE's*
- *Use the Z-Tranforms technique for solving Difference equations*
- *Form partial differential equations and find the solution to first order linear and nonlinear partial differential equations.*
- *Find the root of a given equation.*
- *Estimate the value for the given data using interpolation*
- *Find the numerical solutions for a given ODE's*

1	2	3	4	5	6	7	8	9	10	11	12
H	H	M						M			**L**

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester

DIGITAL LOGIC DESIGN

(Common to ECE/ECM/EEE)

CODE: 7C302

L	T	P/D	C
2	1	-	3

COURSE OBJECTIVES: *To learn the different numbering systems, Boolean functions and design of Combinational and Sequential Circuits.*

COURSE OUTCOMES:

After completing this course, the students will have demonstrated

i. *an ability to understand number systems and apply the rules of Boolean algebra to simplify Boolean expressions.*
ii. *an ability to simplify of Boolean expressions using K-map.*
iii. *an ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders. Code converters.*
iv. *an ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers*
v. *an ability to design digital design using PLD's such as ROM's, PLA's, PAL s.*
vi. *an ability to design digital controllers using Algorithmic State Machine Charts .*

Mapping of Course Outcomes with Program Outcomes

	a	b	c	d	e	f	g	h	i	j	k	L	m
CO1	3	2	2	2								2	3
CO2	3	2	2	2								2	3
CO3	3	2	2	2								2	3
CO4	3	2	2	2								2	3
CO5	3	2	2	2								2	3
CO6	3	2	2	2								2	3

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

Application: Design of a Basic Calculator Using Logic Gates.

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, Concepts of threshold logic and threshold gates.

Applications: Application of Decoder in Seven Segment Display, application of Encoders in Servomotors.

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. Conversion of flip-flops.

Applications: Application of SR Flip Flop in Switch Debounce Circuit.

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) and Shift registers

Applications: Design of 1010 sequence detector, Design of Digital Clock using Counters

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.

Applications: Design of a Weighing machine and Binary multiplier.

TEXT BOOKS:

1. Morris Mano-,Digital design –PHI, 2nd Edition.
2. ZviKohavi and Niraj K Jha -Switching & Finite Automata theory – Cambridge, 3rd Edition.
3. SubrataGhoshal, Digital Electronics,2012, Cengage Learning

REFERENCES:

1. Fletcher -An Engineering Approach to Digital Design – PHI.
2. Fundamentals of Logic Design, Roth, Kenny, Seventh Edition, Cengage Learning
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

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	H	M							L

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester

L	T	P/D	C
3	-	-	3

Code: 7C301 **ELECTRONIC DEVICES AND CIRCUITS**

(Common to ECE/EEE/ECM)

Course Objectives:

The objective of this course is to provide the learners with a comprehensive understanding of electronic devices, circuits and their applications.

Course Outcomes:

After studying this course, the students will be able to

1. *Learning the operation of diode and its application as rectifier and filters*
2. *Understand the Fundamentals of BJT operation, Characteristics, different biasing circuits, analysis of BJT amplifiers.*
3. *Analyze and Design of BJT Single stage, multistage amplifiers at low and high frequencies.*
4. *Analysis of small signal model of FET and frequency response*
5. *Design different types of Feedback Amplifier, Oscillators and their analysis*
6. *Understand the Basic regulator circuits and voltage multipliers.*

Mapping of Course Outcomes with Program Outcomes

	a	b	c	d	e	f	g	h	i	j	k	l	m
CO1	3	2	2	2								2	3
CO2	3	2	2	2								2	3
CO3	3	2	2	2								2	3
CO4	3	2	2	2								2	3
CO5	3	2	2	2								2	3
CO6	3	2	2	2								2	3

UNIT-I 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. Problems based on rectifiers. Introduction to power supply filters.(L,C and π filters)

UNIT- II BIPOLAR JUNCTION TRANSISTOR:

Fundamentals of BJT& Operation, Minority carrier profiles. I/P and O/P Characteristics CB, CE and CC configurations. Transistor as a switch. Switching characteristics (Rise time, Fall time, Delay Time and Storage time), Design of transistor as switch. Problems on transistor switch. BJT Biasing Methods & Stabilization. - Fixed Bias, Collector to Base Bias, Voltage Divider Bias and Problems, Concept of Thermal runway in BJTs.

UNIT-III SMALL SIGNAL & HIGH FREQUENCY ANALYSIS OF BJT:

Small signal Model of BJT, h-parameter representation – Exact analysis of .CE Amplifier-. Approximate analysis of CE, CB and CC Amplifiers.

BJT hybrid π model. – relationship between high frequency parameters and h- parameters, β cut off Frequency (common Emitter short circuit Current gain), Millers Theorem, Concept of Multistage amplifier - N-stage cascaded amplifier, equivalent circuits, Darlington pair(high input resistance transistor circuits), Cascode

(CE+CB) amplifier, Frequency response of single & two stage RC coupled Amplifier, Analysis at Low and High frequencies.

UNIT-IV FIELD EFFECT TRANSISTOR:

Construction & Working of JFET, JFET characteristics, FET Parameters, Construction & Working of MOSFET, MOSFET characteristics, (Enhancement and depletion mode); Comparison of JFET & MOSFET

Biasing of JFET - Self bias and fixed bias. Small signal Analysis of common source, common drain and common gate amplifier configurations

UNIT- V FEED BACK AMPLIFIERS

Fundamentals-classification- Characteristics of feedback Amplifier effect of feedback in voltage series, voltage shunt, current series and current shunt amplifiers. Problems

OSCILLATORS

Classification of Oscillators. Condition for Oscillations. RC Phase shift Oscillator, Wein bridge oscillator- Hartley oscillator, Colpitts oscillator, Quartz crystal Oscillator,

UNIT-VI VOLTAGE REGULATORS:

Classification of Voltage Regulators - Basic regulator circuit: Zener, Transistor Based: Shunt and Series Voltage regulators. Protection Circuits: Current limiting, Short circuit protection. Specifications of Voltage regulator, Voltage multipliers. Switching Regulators – (boost up, step down (buck) & Flyback)

TEXT BOOKS:

1. Electronic Devices and Crcuits-J.Millman, C.C.Halkias and satyabratha jit Tata McGraw Hill,2 Ed. 2007
2. Electronic Devices AND Circuits-R.L.Boylestad &Louis Nashelsky, Pearson/Prentice Hall, 9th edition, 2006.
3. Electronic devices and Circuit Theory-Robert L. Boylstead, Louis Nashelsky, 9ht ed., 2008, PE
4. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972

REFERENCES:

1. Electronic circuit analysis-K.Lal Kisshore,2004,BSP
2. 2.Electronic Devices and Circuits – K.LalKishore, 2 ed., 2005, BSP
3. 3.Electronic Devices: Systems and Applications – Robert Diffenderter, 2nd Indian Reprint., 2010, Cengage Learning
4. Electronic Devices and Crcuits by Sanjeev Guptha,Dhapat Rai Publications.
5. Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata Mc Graw Hill Publications
6. Electronic Circuits and Applications, Muhammad H Rashid, Cengage Learning

1	2	3	4	5	6	7	8	9	10	11	12
H	M			L							L

H: High M: Medium L: Low

Syllabus for B. Tech (E.E.E.) II Year I semester
Electrical and Electronics Engineering

Code: 7A302 **ELECTRO MAGNETIC FIELDS**

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

Course Objective: Students learn about fundamental concepts of static and dynamic electric fields.

Course Outcomes:

1. Understand the Principle of electrostatics.
2. Understand the principle of dipole and field due to dipole.
3. Understand the Fundamentals of dielectrics and calculation of capacitance.
4. Understand the Fundamentals of Ampere circuital law and force in magnetic field.
5. Understand the magnetic dipole and magnetic potential.
6. Understand the self and mutual inductance and time varying fields.

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, div (D)=ρv- Laplace's and Poison'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, 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, 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, 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 Electromagnetism - William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th 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. 4th edition 1992.
4. "Electromagnetic fields", S. Kamakshaiah, Right Publishers, 2007.

1	2	3	4	5	6	7	8	9	10	11	12
M	H										L

H: High M: Medium L: Low

II Year I semester
Electrical and Electronics Engineering

Code: 7A303 **ELECTRICAL MACHINES – I**

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

Course Objective: Students learn about fundamental concepts of DC machines and their applications.

Course Outcomes:

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. Fritzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5th 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, 3rd edition, 2004.

1	2	3	4	5	6	7	8	9	10	11	12
H	M										L

H: High M: Medium L: Low

II Year I semester
Electrical and Electronics Engineering

Code: 7A304 **CIRCUITS and NETWORKS- II**

L	T	P/D	C
3	-	-	3

Course Objective: Students learn about fundamental concepts of electrical engineering.

Course Outcomes:

1. Understand the three phase circuits.
2. Understand the DC and AC transients.
3. Understand the network functions.
4. Analyze the network parameters.
5. Understand the different types of filters.
6. Understand the Fourier analysis of AC circuits.

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., 6th edition.
2. Circuits & Networks (Analysis, Design & Synthesis) – M.S. Sukhija, T.K. Nagasarkar, Oxford University Press, 2nd edition.

REFERENCES:

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

1	2	3	4	5	6	7	8	9	10	11	12
H		M									L

H: High M: Medium L: Low

B. Tech. II Year I semester
Electrical and Electronics Engineering

Code: 7BC04 ELEMENTS of MECHANICAL ENGINEERING

(Common to All Branches except Mechanical Engineering)

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

Course Objectives:

The main objective of the course is to offer the students fundamental knowledge of First Law of Thermodynamics. *Working of SI and CI engines, working principle of different types of Turbines& pumps. properties of material and engineering application. Working principles of various types of power transmission systems*

COURSE OUTCOMES:

At the end of basic mechanical engineering a student should be able to

1. To acquire the knowledge of basic concepts of thermodynamics and analyze the p-v & t-s diagrams of the different cycles.
2. To acquire the knowledge two and four stroke engines, the function of components used in the steam power plant
3. To identify & understand the function of components used in VCR & VAR system, & about the working of hydraulic pumps & hydraulic turbines.
4. To identify & understand *properties of material and engineering application*
5. To acquire the knowledge *of various types of power transmission systems*
6. To acquire the knowledge the different NC and CNC machine.

UNIT – I: Energy Resources and Conversion:
Basic concepts of Thermodynamics – general classification of heat engines, Property and state, System, Boundary and surroundings, Zeroth Law, First Law of Thermodynamics and its applications- Joule's experiment, reversible non-flow processes-Constant volume, constant pressure, constant temperature process, polytropic process, Second Law of Thermodynamics – Statements, Heat engines, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

UNIT-II: Internal combustion engines:
Internal combustion engines, definition, classification, components, working of four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.
Steam Power plant, Boiler, Steam Turbines: Layout of steam power plant, Water tube and Fire tube Boilers: - Simple cross-tube boiler, Cochran, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

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: Engineering Materials:
Classification, mechanical properties, Ferrous Materials – Constituents of Cast Iron & types of Cast Iron, Steels – manufacture by Bessemer converter, Arc furnace, types of steel, effect of alloying elements on steel, Stainless steel, Non- Ferrous Materials: Properties and applications of Aluminum & alloys, Copper and alloys, composite materials – types, fabrication methods, Ceramics – Properties and applications

UNIT-V: Transmission of Motion and Power:

Shafting, Belt drive, types of belt drive, types of belts, chain drives, types of chain drive, Pulleys, parts, types of pulleys, gear drive- classification, Terminology of spur gear, Gear trains – simple and compound, Clutches – purpose and basic principle of contact clutch, brakes - purpose and basic principle of block brake.

UNIT-VI: Robot and sensors:

Introduction, definition, Robot component, **CNC Machine tools** – Introduction, Machine control, Vertical and Horizontal spindles, CNC drill, mill, boring and tapping, Adaptive control, NC and CNC turning centers.

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.

1	2	3	4	5	6	7	8	9	10	11	12

H: High M: Medium L: Low

Syllabus for B. Tech II Year I semester
Electrical and Electronics Engineering (EEE)

ENVIRONMENTAL SCIENCE AND ECOLOGY
Common to All Branches

	L	T	P	C
Code: 7HC21	**3**	**0**	**0**	**0**

II B. Tech I Sem (for EEE, ME and ECE)
II B. Tech II Sem (for CSE, IT, ECM and CE)
(Mandatory course)

There are no credits but grading will be given based on marks scored as **Outstanding/ Excellent/ Very good/ Good/ Above average/ Average/ Satisfactory/Not satisfactory**

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations Course Outcomes:
- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity.

UNIT-II Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy source.

UNIT-III Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation.

UNIT-IV Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants. Acid rain, Global warming, Ozone layer depletion, Water pollution: Sources and types of pollution. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Sewage water Treatment, Kyoto protocol, and Montréal Protocol.

UNIT-V Sustainable development and Green Technology: Concept of sustainable development, threats to sustainability population and its explosion, Crazy consumerism, over- exploitation of resources, strategies for achieving sustainable development environmental education, conservation of resources, urban sprawl sustainable cities and sustainable communities, human health , role of IT in Environment, Environmental Ethics, Environmental Economic – Concept of Green Building, Clean Development Mechanism (CDM).

UNIT-VI Environmental Policy, Legislation & Environment Impact Assessment: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological

and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

TEXT BOOKS:

1. Introduction to Environmental Science Dr. Y. Anjaneyulu, 2004, BS Publications.
2. Environmental Studies by Erach Bharucha, 2005 University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

H: High M: Medium L: Low

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

II Year, I - Sem.
Electrical and Electronics Engineering
ELECTRONIC DEVICES & CIRCUITS LAB
(Common to ECE/ECM/EEE)

Code: 7C371

L	T	P/D	C
-	-	2	1

PART A: Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification and Specifications of Active Devices like Diodes, BJTs, JFETs, MOSFETs.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies

PART B: (For Laboratory examination – Minimum of 10 experiments)

1. Study and Operation of CRO:
   Oscilloscope, CRT features vertical amplifiers, horizontal deflection system, sweep, triggerPulse, delay line, sync selector circuits, Dual trace oscilloscope, standard specifications of CRO, probes for CRO, Measurement of amplitude and frequency. Time Period measurement, Lissajous patterns.
2. PN Junction diode characteristics A. Forward bias B. Reverse bias.
3. Zener diode characteristics
4. Transistor CB characteristics (Input and Output)
5. Transistor CE characteristics (Input and Output)
6. Half wave Rectifier with and without filters.
7. Full wave Rectifier (Centre tapped and Bridge)with and without filters
8. FET characteristics
9. CE Amplifier
10. CC Amplifier (Emitter Follower).
11. FET amplifier (Common Source)
12. RC Phase Shift Oscillator

1	2	3	4	5	6	7	8	9	10	11	12
	H	M									L

H: High M: Medium L: Low

II Year I Semester

Electrical and Electronics Engineering

Code: 7A473 ELECTRICAL MACHINES LAB – I

L	T	P/D	C
-	-	3	2

The following experiments are required to be conducted:

1. Magnetization characteristics of DC shunt generator for the calculation of critical field resistance and critical speed.
2. Determination of characteristics from the Load test on DC shunt generator.
3. Determination of characteristics from the Load test on DC series generator.
4. Determination of characteristics from the Load test on DC compound generator.
5. Hopkinson's test on DC shunt machines for the determination of the efficiency.
6. Fields test on DC series machines for the determination of efficiency.
7. Swinburne's test and speed control of DC shunt motor and Predetermination of efficiencies.
8. Brake test on DC compound motor for the determination of performance curves.
9. Brake test on DC shunt motor for the determination of performance curves.
10. Separation of losses in DC shunt motor.

1	2	3	4	5	6	7	8	9	10	11	12
								L	H		M

H: High M: Medium L: Low

II Year I semester
Electrical and Electronics Engineering
Technical Seminar - III

L	T	P/D	C
-	-	2	1

Code: 7A393

Course objective

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

COURSE OUTCOMES :

1 Deliver lecture on emerging technologies.
2 Explain domain knowledge to resolve real time technical issues
3 Demonstrate ability to lead and explain concepts and innovative ideas.
4 Demonstrate team leading qualities.
5 Demonstrate public speaking skills.
6 Exchange new information that would not have been available otherwise.
7. Develop debating and interview skills.

Procedure

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

1	2	3	4	5	6	7	8	9	10	11	12
H	M										L

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering

Code: 7HC15	**PROBABILITY THEORY AND STATISTICS**	**L**	**T**	**P/D**	**C**
	(Common to All Branches)	**2**	**--**	**--**	**2**

Pre Requisites: Nil

Course Objectives: *Students are expected to learn*

1. *Basic concepts of probability and able to evaluate probability.*
2. *Concepts on discrete probability distributions and methods to solve problems.*
3. *Concepts on continuous probability distributions and methods.*
4. *About the concepts on correlation and regression*
5. *Basic concepts of testing of hypothesis for large size samples and methods to solve problems.*
6. *Test the hypothesis related to small size samples.*

UNIT-I: BASIC PROBABILITY:
Probability spaces, conditional probability, independent events, and Bayes' theorem.
Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables, Chebyshev's Inequality

UNIT-II: DISCRETE PROBABILITY DISTRIBUTIONS:
Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution

UNIT-III: CONTINUOUS RANDOM VARIABLE & DISTRIBUTIONS:
Continuous random variables and their properties, distribution functions and densities,
Normal, exponential and gamma distributions, evaluation of statistical parameters for these distributions

UNIT-IV: APPLIED STATISTICS:
Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

UNIT-V: TESTS OF HYPOTHESIS FOR LARGE SAMPLES:
Tests of Hypothesis, Type–I and Type-II Errors, Hypothesis testing concerning one mean and two means and test of hypothesis concerning to one Proportion and difference of proportions.

UNIT-VI: TESTS OF HYPOTHESIS FOR SMALL SAMPLES*:*
Student t-test, Hypothesis testing concerning one mean and two Means, F-test and χ^2 test-Goodness of fit, Independence of Attributes.

TEXT BOOKS:

1. Ronald E. Walpole,Raymond H. Myers,Sharon L. Myers,Keying Ye, Probability & Statistics For Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. Probability and Statistics, T.K.V. Iyengar, B. Krishna Gandhi, S. Ranganatham, M.V.S.S.N. Prasad, S. Chand Publications.

REFERENCE BOOKS:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, pearson Educations.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. A.Ross, A First Course in Probability, 6th Ed., Peasrson Education India, 2002.

Course Outcomes: *After the course completion the students will able to solve*

1. *The random variable problems and probability distributions.*
2. *Problems on discrete probability distributions.*
3. *Problems on continuous probability distributions*
4. *Problems on curve fitting, correlation and regression.*
5. *Test the hypothesis related to samples concerning to the means and proportions of large size samples.*
6. *Apply and solve the problems using t-test, Chi-square test also testing the hypothesis problems on small size samples, goodness of fit and independence of attributes.*

1	2	3	4	5	6	7	8	9	10	11	12
	M	H									L

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering

Code: 7A405 ELECTRICAL MACHINES-II

L	T	P/D	C
3	-	-	3

Course Objective: Students learn about fundamental concepts of transformers and induction motors with applications.

Course Outcomes: Students

1. Learn basic concepts of single phase transformer.
2. Study about testing of single phase transformer and auto transformer.
3. Study about poly phase transformer.
4. Study about poly phase induction motors.
5. Study about torque speed characteristics and circle diagram of induction motor.
6. Study about different starting methods of induction motor.

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

Single phase transformers-types - constructional details-minimization of hystersis 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. Electrical machines- P S Bhimbra, Khanna Publishers.
2. Theory & Performance of Electrical Machines, J. B. Gupta, S.K. Kataria & Sons.

REFERENCES:

1. Performance and Design of AC Machines – MG. Say, BPB Publishers
2. Theory of Alternating Current Machinery – Langsdorf, Tata McGraw-Hill Companies, 2nd edition.
3. Electric Machines – I.J. Nagrath & D.P. Kothari, Tata Mc Graw Hill, 7th Edition, 2005.
4. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, Mc Graw Hill Companies, 5th edition.

1	2	3	4	5	6	7	8	9	10	11	12
	M	H		L							L

H: High M: Medium L: Low

II Year II Semester

Electrical and Electronics Engineering

Code: 7A406 POWER SYSTEMS - I

L	T	P/D	C
3	1	-	3

Course Objective: Students learn about fundamental concepts of different conventional power generation methods and transmission requirements.

Course Outcomes: Students

1. Learn basic concepts of hydro electric and thermal power plants.
2. Study about gas and nuclear power plants.
3. Study about transmission line parameters and efficiency.
4. Study about performance of transmission lines.
5. Learn basic about over head insulators and mechanical design.
6. Learn fundamentals of underground cables.

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, 4th 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, 2nd Edition.

1	2	3	4	5	6	7	8	9	10	11	12
H	M										L

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering

Code: 7AC07 **CONTROL SYSTEMS**

L	T	P	C
3	1	-	3

Course Objective: Students learn about fundamental concepts of time and frequency domain analysis of a given system.

Course Outcomes: Students

1. Learn basic concepts of control systems.
2. Study about time response analysis.
3. Learn basic concepts of stability and root locus method.
4. Study about frequency response analysis.
5. Learn basic concepts stability analysis in frequency domain.
6. Learn fundamentals of state space analysis.

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, 2nd edition.

REFERENCES:

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

II Year II Semester

Electrical and Electronics Engineering

L	T	P	C
3	-	-	3

CODE : 7C405 **ANALOG CIRCUITS**

Course Objectives:

To understand the basic functioning and applications of various devices such asd amplifiers and oscillators.

COURSE OUTCOMES:

After studying this course, the students will be able to

1. *Understand Power Amplifiers*
2. *Analyze and Design tuned and RF amplifiers such as single tuned, double tuned, stagger tuned and wide band amplifier.*
3. *Understand the responses and applications of RC and RL circuits, basic operations of clippers, Clampers*
4. *Understand different types multivibrators, their analysis, designing and applications*
5. *Understand different sweep generators and comparisons*
6. *Understand types of Logic gates and Sampling gates.*

Mapping of Course Outcomes with Program Outcomes

	a	b	c	**d**	e	f	g	h	i	j	k	l	m
CO1	3	2	2									2	3
CO2	3	2	2									2	3
CO3	3	2	2									2	3
CO4	3	2	2									2	3
CO5	3	2	2									2	3
CO6	3	2	2									2	3

UNIT I: POWER AMPLIFIERS

Classification of Power Amplifiers - Class A, B, AB & C power amplifiers –push pull configuration, complementary symmetry circuits, Distortion in Amplifiers. Harmonic distortion and Crossover Distortion in Power Amplifiers– Conversion efficiency and relative performance.

UNIT II: TUNED AND RF AMPLIFIERS

Introduction to Tuned Amplifiers, Q-Factor. single tuned capacitive coupled amplifier, tapped single tuned capacitance coupled amplifier, single tuned inductively coupled amplifier, stagger tuning, synchronous tuned Amplifier.

UNIT III: WAVE SHAPING:

RC high pass, low pass circuit response for sinusoidal, step, pulse, square, ramp & exponential inputs- Differentiator –Integrator. RL, Diode clippers- Transistor clipper- clipping at two independent levels – Emitter coupled clipper- comparator-– Applications of voltage comparators.

Clamping operation – clamping with source, diode resistances- clamping circuits theorem- practical clamping circuits.

UNIT IV: MULTIVIBRATORS:

Stable states of Bistable Multivibrator A fixed bias transistor Bistable Multivibrator -A self biased transistor Bistable Multivibrator - commutating capacitor – Unsymmetric triggering of Bistable Multivibrator - triggering through a unilateral device- symmetrical triggering – Schmitt trigger circuit.

General operation of monostable multivibrator, collector coupled monostablemultivibrator - wave forms of collector coupled monostable multivibrator - Emitter coupled monostablemultivibrator - triggering of monostable multivibrator. Astablemultivibrator, collector coupled Astable multivibrator -Emitter coupled Astable multivibrator. Designing of Bistable, Monostable and Astable Multivibrators.

UNIT V: TIME BASE GENERATORS:

General features of time base signals-sweep circuit using a transistor switch-UJT,UJT characteristics, UJT as a sweep circuit, - General considerations & principles of Miller & Boot strap time base generators- the transistor miller time base- the transistor, Boot strap time base generator- A simple current sweep transistor current time base generator.

UNIT VI: SAMPLING GATES:

Basic operating principle unidirectional, Bidirectional sampling gates using diodes, transistors- reduction of pedessed sampling scope.

LOGIC GATES: Digital operation of a system- OR, AND, NOT, NAND & NOR gates- DTL Logic– RTL Logic, TTL logic – comparison.

TEXT BOOKS:

1. Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972
2. Pulse digital and switching wave forms-J. Millman and H. Taub, Tata McGraw-Hill, New Delhi,2001.
3. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

REFERENCES:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss
3. Electronic Circuit Analysis-K.Lal Kishore, 2004, BSP

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

L	T	P	C
2	0	0	2

II Year II Semester

Electrical and Electronics Engineering

CODE: 7ZC01 MANAGEMENT SCIENCE AND FINANCIAL ACCOUNTING (MSFA)

Course Objective: To make students understand the basics of management and Financial Accounting, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields, which facilitate them in making better planning and decisions

Course Outcomes:

1. Outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
2. Helps in understanding organization behavior, personality determinants and other key aspects
3. Infers the need to understand the importance of Strategic management and Business environment in particular
4. Enrich students with basic concepts of Financial Accounting.
5. Understand basic concepts of Depreciation and need for preparing trial balance.
6. Helps in preparation of Financial Statements (final accounts).

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; Controlling: Basic control process- Fayol's principles of Management - Taylor's principles of scientific management- Maslow's Motivational theory.

UNIT II: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:
Definition, Nature and Scope of OB, Personality-determinants of Personality – Perception- Attitudes- Attribution theory- Johari Window and Transactional Analysis, Stress Management- factors and remedies

UNIT III: STRATEGIC MANAGEMENT:
Introduction to Strategic Management, Vision, Mission, Goals, Objectives, Environmental Scanning- PESTEL, SWOT Analysis, Competitive Advantage, Concept of Core Competence, PORTER's five force model, types of strategies, Strategic formulation and Implementation.

UNIT IV: FUNDAMENTALS OF FINANCIAL ACCOUNTING:
Definition of Accounting, Accounting Concepts and conventions, principles of Double-Entry system, Book Keeping, Overview of books of original records Journal, Ledger and Subsidiary books

UNIT V: TRIAL BALANCE AND DEPRECIATION OF FIXED ASSETS: Significance of Trial balance, Preparation of trial balance Definition of Depreciation, Depreciation of fixed assets, Methods of Depreciation – Straight line method and Diminishing Balance method

UNIT VI: CLASSIFICATION OF REVENUE AND CAPITAL EXPENSES, AND PREPARATION OF FINAL ACCOUNTS:

Revenue expenditure, Capital expenditure, Preparation of Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments

REFERENCES:

1. A R Aryasri: Management Science, Tata Mc Graw Hill
2. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi
3. A R Aryasri: Managerial Economics and Financial Analysis, Tata Mc Graw Hill

1	2	3	4	5	6	7	8	9	10	11	12
								H	M		L

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering
COMPREHENSIVE VIVA VOCE-I

Code: 7A472

L	T	P/D	C
-	-	-	1

Course Objective:
Evaluate, comprehend and assess of the concepts and the knowledge gained in the core courses of the first and the second year.

Course Outcomes :
At the end of this course, the student will be able to

1. Comprehend the concepts in the core and elective courses.
2. Exhibit technical knowledge to face interviews.
3. Exhibit lifelong Learning skills for higher education and to pursue Professional practice.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external evaluation.

Internal:
Comprehensive Viva Voce is Conducted twice in a semester and evaluated for 15 marks each.

End examination : 70 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.

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

II year B.Tech – II Sem

Code: 7A475 CONTROL SYSTEMS AND SIMULATION LAB

L	T	P	C
		2	1

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

1. An ability to explore the applications of control systems.
2. An ability to explore the concepts of control systems.

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.

1	2	3	4	5	6	7	8	9	10	11	12
M	H	M	M					M		M	

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering
Analog Circuits Lab

Code: 7C473

L	T	P/D	C
-	-	2	1

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

Course Objectives: To prepare students to practice the design and analysis of any Analog electronics circuit.

Course Outcomes:
At the end of the laboratory course, the students will be able to

1. To understand the design and working of various linear and non-linear wave shaping circuits.
2. To demonstrate the working principle of various multivibrators.
3. To verify the functionalities of various logic gates.
4. To perform and verify the BJT/ FET and feedback amplifiers.
5. To perform and verify the working of oscillators and voltage regulators.
6. To perform laboratory experiment to verify the conversion efficiency of various power amplifiers.

Syllabus Content:

Part-A: Hardware based experiments

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers, Clampers.
3. UJT Relaxation Oscillator
4. Astable and monostable Multivibrator.
5. Bistable Multivibrator.
6. Study of Logic Gates with discrete components.

Part-B: Software Simulation based experiments (Multisim OR Pspice OR Tina Pro Or Equivalent Simulation Software)

1. Common Emitter and Common Source amplifier
2. Voltage shunt and Feedback Amplifier
3. Cascade Amplifier (CE+CE, CE+CC)
4. RC Phase Shift Oscillator using Transistors
5. Class- A and Class-B Complementary Symmetry Power Amplifier
6. Series and Shunt Voltage Regulator.

	1	2	3	4	5	6	7	8	9	10	11	12
									H	M		M

H: High M: Medium L: Low

II Year II Semester
Electrical and Electronics Engineering
TECHNICAL SEMINAR - IV

L	T	P/D	C
-	-	2	1

Code: 7A494

Course objective

Develop an ability to understand and present the latest technological developments in computer science. Identify one of them, understand its impact on the event/method/society as a whole and present the seminar on the same which enhances oratory and interview facing skills.

COURSE OUTCOMES:

1Deliver lecture on emerging technologies.
2 Explain domain knowledge to resolve real time technical issues
3 Demonstrate ability to lead and explain concepts and innovative ideas.
4 Demonstrate team leading qualities.
5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.
6 Exchange new information that would not have been available otherwise.
7 Develop debating and interview skills.

Procedure

1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of marks

There shall be a Technical Paper writing and seminar evaluated for 100 marks in First Year First Semester. The evaluation is purely internal and will be conducted as follows:

Literature survey, topic and Content	: 10 marks
Presentation including PPT	: 15 marks
Seminar Notes	: 10 marks
Interaction	: 5 marks
Report	: 10 marks
Attendance in the seminar class	: 10 marks
Punctuality in giving seminar as per schedule time and date	: 10 marks
Mid semester viva (on the seminar topics completed up to the end of 9th week	: 10 marks
End semester Viva	: 20 marks
Total	100 marks

B.Tech. (EEE) III Year – I Sem

CODE: 7C508 **IC APPLICATIONS**

L	T	P	C
3	--	--	3

Course Objectives

- 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

1. Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
2. Design the basic circuits using Operational Amplifiers.
3. Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
4. Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters, and IC regulators.
5. Classify and characterize the TTL/ECL Logic Families.
6. Explore the design of various logic gates using CMOS logic.

Mapping of Course Outcomes with Program Outcomes

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3		2	3					2			
CO2	3	3	3	3	3				3	3		3
CO3	3	3	3		2				3	3		3
CO4	3	2	3	3	3				2	3		3
CO5	3	2			3							2
CO6	2		3	3	3				2	3		3

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, IC REGULATORS

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, A/D Converters: Introduction, Characteristic Parameters, Counter Type, Dual Slope, Successive Approximation and Flash types A/D Converters, IC REGULATORS: Three terminal voltage regulators 7805, 7809, 7912, IC 723.

UNIT – V: LOGIC FAMILIES

Classification of IC Logic Families, Multi emitter transistor logic, Standard TTL NAND & NOR Gate-Analysis & TTL Open Collector Outputs, Tristate TTL. Unsaturated logic- ECL logic family, ECL Inverter/Buffer, ECL NOR/OR logic, Electrical characteristics of logic gates.

UNIT – VI: MOS& CMOS LOGIC FAMILY

NMOS & PMOS logic- Logic gates implementation, Passive pull up & active pull up .CMOS logic family-Design of logic gates and Boolean functions. CMOS Open Drain and Tristate Outputs. Comparison of Various

Logic Families. IC interfacing, TTL driving CMOS & CMOS driving TTL.
Applications: Design of 4x1 MUX using CMOS

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.

B.Tech. EEE III year – I Sem

Code: 7A508 **ELECTRICAL MACHINES - III**

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
x	x			x				x			

Corse Objective:

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:

After completion of this course the students are able to

1) Explain the constructional details and generation of EMF.
2) Ex plain the causes for harmonics and its suppression and also armature reaction.
3) Evaluate the performance of alternator by different methods.
4) Explain how to operate the alternators in parallel for load sharing and how to control the reactive power.
5) Analyze and explain applications of synchronous motor.
6) Explain the various applications of single phase induction motor and special purpose motors.

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 Xq (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, 7th Edition.
2. Electrical Machines - P.S. Bimbra, Khanna Publishers.

REFERENCES:

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, 5th edition.
3. Theory of Alternating Current Machinery - Langsdorf, Tata Mc Graw-Hill, 2nd edition.
4. Electromachanics - III (Synchronous and single phase machines) -S. Kamakashiah, Right Publishers.

III year B.Tech – I Sem

Code: 7A509 **POWER ELECTRONICS**

L	T	P	C
3	1		4

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**						**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:

After completion of this course the students are able to

1) Understand the construction and operation of various power semiconductor devices and analyze about the series and parallel operation of SCRs.
2) Analyze the operation of different configurations of single phase converters for different loads.
3) Analyze the operation of different configurations of three phase converters for different loads.
4) Explain the operation of different type's choppers.
5) Explain the operation of inverter and applications of inverters.
6) Explain the working of an AC voltage controller and Cyclo-Converters for different configurations.

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, Two transistor analogy, Turn on and turn off methods, Dynamic characteristics of SCR, Turn on and Turn off mechanism., SCR, UJT firing circuit, Series and parallel connections of SCR's, Snubber circuit details, Specifications and Ratings of SCR's, BJT, IGBT.

UNIT – II SINGLE 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,

UNIT – III THREE PHASE CONTROLLED CONVERTERS:

Three phase half controlled and fully controlled bridge converters with R and RL loads, Effect of Source inductance, Waveforms, Numerical Problems.

UNIT – IV 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, Jones chopper and waveforms, Problems, Buck, Boost, Buck-Boost choppers.(Qualitative treatment).

UNIT – V INVERTERS:

Inverters, Single phase inverter, Half and Full bridge VSI & CSI inverters, Waveforms, Voltage control techniques for inverters, Three phase inverters with 120degrees and 180 degrees mode of conduction, Pulse width modulation techniques (Multiple Pulse and Sinusoidal), Numerical problems.

UNIT –VI 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

TEXT BOOKS:

1. Power Electronics - P.S.Bimbhra, Khanna Publishers.
2. Power Electronics Circuits, Devices and Applications - M. H. Rashid, Prentice Hall of India, 2nd edition.

REFERENCES:

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. Power Electronics - M. D. Singh & K. B. Kanchandhani, Tata Mc Graw Hill Publishing Company.

III YEAR B.TECH – I SEM

CODE: 7A510 **POWER SYSTEMS-II**

L	T	P	C
3	1		4

1	2	3	4	5	6	7	8	9	10	11	12
x		**x**	**x**					**x**			

Course Outcomes:

1) Understand the importance of power factor and analyze the different methods of power factor and voltage control.
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) Learn about per unit system and symmetrical fault analysis.
5) Learn about symmetrical components, sequence impedances and unsymmetrical fault analysis.
6) Analyze different types of distribution systems.

UNIT – I 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, and Main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS): Advantages of Gas insulated substations, Single line diagram of gas insulated substations, 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 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.

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.

UNSYMMETRICAL FAULT ANALYSIS:

LG, LL, LLG faults with and without fault impedance, 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.

REFERENCES:

1. Electrical Power Systems - C.L. Wadhawa New Age International (P) Limited, Publishers.
2. Electrical Power Generation, Transmission and Distribution - S.N. Singh., PHI.

1	2	3	4	5	6	7	8	9	10	11	12
				x		**x**				**x**	

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

III Year B.Tech EEE - I Sem

CODE: 7EC01 **DATA STRUCTURES**

(OPEN ELECTIVE-I)

Course Objective:

1. Understand the concepts of Abstract data Type, linear data structures such as stacks, queues and lists and their applications.
2. Comprehend different non linear data structures such as trees and graphs and analyze their time complexities.
3. Understand object oriented programming and advanced C++ concepts and be able to write programs with C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, Templates etc.

Course Outcomes:

1 Explain Abstract data type, stack and Queues with their applications
2 Write programs on Singly linked lists, Doubly linked lists, Circular list and explain their operations.
3 Explain concepts of Trees, AVL Trees and Graphs with examples and applications.
4 Describe and solve problems of searching and sorting and evaluate the time complexity of each algorithm.
5 Explain concepts of OOPs and implement programs using objects, classes, constructors and destructors.
6 Explain and apply concepts of oops, write programs implementing functions, operator overloading and inheritance.

UNIT I

Introduction to data structures: Abstract data type (ADT), Stacks, Queues and Circular queues and their implementation with arrays.
Applications of Stack: infix to post fix conversion, postfix expression evaluation.
Applications of Queues.

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.

UNIT III

Trees- Binary trees, terminology, representation, traversals. AVL trees, AVL tree operations: Insertion, deletion and searching. Graphs- terminology, representation, graph traversals (DFS and BFS).

UNIT IV

Searching - Linear and binary search methods. **Sorting** - Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort. **Heaps** - Introduction, Min Heap, Max Heap, Operations on Heaps, Heap Sort; Performance analysis of Searching and Sorting Algorithms

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, copy constructor. Destructor.

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.

TEXT BOOKS:

1. Data Structures and C++ by Reema Thareja
2. Data Structure through C by Yashavant Kanetkar.
3. The complete reference C++ By Herb Schildt.

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
4. Data Structures, A pseudocode Approach with C by Richard F. Gilberg and Behrouz A. Forouzan.

1	2	3	4	5	6	7	8	9	10	11	12
				x		**x**				**x**	

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

III Year B.Tech EEE - I Sem

CODE: 7ZC22 **BASICS OF ENTREPRENEURSHIP**

(OPEN ELECTIVE-I)

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

Course Outcomes:

1. The students' will acquire basic knowledge on Skills of Entrepreneurship.
2. The students' will understand the techniques of selecting the customers through the process of customer segmentation.
3. Business Models and their validity are understood by the students'.
4. The basic cost structure and the pricing policies are understood by the students'.
5. The students' will acquire knowledge about the project management and its techniques.
6. The students' get exposure on marketing strategies for the Start up.

Unit – I: Introduction to Entrepreneurship: - Define Entrepreneurship, Entrepreneurship as a Career option, Benefits and Myths of Entrepreneurship, Success Rate of Entrepreneurs related to Experience and Family Backup, Characteristics, Qualities and Skills of Entrepreneurship, Entrepreneurial Propensity, Life as an Entrepreneur, Impact of Entrepreneurship on Economy and Society.

Unit – II: Opportunity & Customer Analysis: - Identify your Entrepreneurial Style, Identify Business Opportunities, Methods of finding and understanding Customer Problems, Process of Design Thinking, Identify Potential Problems, Customer Segmentation and Targeting, Customer Adoption Process, craft your Values Proportions, Customer-driven Innovation.

Unit – III: Business Model & Validation: - Types of Business Models, Lean approach, the Problem-Solution Test, Solution Interview Method, difference between Start-up Venture and Small Business, Industry Analysis, Identify Minimum Viable Product (MVP), Build-Measure-Lean Feedback loop, Product-market fit test.

Unit – IV: Economics & Financial Analysis: - Revenue sources of Companies, Income Analysis, and Costs Analysis - Product Cost and Operations Cost, basics of Unit Costing, Break Even Analysis Profit Analysis, Customer Value Analysis, different Pricing Strategies, advantages and disadvantage of various Sources of Finance, Investors Expectations, Return on Investment , Practice pitching to Investors and Corporate.

Unit – V: Team Building & Project Management: - Leadership Styles, Shared Leadership Model, Team Building in Venture, Role of good team in venture, Roles and Respondents, Explore collaboration tools and techniques- Brainstorming, Mind mapping. Importance of Project Management, Time Management, Workflow, Network Analysis Techniques – Critical Path Method, Project Evaluation Review Technique and Gantt chart.

Unit – VI: Marketing & Business Regulations: - Positioning, Positioning Strategies, building Digital presence and leveraging Social Media, Measuring effectiveness of Channels, Customer Decision-making Process, Sales Plans and Targets, Unique Sales Proposition (USP), Follow-up and close Sales. Business regulations of starting and operating a Business, Start-up Ecosystem, Government schemes.

REFERENCES:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
2. Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
3. Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
4. Madhurima Lall, Shikha Sahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
5. S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.

6. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
7. 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.

1	2	3	4	5	6	7	8	9	10	11	12
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L	**T**	**P/D**	**C**
3	**0**	**0**	**3**

III Year B.Tech EEE - I Sem

CODE: 7ZC05 BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT

(OPEN ELECTIVE-I)

Course Objective: To make the students understand the concepts and principles of Indian Banking Business, Insurance Business and Capital market business products and services, which facilitate them to understand the nature of market

Course Outcomes:

1. Describe the new dimensions and products served by the banking system in INDIA.
2. Explain the credit control system and create awareness on NPA's
3. Apply the knowledge of Insurance concepts in real life scenarios
4. Recognize the importance of regulatory and legal frame work of IRDA
5. Identify the risk management process and methods.
6. Calculate the diversity of risk and return

UNIT I: INTRODUCTION TO BANKING BUSINESS:

Introduction to financial services - History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank. KYC norms, New Dimensions and products- E-Banking: Mobile-Banking, Net Banking, Digital Banking, Negotiable Instruments: Cheque system.

UNIT II: BANKING SYSTEMS AND ITS REGULATION:

Banking Systems: Branch Banking, Unit Banking, Correspondent Banking, Group Banking, Deposit Banking, Mixed Banking and Investment Banking - Banking Sector Reforms with special reference to Prudential Norms, Capital Adequacy Norms, Classification of Assets and NPA's, Functions of RBI, Role of RBI in regulating Indian Banking. Banking Ombudsman scheme.

UNIT III: INTRODUCTION TO INSURANCE:

Introduction to insurance, Need and importance of insurance, principles of insurance, characteristics of insurance contract, branches of insurance and types of insurance: Life insurance and its products, General Insurance and its variants.

UNIT IV: INSURANCE BUSINESS ENVIRONMENT:

Procedure for issuing an insurance policy –Nomination - Surrender Value - Policy Loans – Assignment - Revivals and Claim Settlement; Insurance as a tax mitigation tool, Role of IRDA in Insurance Regulation.

UNIT V: FINANCIAL MARKETS AND RISK MANAGEMENT:

Introduction to Financial Markets: Money Market – Capital market; Introduction to Risk Management, meaning and classification of risks, Risk management process, Risk Management Approaches and Techniques.

UNIT VI: DERIVATIVES AS A RISK MANAGEMENT TOOL:

Introduction to Financial Derivatives, Advantages of Derivatives - types of Derivative Contracts - Forwards, Futures, Options and Swaps - Differences among Forwards, Futures and Option Contracts.

References:

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General Principles of Insurance Harding and Evantly
3. Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
4. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
5. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
6. G. Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008.

1	2	3	4	5	6	7	8	9	10	11	12
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L	T	P/D	C
3	0	0	3

III Year B.Tech EEE - I Sem

CODE: 7ZC25 **BASICS OF INDIAN ECONOMY**

(Common to all Branches)

(OPEN ELECTIVE-I)

Course objectives: To provide basic knowledge relating to the Indian Economy thus making the students aware of the current aspects taking place in the Indian and world economy.

Course Outcomes:

1. Gain knowledge relating to Economics, various sectors and its growth
2. Will gain knowledge relating to various concepts of National income and related aggregates
3. Students will learn about Indian Industrial policy and benefits of LPG to India
4. Comprehend knowledge relating to Fiscal policy & Taxation system in India
5. Learn about inflation & business cycles.
6. Know about the BoP and its influence on economy.

UNIT 1: INTRODUCTION TO ECONOMICS:

Definition, Economics and economy, back ground of economy, sectors of the economy, types of economy, growth of economy, primary moving force of Economic growth in India, mixed economy.

UNIT 2: NATIONAL INCOME AND RELATED AGGREGATES

Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross and Net Domestic Product (GDP and NDP) - at market price, at factor cost; National Disposable Income (gross and net), Private Income, Personal Income and Personal Disposable Income; Real and Nominal GDP.

UNIT 3: INDUSTRIAL POLICY & LIBERALIZATION OF ECONOMY

Industrial policy in India, its objectives, Review of Industrial policies up to 1986, Industrial policy 1991 - causes of its implementation, benefits of Liberalization, privatization & Globalization to the Indian economy.

UNIT 4: FISCAL POLICY & TAXATION SYSTEM

Fiscal policy- Definition, objectives, importance, setbacks, recent fiscal policy of India, Reforms to strengthen the fiscal policy in India. Taxation system in India, methods of taxation, a good tax system, VAT, GST, Reforms in taxation.

UNIT 5: INFLATION & BUSINESS CYCLES:

Inflation – Definition, types, effects of inflation on various segments of the population and sectors of the economy, measures to control inflation, Business cycles: Introduction, Depression, Recovery, Boom, and Recession.

UNIT 6: BALANCE OF PAYMENTS

Balance of payments account - meaning and components; balance of payments deficit-meaning. Foreign exchange rate - meaning of fixed and flexible rates and managed floating. Determination of exchange rate in a free market

REFERENCES:

1. Indian Economy, Datt & Mahajan, 70th Edition, Sultan Chand publishers.
2. Indian Economy, Misra & Puri, 33rd Edition, Himalaya publishing house.
3. Latest Budget document by Ministry of Finance
4. Latest Economic survey
5. 12th Five year plan
6. News articles in The Hindu, The Business Line

III year B.Tech – I Sem

Code: 7H518 **QUANTITATIVE APTITUDE**

L	T	P	C
1	1	0	2

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**								

Course Objective :

Learn and practice problems on numbers systems, ratios, mensuration and relations to Excel in and competitive examinations.

Course Outcomes: After completing this course, students should able to

1. Solve problems related to number systems
2. Find averages of numbers and groups
3. Solve problems related to ratio and proportion
4. Find simple interest, solve time work and distance problems
5. Solve menstruation problems
6. Interpret the various kinds of data and find the relation between them.

UNIT I

Number System: Test for Divisibility, Test of prime number, Division and Remainder – HCF and LCM of Numbers - Fractions.

UNIT II

Average: Average of different groups, Replacement of some of the items - Percentage - Profit and Loss.

UNIT III

Ratio and Proportion: Properties of Ratio, Comparison of Ratios, Useful Simple Results on Proportion – Partnership and Share – Mixtures.

UNIT IV

Simple Interest: Effect of change of P, R and T on Simple Interest - Compound Interest: Conversion Period, Difference between Compound Interest and Simple Interest – Time and Work – Time and Distance.

UNIT V

Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.

UNIT VI

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

TEXT BOOKS:

1. Quantitative Aptitude by R.S. Agarwal
2. Quantitative Aptitude by Abhijit Guha

III year B.Tech – I Sem
IC APPLICATIONS LAB

Code: 7CC76

L	T	P	C
0	0	4	2

Prerequisites: EDC, ECA, STLD.

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

- An ability to explore the applications of IC 741 OP-AMP.
- An ability to design Active filters and its applications
- An ability to understand and implement generate square and Triangular waveforms using 555 Timers
- An ability to design D to A converters and its applications

Mapping of Course Outcomes with Program Outcomes

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	2	3	3				2	3		3
CO2	3	2		2	3				3	3		3
CO3	3		3		2					3		3
CO4	3	2	3		3				2	3		
CO5	3	2	3		3							
CO6	2		3	3	3				2	3		3

Syllabus Content

(IC Application Lab)

Design and testing of

1. OP AMP Modes(-ve feed back) – Inverting ,Non inverting, Differential amp, Unity gain.
2. OP AMP Applications – Adders, Subtractor.
3. OP AMP Applications – Comparator Circuits.
4. OP AMP Applications – clipper Circuits.
5. Square wave generator using OP AMP
6. Triangular wave generator using OP AMP
7. Active Filter Applications – LPF, HPF (first order)
8. Oscillators-RC phase shift , wein bridge.
9. IC 555 Timer – Monostable
10. IC 555 Timer -Astable .
11. 4 bit DAC using OP AMP.
12. IC 723 voltage regulator

III year B.Tech – I Sem

Code: 7A578 POWER ELECTRONICS AND SIMULATION LAB

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**			**x**		**x**		**x**	

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

1. Understand the concepts studied in theory subject.
2. Understand the applications of the concepts.

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 – Math-works, USA.

III year B.Tech – I Sem

Code: 7A577 **ELECTRICAL MACHINES LAB – II**

L	**T**	**P**	**C**
		2	**1**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**		**x**			**x**	**x**	

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

1. Understand the concepts studied in theory subject.
2. Understand the applications of the concepts.

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 Xd and Xq 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 – I Sem

Code: 7586 **SUMMER INDUSTRY INTERNSHIP – I**

1	2	3	4	5	6	7	8	9	10	11	12
								X	**X**		

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes: At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- 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.
- Inculcate an enthusiasm to use the creative ideas to build the innovative projects and prototypes which are meeting the current needs of the market and society as a whole.
- Improve their communicative skills and team skills largely improve.
- Work as an individual and in a team.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer third year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship project. Project shall consist of design, fabrication, software development or building of prototype. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

Day to day work (internal guide 10M external guide : 5M)	:	15 marks
Report	:	05 marks
Demonstration / presentation (internal presentation is evaluated by HOD, senior faculty and internal guide)	:	10 marks
		30 marks
End examination	:	70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. 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 internal guide.

L	T	P/D	C
0	0	2	1

1	2	3	4	5	6	7	8	9	10	11	12
								X	**X**		

III Year B.Tech – I Sem

Code: 7A595 **TECHNICAL SEMINAR-V**

COURSE OUTCOMES:

1 Deliver lecture on emerging technologies.

2 Explain domain knowledge to resolve real time technical issues

3 Demonstrate ability to lead and explain concepts and innovative ideas.

4 Demonstrate team leading qualities.

5 Demonstrate public speaking and lifelong learning skills for higher studies and to pursue professional practice.

6 Exchange new information that would not have been available otherwise.

7. Develop debating and interview skills.

Procedure:

1. Seminar in-charges shall highlight the significance of Technical Seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar In-charge shall take signatures from students.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot / week.
5. Progress of the seminars needs to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for Technical Seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

Distribution of Marks

Day to day progress of the work	15 marks
Final report and viva	15 marks
Level of content	20 marks
Presentation	20 marks
Discussion & Involvement	20 marks
Attendance	10 marks
Total	100 Marks

III year B.Tech – II Sem

Code: 7DC05 **MICROPROCESSOR AND MICROCONTROLLERS**

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**	**x**				**x**			

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

1. *The microprocessor and microcontroller architecture, instructions set and procedures of programming.*
2. *Understand the assembly language programs, pin diagram and timing diagrams for 8086 & 8051.*
3. *Understand and practice the interfacing related applications of 8255 with 8086 and serial communication.*
4. *Learn the usage of multiple interrupts of 8051, USART architecture, RS232.*

Course Outcomes: *After completing this course, Students will be able to*

1. *Understanding the concepts of 8086 Architecture*
2. *Understanding the concepts of Instruction set & developing skills in writing assembly language programs.*
3. *Ability to interface keyboard, stepper motor ADC, DAC to 8086 using 8255*
4. *Understanding the concepts of 8051 Architecture*
5. *Exploring the concepts of instruction set of 8051*
6. *Ability to interface LED, LCD, Keyboard DAC, ADC with 8051*

UNIT – I: ARCHITECTURE OF 8086 MICROPROCESSOR:

Memory segmentation, BIU and EU. General purpose registers. 8086 flag register and function of 8086 Flags. Pin diagram of 8086-Minimum mode and maximum mode of operation. Timing Diagram.

UNIT – II: INSTRUCTION SET OF 8086:

Addressing modes of 8086. Assembler directives. Simple programs, procedures, and macros. Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation. Introduction to DOS and BIOS interrupts.

Applications: Design of an 8-bit Calculator

UNIT – III: INTERFACING WITH 8086:

Interfacing with RAMs, ROMs along with the explanation of timing diagrams. 8255 PPI – various modes of operation. Interfacing with key boards, ADCs, and DACs Stepper Motor .Interrupt structure of 8086. Vector interrupt table. Interrupt service routines. 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance.

Applications: Interfacing of a Temperature sensor with 8086

UNIT – IV: THE 8051 ARCHITECTURE:

Architecture of 8051 Micro controller, Memory Organization. Special Function Registers. Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts.

UNIT – V: INSTRUCTION SET OF 8051:

Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic, Jump and Call Instructions, Simple programs.

Programs based on Timer Interrupts, External Hardware Interrupts, Serial communication interrupts Timers and counters..

UNIT – VI: APPLICATIONS OF 8051:

Interfacing with keyboards, LEDs, 7 segment LEDs, LCDs, Interfacing with ADCs. Interfacing with DACs, Concept of Multiple Interrupts.

TEXT BOOKS:

1. Advanced microprocessor & Peripherals - A.K.Ray & K.M.Bhurchandi, TMH, 2000.
2. Microprocessors and interfacing – Douglas V. Hall, TMH, 2nd Edition, 1999.
3. 8051 Microcontroller–Kenneth J. Ayala, Penram International/ Thomson, 3rd Edition, 2005.
4. The 8051 Microcontroller And Embedded Systems Using Assembly And C – Mazidi, Pearson Education India, 2nd edition, 2008.

REFERENCES:

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

III year B.Tech – II Sem

Code: 7A611 **SWITCH GEAR AND PROTECTION**

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
x		**x**	**x**					**x**			

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

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. Electrical Power Systems – C.L.Wadhwa, New Age international (P) Limited, Publishers, 3rd edition.
2. Protection and Switchgear- Bhavesh Bhalja, R. P. Maheshwari, N.G. Chothani, Oxford University Press, 1st edition.
3. Power System Protection and Switchgear – Badri Ram, D.N Viswakarma, TMH Publications.

REFERENCES:

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. Switchgear and Protection – Sunil S Rao, Khanna Publlishers
4. A Text book on Power System Engineering – B.L.Soni, Gupta, Bhatnagar, Chakrabarthy, Dhanpat Rai & Co.

III year B.Tech – II Sem

Code: 7A612 **MEASUREMENTS & INSTRUMENTATION**

L	T	P	C
3	-	-	3

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**			**x**

Course Objective:

The basic principles of all measuring instruments and in measurement of electrical and non-electrical parameters viz., Resistance, Inductance, Capacitance, voltage, current Power factor, Power, Energy, Strain, Temperature, Torque, Displacement etc. and the different types of electrical and non electrical transducers. It introduces the different signal analyzers and oscilloscopes.

Course Outcomes: The student should be able to

1. Understand the principle of operation of different types of instruments viz., PMMC, moving iron type of instruments, the required characteristics of an instrument in general. The student demonstrates the ability to compensate for the errors in the instruments and to extend the range of the instruments.
2. Demonstrates the knowledge of Potential and Current transformers; the errors in them and the effect of having an open/short in the secondary circuits; Understand the principle of operation of Dynamometer and Moving-iron type of Power factor meters.
3. Comprehends the principle of operation of dynamometer type of Wattmeter and Induction type of Energy meter; use the wattmeter to measure the Active and Reactive power and demonstrates the ability to extend the range of them.
4. Identify and use different techniques of measurement of Resistance, Inductance and Capacitance values.
5. Understand the principle of operation of Different type of digital voltmeters, wave analyzers, spectrum analyzers and Cathode ray Oscilloscope.
6. Demonstrates the ability in characterizing the different types of transducers and uses them to measure Strain, Gauge Sensitivity, Displacement, Velocity, Acceleration, Force, Torque and Temperature.

UNIT-I MEASURING INSTRUMENTS- INSTRUMENT TRANSFORMERS:

Significance of Measurement, static characteristic of system- Linearity, Sensitivity, Precision, Accuracy - 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.

UNIT –II: INSTRUMENT TRANSFORMERS

Introduction, advantages, burden of instrument transformer, Current Transformer - errors in current transformer, Effect of secondary open circuit, Potential transformer- errors in potential transformer, Testing of current transformers with silsbee's method.

Power Factor Meters: Type of P.F. Meters, Dynamometer and Moving iron type, 1- ph and 3-ph meters.

UNIT –III 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 - IV 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-V DIGITAL VOLTMETERS- SIGNAL ANALYZERS- CRO:

Digital voltmeters, Successive approximation, Ramp, Dual slope integration continuous balance type, 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 . CRO- Cathode Ray Tube (CRT), Screens, Probes, Applications of CRO, Measurement of frequency and phase using CRO, Block diagram.

UNIT-VI MEASUREMENT OF NON-ELECTRICAL QUANTITIES:

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, Guage 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, 5th Edition, Wheeler Publishing.
2. Transducers and Instrumentation– D.V.S Murthy, Prentice Hall of India, 2nd Edition.
3. A course in Electrical and Electronic Measurements and Instrumentation -A.K. Sawhney, Dhanpatrai & Co. 18th Edition.

REFERENCES:

1. Measurements Systems, Applications and Design – D O Doeblin- 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, 3rd Edition.
4. Modern Electronic Instrumentation and Measurement techniques – A.D Helfrick and W.D.Cooper, Pearson/Prentice Hall of India.

III Year B.Tech – II Sem

Elements of Fluid Mechanics and Hydraulic Machinery

Code: 7BC56

L	T	P/D	C
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Course Objectives:

To understand the basic principles of fluid mechanics and types of flows. To understand boundary layer concepts and flow through pipes. Evaluate the performance of hydraulic turbines and characteristic curves of pumps.

Course Outcomes:

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

1. Understand the fluid properties and measurement of pressure with monometers.
2. Understand the classification of fluid, Bernoulli's equation, momentum equation and their applications
3. understand Reynolds's experiment, major losses, minor losses
4. Understand velocity triangle, work done calculations, elements of hydroelectric power plant, and pump storage plant.
5. Understand the classifications of turbines working principles of turbines, draft tube theory, performance of turbine.
6. Understand various types of pumps working principle of reciprocating pump, centrifugal pump, performance characteristics of centrifugal pump.

	1	2	3	4	5	6	7	8	9	10	11	12
CO1		**H**	**L**						**M**			**L**
CO2		**H**	**L**						**M**			**L**
CO3		**H**	**L**						**M**			**L**
CO4		**H**	**L**						**M**			**L**
CO5		**H**	**L**						**M**			**L**
CO6		**H**	**L**						**M**			**L**

UNIT I: FLUID STATICS:

Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers. *Applications: Foundation of basic concepts and pressure measurement devices.*

UNIT II: FLUID KINEMATICS:

Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow and three dimensional flow.

Fluid dynamics: Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

Applications: The fluid dynamics concepts are employed in analyzing fluid flow problems and design of hydraulic devices.

UNIT III

Exact flow solutions in channels and ducts, Couette and Poisuielle flow, laminar flow through circular conduits and circular annuli- concept of boundary layer – measures of boundary layer thickness – Darcy Weisbach equation, friction factor,

Applications: Analysis of fluid flow through pipes and design of hydraulic pipe.

UNIT IV

Need for dimensional analysis–methods of dimension analysis–Similitude–types of similitude Dimensionless parameters–application of dimensionless parameters–Model analysis.

UNIT V

Euler's equation – theory of Rotodynamic machines – various efficiencies – velocity components at entry and exit of the rotor, velocity triangles – Centrifugal pumps, working principle, work done by the impeller, performance curves – Cavitation in pumps- Reciprocating pump–working principle.

Applications: Lifting of water in steam power plant, irrigation, and other power plants.

UNIT VI

Classification of water turbines, heads and efficiencies, velocity triangles- Axial, radial and mixed flow turbines Pelton wheel, Francis turbine and Kaplan turbines, working principles – draft tube- Specific speed, unit quantities, performance curves for turbines – governing of turbines.

Applications: Turbines used in hydro-power plants under different head conditions.

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.

REFERENCES:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4..Hydraulic Machines Including Fluidics PB by Jagdish Lal Metropolitan Book Co. Pvt. Ltd. , 1994.

1	2	3	4	5	6	7	8	9	10	11	12

L	T	P/D	C
3	0	0	3

III Year II semester

CODE: 7FC03 **PYTHON PROGRAMMING**

(Common to all Branches)

(OPEN ELECTIVE-II)

Course Objectives:-

After taking this course, you should be able to:

Use Python interactively, execute a Python script at the shell prompt, use Python types, expressions, and None, use string literals and string type, use Python statements (if...elif..else, for, pass, continue, . . .), understand the difference between expressions and statements, understand assignment semantics, write and call a simple function., utilize high-level data types such as lists and dictionaries, understand the difference between mutable and immutable types, write a simple class and access methods and attributes, import and utilize a module, read from and write to a text file.

Course Outcomes:

CO1: Gains exposure towards Python versions and their specifications.
CO2: Build programs using primitive data types.
CO3: Write applications that include functions, modules, packages along with respective exceptional handling mechanism.
CO4: Writes applications using OO features of Python
CO5: Write applications using Files.
CO6: Hands on exposure on NumPy/Tkinter/Plotpy modules.

UNIT -I: INTRODUCTION TO PYTHON:

History, Features, Modes of Execution, Setting up path, working with Python Basic Syntax, Variable and Data Types, Operators. Conditional Statements (If, If- else, Nested if-else) Looping (for, While Nested loops) Control Statements (Break, Continue, Pass).

Input-Output: Printing on screen, Reading data from keyboard, Opening and closing file

UNIT-II: FUNCTIONS:

Defining a function, calling a function, Types of functions, Function Arguments, Anonymous functions, Global and local variables

String Manipulation: Accessing Strings, Basic Operations, String slices, Function and Methods

Lists: Accessing list, Operations, Working with lists Function and Methods

Tuple: Accessing tuples, Operations, Working.

Dictionaries: Accessing values in dictionaries, working with dictionaries, Properties Functions and Methods.

UNIT-III: MODULES:

Importing module, Math module, Random module, Packages

Exception Handling: Exception, Exception Handling, except clause, Try? Finally clause User Defined Exceptions

Unit-IV: Python- OOPs concept:

Class and object, Attributes, Inheritance, Overloading Overriding, Data hiding.

Regular expressions: Match function, Search function, Matching VS Searching, Modifiers Patterns.

Unit -V:

Introduction to Files, File Handling, Working with File Structure, Directories, Handling Directories

Unit -VI:

Case Study with NumPy/PlotPy/SciPy/GUI Programming, Introduction, Tkinter programming, Tkinter widgets

TEXT BOOK:

1. [Apress]-Beginning Python. From Novice to Professional, 2nd ed. - [Hetland] (2008)

REFERENCE BOOKS:

1. Introduction to Computation and Programming using Python, Revised and Expanded Edition, John V. Guttag, The MIT Press.
2. Programming Python, Fourth Edition by Mark Lutz, O'Relly
3. Python Programming using problem solving approach, Reema Thareja, Oxford Higher Education.

1	2	3	4	5	6	7	8	9	10	11	12
				x						**x**	

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

B. Tech. IV Year I semester

CODE: **7ZC23** **ADVANCED ENTREPRENEURSHIP**

(Common to all Branches)

(OPEN ELECTIVE – III)

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 prospects as an Entrepreneur.

Course Outcomes:

1. The Students' gain knowledge on the stages of Startup and the turbulence environment it undergoes and the stages related to growth of the Startup.
2. The Students are exposed to the various business models and critically evaluating the effectiveness of the business models.
3. The students understand the method of business traction and the need of customer relationship management.
4. The students understand the various channels of revenue building and exploration of new revenue avenues.
5. The students understand the need of sales planning and sales management and also financial modeling
6. The students are exposed to the legal implications affecting the company's prospects and the issues related to intellectual property rights.

UNIT – I ORIENTATION TO GROWTH:

Stages of a Startup Company, Infant Mortality of Startup's, Sustaining the Phase of Launching, Entrepreneurial Propensity, Locus of Control, First Generation Entrepreneur, Growth Opportunities, Diversification and Expansion of Business, Growth Assessment, SWOT Analysis, Growth strategies adopted by ideal startup, Ansoff Growth Matrix, Six ways of Adjacencies for Growth. Case Study of Nike

UNIT - II - EXPANDING CUSTOMER BASE:

Customer Segmentation: Division of Market into Segments, Evaluating the profitability of Segments. Developing Business Model in relation to the current customers. Changing customer segments and revisit of business models. Evaluation of Business Models for new customer segments. Critical evaluation of business models Old Vs New. Risk of changing the Business Models. Analyzing the scalability of business model using Break Even Analysis.

UNIT- III - TRACTION OF BUSINESS:

Meaning of Business Traction, Business Traction Process, and Metrics to Measure Business Traction, Customer Retention, Customer Churning, Relationship Business, Customer Life Time Value, Identifying the unnecessary moves in business traction. Traction of Business using Bull's-eye framework. Measuring the effectiveness of selected channels. Budgeting and Planning.

UNIT- IV - GROWING REVENUES:

Identifying Growing Revenues, stabilizing growing revenues, Developing additional revenues (licensing and franchising). Exploring New channels and Partnerships for growth revenues. Evaluating the Growth streams based on longevity. Lean Startup Canvas.

UNIT V - SALES PLANNING & FINANCIAL MODELING:

Understanding the consumer buying decision behavior, setting sales plans, sales targets, Art of pitching the sales, Selling process, Building a professional sales team , Sales Management. Price Sensitivity of the market. Optimization of cost and operational expenses. Financial modeling of the Venture, Assessment of competitors and Peer's financial models.

UNIT –VI - SUPPORT SYSTEM:

Legal Management in Startups: Issues and Legal constraints effecting the business. Need for professional services: Legal consultancy and Accounting. Need for proper documentation for fool-proof administration of business. Intellectual Property rights and their importance. Business Mentoring, role of experts in managing business.

REFERENCES:

1. Entrepreneurship Rajeev Roy "" oxford ,2012
2. Entrepreneurship Development Khanka, ,S.Chand 2012
3. Small Scale industries and Entrepreneurship Vasanth Desai "Himalya publishing 2012
4. Robert Hisrich et al "enterpreneruship TMH 2012
5. Entrepreneurship Development Khanka, ,S.Chand 2012
6. Entrepreneurship Development B.Janikairam and M Rizwana

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								x	**x**	**x**	**x**

L	**T**	**P/D**	**C**
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III Year II semester

CODE: 7ZC19 ENTREPRENEURSHIP, PROJECT MANAGEMENT AND STRUCTURED FINANCE (OPEN ELECTIVE-II)

Course Objective: The objective of the course is to make students understand the nature of Entrepreneurship, its importance and to create an awareness regarding the systematic planning and implementation of projects; highlight the components of structured finance and establish a framework of CMBS with respect to Servicing Agreements

Course Outcomes:

1. Students will understand the nature of Entrepreneurship and its importance
2. Will gain knowledge regarding project, its life cycle and organization
3. Will gain knowledge relating to project formulation and implementation
4. Comprehend the components of structured finance
5. Establish a framework of CMBS
6. Students will gain knowledge relating to the CRE Servicing

UNIT I: CONCEPTS OF ENTREPRENEURSHIP:

Definition of Entrepreneurship, Evolution of Entrepreneurship, Classification of Entrepreneurs**,** Characteristics of Entrepreneur**,** Selection of Product and the means required for starting an enterprise, Financing and Financial incentives available, Success rate of entrepreneurs – a case study.

UNIT-II: BASICS OF 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 III: PROJECT FORMULATION AND IMPLEMENTATION:

Generation of Project Ideas; Monitoring the environment; Preliminary Screening of Projects; Feasibility study; Project Selection. Detailed Project Report: Market, Technical, Financial and Economic aspects. Pre-requisites for Successful Project Implementation; Control of in-progress Projects (Gantt chart, PERT, CPM); Project Risk Management Process, Post-audit; Abandonment Analysis

UNIT-IV: INTRODUCTION TO STRUCTURED FINANCE:

Term Loans, Bonds/Debentures, Types of debentures, Issue of debt instruments. Structured Finance: Evolution, Securitization process, characteristics, and structured finance products (ABS, CDO, MBS, CDS)

UNIT-V: COMMERCIAL MORTAGAGE LOAN BASICS:

Definition and characteristics of CMBS, CMBS Vs other Mortgage Backed Securities, CMBS three level perspective: property level, loan level, bond level; Life cycle of commercial real estate loans – Loan cycle, Key players in loan cycle; Property types and characteristics, property performance.

UNIT- VI: BASICS OF CRE SERVICING:

Introduction to servicing, Role of the Servicer, Servicing approaches, Influence of technology, Ethics in commercial servicing, Servicing – sources of income, Overview of servicing agreements, Pooling & Servicing agreement, Sub servicing agreement.

REFERENCES:

1. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
2. Jeffrey K. Pinto "Project Management", 2nd edition, Pearson
3. Dhandapani Alagiri "Structured Finance – Concepts & Perspectives", ICFAI University press.
4. Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
5. Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
6. The Complete Real Estate Documents by Mazyar M. Hedayat, John J. Oleary
7. The Fundamentals of Listing and Selling Commercial Real Estate - By Keim K. Loren (Author)

1	2	3	4	5	6	7	8	9	10	11	12
					x		**x**				

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

III Year II semester

CODE: 7ZC26 **BASICS OF POLITY AND ECOLOGY**

(Common to all Branches)

(OPEN ELECTIVE-II)

Course Objectives:

To provide basic knowledge relating to the Ecology and Disaster Management, thus making the students appreciate the current aspects related to both Ecology and Disaster Management.

Course outcomes:

CO_1: Comprehend knowledge relating to the conservation of the environment.

CO_2: Learn about bio-diversity and climatic changes occurring in the environment.

CO_3: Know about the international treaties, conventions and organizations active in the field of environmental protection.

CO_4: To provide students an exposure to disasters, their significance and types.

CO_5: To enhance awareness of institutional processes in the country

CO_6: To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)

UNIT I: ECOLOGY AND ENVIRONMENT:

Environment-Origin, Evolution of Environment and its uses by Humans; Degradation of Natural Environment, Principles of Ecology; Composition and various types of Ecosystem; International Solar Alliance.

UNIT II: BIO-DIVERSITY AND CLIMATE CHANGE:

Classification of Biodiversity, Biodiversity loss, Methods of biodiversity conservation, Conservation of Natural Resources such as Soil, Land, Water and Energy. Sustainable Development and Cleaner Technology. Green house effect and Global Warming, Strategies to cope with Green House Effect, Desertification, Depletion of ozone layer.

UNIT III: INTERNATIONAL TREATIES, CONVENTIONS & ORGANIZATIONS:

Indian Board for Wildlife (IBW). United Nations Environmental Programme (UNEP), United Nations Framework Convention for Climate Change (UNFCCC). International Union for conservation of Nature and National Resources (IUCN), World Wide Fund for Nature (WWF). Montreal Protocol (1987), Kyoto Protocol (1997), Paris Agreement (2016).

Unit IV: 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 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: 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.

ESSENTIAL READINGS:

- Environment and Ecology – Anil Kumar De and Arnab Kumar De, 2009, New Age International (P) Ltd.
- B. K. Khanna: "Disasters: All you wanted to know about", New India Publishing Agency, New Delhi
- Amita sinvhal ,"Understanding earthquake disasters"TMH,2010

SUGGESTED READINGS:

- ICSE Environment Education for Class X – Dr. M.P. Mishra , 2009, S.Chand and Company
- Pradeep sanhi,Madhavi malalgoda and arya bandhu,"Diasaster risk reduction in south asia "PHI

III year B.Tech – II Sem

Code: 7HC74 **SOFT SKILLS AND TECHNICAL COMMUNICATION**

L – T –P/D - C
0 0 2 1

1	2	3	4	5	6	7	8	9	10	11	12
							X	X	X		X

To enable students to

- **make a self-assessment**
- **enhance their soft skills and behavioral patterns**
- **equip themselves with the required skill set for their career advancement**
- **develop interpersonal communication skills**
- **participate in group tasks and use effective language skills in interviews**
- **overcome stress and enhance employability quotient**

Unit 1: Know Yourself – SWOT / SWOC Analysis

1. **Introduction: Importance of knowing yourself**
2. **Meaning of SWOT / SWOC**
3. **SWOT / SWOC analysis**
4. **Benefits of SWOT / SWOC analysis**
5. **SWOT / SWOC grid**

Emotional Intelligence

1. Nature and significance of Emotional Intelligence

2. Five basic competencies of Emotional Intelligence according to Goleman:

a. Self-awareness b. Self regulation c. Motivation d. Empathy e. Social skills.

3. Strategies to enhance Emotional Intelligence

Unit 2:Soft Skills-I

1. Introduction to Soft skills
2. Definition of Soft Skills. Difference between Soft Skills and Hard Skills
3. Importance of Soft Skills
4. **Positive Attitude:** Meaning; Difference between Attitude and Behavior
5. Attitude Building
6. Need for developing Positive Attitude

Goal Setting

1.The purpose of Goal setting
2.Types of Goals
3. How to set SMART goals

Time Management

1.Need and Importance of Time Management
2. Scheduling and Prioritizing tasks
3. Identifying major time wasters

Unit 3:Soft Skills-II

Team work and Team Dynamics

1. Introduction
2. Team Vs Group
3. Stages of team building
4. Characteristics of an effective team, role of a team leader

Problem Solving

1.Definition
2. Skill sets in Problem solving
3. Steps in solving problems

Decision Making

1. Decision making: Definition, Importance of Decision Making.
2. Decision Making process

Unit 4: Technical Communication

1. Definition and importance of Technical Communication
2. Types of Technical Communication
3. Report writing: Significance, types, steps, layout and Mechanism
4. Review of technical articles.

Unit 5: Etiquette and Stress Management

1. **Etiquette: Introduction and classification**
2. Work place etiquette
3. Strategies to handle Stress

Unit 6:Résumé Writing andInterview Skills

Résumé: Introduction

1.Types of Résumé
2.Difference among Bio-data, Curriculum Vitaé and Résumé
3.Resume writing: Purpose and Design
4. Tips to write a winning Resume.
5. Cover letter

Interview Skills

1. Meaning and purpose of an Interview
2. Types of interviews (Face to Face / Panel Interviews/Telephonic interviews etc.)
3. Interview Preparation techniques
4. Common mistakes
5. Dress code at an interview
6. FAQs in HR Interview
7. Mock Interviews

Lecture Schedule

Unit No	**Title of the Unit**	**Sub-Topics**	No. of classes
Unit -I	**Know yourself SWOT / SWOC Analysis**	1. **Introduction: Importance of knowing yourself** 2. **Meaning of SWOT / SWOC** 3. **SWOT / SWOC analysis** 4. **Benefits of SWOT / SWOC analysis** 5. **SWOT / SWOC grid**	**6**
		Emotional intelligence **1. Nature and significance of Emotional Intelligence** **2. Five basic competencies of emotional intelligence according to Goleman:** **a. Self-awareness b. Self regulation c. Motivation** **d. Empathy, Social skills.** **3. Strategies to enhance emotional intelligence**	
Unit- II	**Soft Skills-I**	1. **Introduction**: 2. Definition of Soft Skills. Difference between Soft Skills and Hard Skills 3. Importance of Soft Skills 4. **Positive Attitude:** Meaning; Difference between Attitude and Behavior 5. Attitude Building 6. Need for Developing Positive Attitude	**12**
		Goal Setting 1.The purpose of goal setting	

		2.Types of Goals 3. How to set SMART goals	
		Time Management 1. Need and Importance of Time Management 2. Scheduling and Prioritizing tasks 3. Identifying major time wasters	
Unit- III	**Soft Skills-II**	**Team work and Team Dynamics-** 1.Introduction 2. Stages of team building 3. Team Vs Group 4.Characteristics of an effective team: Role of a team leader	**10**
		Problem Solving, 1.Definition 2.Steps in solving problems 3. Skill sets in Problem Solving	
		Decision Making 1. Decision making: Definition, Importance of Decision Making. 2. Decision Making process	
Unit IV	**Technical Communication**	1. Definition and importance of Technical Communication 2. Types of Technical Communication 3. Report writing: Significance, types, steps, layout and Mechanism 4. Review of technical articles.	**6**
Unit V	**Etiquette and Stress Management**	Etiquette and Stress Management 1. Etiquette : Introduction and classification 2. Work place etiquette 3. Strategies to handle Stress	**4**
Unit-VI	**Résumé Writing andInterview Skills**	**Résumé: Introduction** 1. Types of Résumé 2.Difference among Bio-data, Curriculum Vitaé and Résumé 3.Resume Writing: Purpose and Design 4. Tips to write a winning Resume 5. Cover letter	**10**
		Interview Skills 1. Meaning and purpose of an Interview 2. Types of interviews (Face to Face / Panel Interviews/ telephonic etc.) 3. Interview preparation techniques 4. Common mistakes 5. Dress code at an interview **6.** FAQs in HR Interview **7.** Mock Interviews	

Suggested reading:

1. SOFT SKILLS – *Dr. K. Alex, S.Chand publications*
2. SOFT SKILLS – *Meenakshi Raman*
3. Technical communication- *Meenakshi Raman and Sangeetha Sharma (Oxford Publications)*
4. Advanced Technical communication - *Kavita Tyagi and Padma Mistri*
5. Developing Speaking-Listening Skills in English (With CD)
6. Basic Communication Skills For Technology- *Andrea J Rutherfoord- Pearson*
7. Developing Communication Skills- *Krishna Mohan- Macmillan*
8. Written Communication Skills- *Michael Hatton-iste*

III year B.Tech – II Sem

Code: 7H619 **LOGICAL REASONING**

L	T	P	C
1	1	0	2

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**						**x**			

Course Objectives

Understand and solve arithmetic, analogy, coding, puzzles and ranking related problems for enhancing employability.

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

1. Generate number and alphabet series
2. Apply concept of analogy and solve related problems
3. Classify and figure out odd one
4. Realize the various techniques for coding and decoding
5. Solve the relations puzzles.
6. Solve the problem related to number, ranking and arithmetic reasoning

UNIT – I

Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.
Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.

UNIT – II

Classification / Odd One Out: Word Classification, Number Classification, Letter Classification.
Coding – Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding.

UNIT – III

Blood Relations, Deciphering Jumbled up Descriptions, Relation Puzzle – Direction sense test.
Number, Ranking & Time Sequence Test – Arithmetical Reasoning – Mathematical Operations.

UNIT – IV

Directions, Arithmetical Reasoning.
Puzzle Test: Classification Type Questions, Seating Arrangements Comparison Type Questions, Sequential Order of Things, Selection Based on given conditions, Family – Based Puzzles, Jumbled Problems.

UNIT – V

Assertions and Reason– Logical Venn Diagrams – Alpha Numeric Sequence Puzzle.
Cubes and Dice – Analytical Reasoning .Logical Deduction: Logic, Statement – Arguments,

UNIT – VI

Clocks & Calendar, Data Sufficiency and Syllogism.

TEXT BOOK:

1. Verbal and Non Verbal Reasoning by R.S. Agarwal

III year B.Tech – II Sem

Code: 7A681 **ELECTRICAL WORKSHOP**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**		**x**				**x**			

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

III year B.Tech – II Sem

Code: 7DC71 **MICROPROCESSORS AND MICROCONTROLLERS LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**					**x**	

Course Objectives:

a. *Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.*
b. *The student can also understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.*
c. *Student able to do any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.*

Course Outcomes:

- *Analyze and apply working of 8086.*
- *Compare the various interface techniques. Analyze and apply the working of 8255, 8279,8259, 8251, 8257 ICs and design and develop the programs.*
- *Learning the Communication Standards.*

Cycle - I

Introduction to MASM/TASM, KIEL IDE, Familiarization with 8086, 8051 Kits

8086 ALP using kit and MASM

1. Basic arithmetic and logical operations
2. Code conversion decimal arithmetic programs
3. String manipulation programs
4. Display a message on the screen of a computer using DOS / BIOS interrupts.

Cycle – II

Following peripherals and interfacing experiments to be implemented on 8086 and 8051 kits

1. A/D and D/A interfacing
2. Serial interfacing with PC
3. Keyboard and display interfacing
4. Stepper motor controller
5. Traffic light controller
6. Real Time clock interface with 8051 using 1^2C

III Year B.Tech – II Sem
FM AND HM LAB

Code: 7BC82

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

Course Objectives:
To understand the basic principles of fluid mechanics and types of flows. To understand boundary layer concepts and flow through pipes. Evaluate the performance of hydraulic turbines and characteristic curves of pumps.

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

1. compute the performance of pelton wheel under working conditions
2. compute the performance of francis turbine under working conditions
3. compute performance of reciprocating pump under working conditions
4. compute the Performance of centrifugal pump under working conditions
5. compute the Performance of multistage pump under working conditions
6. compute the coefficient of discharge of venturimeter of orifice meter under working conditions

	1	2	3	4	5	6	7	8	9	10	11	12
CO1		**H**	**L**						**M**			**L**
CO2		**H**	**L**						**M**			**L**
CO3		**H**	**L**						**M**			**L**
CO4		**H**	**L**						**M**			**L**
CO5		**H**	**L**						**M**			**L**
CO6		**H**	**L**						**M**			**L**

List of Experiments:

1. Verification of Bernoulli's Theorem
2. Calibration of Orifice meter
3. Determination of friction factor for a given pipe line
4. Determination of minor losses in a pipeline.
5. Determination of Co-efficient of discharge for mouth piece (Cd)
6. Determination of Co-efficient of discharge for Notches(Cd)
7. Performance Test on Multi Stage Centrifugal Pump.
8. Performance Test on Reciprocating Pump.
9. Performance Test on Pelton Wheel.
10. Performance Test on Francis Turbine.
11. Performance Test on Kaplan Turbine

B. Tech. III Year II semester

Code: 7A674 **GROUP PROJECT**

L	T	P/D	C
-	-	4	2

1	2	3	4	5	6	7	8	9	10	11	12
x											

Course Objectives:

To acquire basic knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes:

At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- 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.
- 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.
- Improve their communicative skills and team skills largely improve.
- 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 faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external

The **internal evaluation** shall consist of:

Day to day work	:	15 marks
Report	:	05 marks
Demonstration / presentation	:	10 marks
		---
		30 marks
End examination	:	70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. 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.

B. Tech. III Year II semester

Code: 7A676 **COMPREHENSIVE VIVA- VOCE- II**

L	T	P/D	C
-	-	-	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**							**x**			

Course Objectives:

Prepare students in basics and advanced relevant courses to revise and face technical interviews for enhancing employability**.**

Course Outcomes:

At the end of this course, the student will be able to

1. Assess the relevant courses they have undergone till the completion of that academic year.
2. Comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

Comprehensive Viva Voce will be conducted in third year second semester for 100 marks. Out of 100 marks 30 marks are evaluated internally and 70 marks for external evaluation.

Internal:

Comprehensive Viva Voce is conducted twice in a semester and evaluated for 30 marks each and average will be considered for internal.

Internal Examination : 30 Marks

End examination : 70 Marks.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The end examination will be carried out by a committee consisting of an external examiner, head of the department, and subject experts.

IV year B.Tech – I Sem

Code: 7A714 **POWER SYSTEM ANALYSIS AND CONTROL**

L	T	P	C
3	1	-	4

1	2	3	4	5	6	7	8	9	10	11	12
	x	x	x			x		x		x	

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 – II 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 – III 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 –IV 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 Busses, Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods, Comparison of Different Methods, DC load Flow.

UNIT –V POWER SYSTEM STATE STABILITY ANALYSIS:

Concepts of Steady State, Dynamic and Transient Stabilities, Steady State Stability Power Limit, 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-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, 6th Edition.
2. Modern Power System Analysis –I.J. Nagrath & D.P. Kothari, Tata Mc Graw Hill Publishing Company Ltd, 2nd edition.
3. Power System Analysis- T.K. Nagasarkar, M.S. Sukhija, Oxford University Press, 2nd edition.

REFERENCES:

1. Power System Analysis and Design – J. Duncan Glover and M.S. Sarma., THOMPSON, 3rd Edition.
2. Electric Energy systems Theory – O.I. Elgerd, Tata Mc Graw Hill Publishing Company Ltd., 2nd edition.
3. Power System Analysis – Grainger and Stevenson, Tata McGraw Hill.
4. Power System Analysis – Hadi Saadat, Tata Mc Graw Hill Publishing, 2nd Edition.

IV Year, B. Tech – I - Sem.

CODE: 7CC03 **SIGNALS AND SYSTEMS**

(PROFESSIONAL ELECTIVE-I)

L	T	P	C
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
X	**X**	**X**		**X**							

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 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, 2nd Edn.

REFERENCES:

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

IV Year – I Sem. B.Tech

Code: 7A725 **ADVANCED CONTROL SYSTEMS**

(PROFESSIONAL ELECTIVE-I)

1	2	3	4	5	6	7	8	9	10	11	12
X	**X**		**X**								

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with state space, describing function, phase plane and stability analysis including controllability and observability. It also deals with modern control and optimal control systems.

Course outcomes:

Students will be able to

1. Understand the controllability and observability.
2. Understand the phase plane analysis.
3. Understand the stability analysis.
4. Know about Effect of state feedback on controllability and observability.
5. Understand the minimization of functional of single function
6. Study about formulation of optimal control problem

UNIT – I STATE SPACE ANALYSIS

State Space Representation, Solution of State Equation, State Transition Matrix, Canonical Forms – Controllable Canonical Form, Observable Canonical Form, Jordan Canonical Form.

CONTROLLABILITY AND OBSERVABILITY

Tests for controllability and observability for continuous time systems – Time varying case, minimum energy control, time invariant case, Principle of Duality, Controllability and observability form Jordan canonical form and other canonical forms.

UNIT – II DESCRIBING FUNCTION ANALYSIS

Introduction to nonlinear systems, Types of nonlinearities, describing functions, describing function analysis of nonlinear control systems.

PHASE-PLANE ANALYSIS

Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

UNIT-III STABILITY ANALYSIS

Stability in the sense of Lyapunovs, Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT – IV MODAL CONTROL

Effect of state feedback on controllability and observability, Design of State Feedback Control through Pole placement. Full order observer and reduced order observer.

UNIT-V CALCULUS OF VARIATIONS

Minimization of functional of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation.

UNIT-VI OPTIMAL CONTROL

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

TEXT BOOKS:

1. Modern Control System Theory – by M. Gopal, New Age International Publishers, 2nd edition,1996.

REFERENCES:

1. Modern Control Engineering – by K. Ogata, Prentice Hall of India, 3rd edition, 1998
2. Control Systems Engineering by I.J. Nagarath and M.Gopal, New Age International (P) Ltd.
3. Digital Control and State Variable Methods – by M. Gopal, Tata Mc Graw-Hill Companies, 1997.
4. Systems and Control by Stainslaw H. Zak , Oxford Press, 2003.

1	2	3	4	5	6	7	8	9	10	11	12
x			**x**								

IV Year B.Tech – I Sem

CODE: 7A716 **UTILIZATION OF ELECTRICAL ENERGY**

(PROFESSIONAL ELECTIVE – I)

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

The student will able to:

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.
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. 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.
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, 9th edition.
2. Utilization of Electric Energy - E.Open Shaw Taylor Orient Longman, 2nd edition.
3. Art & Science of Utilization of electrical Energy - Partab, Dhanpat Rai & Sons, 2nd edition.

REFERENCES:

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

IV year B.Tech – I Sem

CODE: 7A734 **HVDC & FACTS**

(PROFESSIONAL ELECTIVE-I)

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
	x	x	x					x		x	

Objectives:

Understand operating principles of HVDC systems and control aspects.

- Deals with analysis of harmonics, filters, reactive power and power flow
- Understand concepts and control aspects of FACTS devices.

Course Outcomes: The student will be able to

1. Acquire the knowledge to compare AC and HVDC systems in terms of power transmission and stability.
2. Acquire knowledge on analysis of harmonics, filters, reactive power and power flow in HVDC systems.
3. Acquire knowledge in improving the transmission capability and stability of the power system by applying FACTS controllers.

UNIT – I: INTRODUCTION:

Comparison of AC and DC transmission systems, application of DC transmission, types of DC links, typical layout of a HVDC converter station. HVDC converters, pulse number, analysis of Graetz circuits with and without overlap, converter bridge characteristics.

UNIT – II: CONVERTER & HVDC SYSTEM CONTROL:

Principles o DC Link Control – Converters Control Characteristics – system control hierarchy, firing angle control current and extinction angle control starting and stopping of DC link.

UNIT-III: HARMONICS, FILTERS AND REACTIVE POWER CONTROL:

Introduction, generation of harmonics, AC and DC filters. Reactive Power Requirements in steady state, sources of reactive power, Power Flow Analysis in AC/DC Systems: Modeling of DC/AC converters, Controller Equations – Solutions of AC/DC load flow – Simultaneous method-Sequential method,

UNIT-IV: Introduction to FACTS:

Flow of power in AC parallel paths and meshed systems, basic types of FACTS controllers, brief description and definitions of FACTS controllers.

UNIT –V: STATIC SHUNT COMPENSATORS:

Objectives of shunt compensation, methods of controllable VAR generation, static VAR compensators, SVC and STATCOM, comparison between SVC and STATCOM.

UNIT –VI: STATIC SERIES COMPENSATORS:

GCSC, TSSC, TCSE & SSSC, Objectives of series compensator, Variable impedance type series compensators, Basic operating control schemes, Power angle characteristics, Control range and VA rating, External control.

Combined Compensators: Introduction, unified power flow controller (UPFC), basic operating principle, independent real and reactive power flow controller, control structure.

TEXT BOOKS:

1. HVDC Transmission – S Kamakshaiah, V. Kamaraju, Tata Mc. Graw Hill Publications, 1st Edition, 2011.

2. Understanding FACTS – Concepts and Technology of Flexible AC Transmission Systems" Narain G. Hingorani, Laszlo Gyugyi, Wiley India publications, 2011.

3. HVDC Transmission – J. Arrillaga, IEE, 2nd Edition, 1998.

4. Direct Current Transmission -. E.W. Kimbark, Volume 1, John Wiley & Sons, 1971.

IV year B.Tech – I Sem

Code: 7A715 **RENEWABLE ENERGY SOURCES**

(Professional Elective – II)

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**							**x**	

Course Objectives:

Becomes familiar with solar energy, its radiation, Collection, storage and application and also gets introduced to other forms of Renewable Energy sources viz., the Wind energy, Biomass energy, geothermal energy and ocean energy.

Course Outcomes:

The student should be able to

1. Understand the role and potential of new and renewable energy sources realize the potential of solar energy, its impact on environment; define and understand the terms describing the different angles that one may incur in setting up a solar panel and be able to use the instruments for measuring solar radiation.

2. Demonstrates the knowledge of different techniques of solar collection and storage.

3. The student becomes familiar with the different types of horizontal and vertical axis wind mills and understands the performance characteristics of the same. The student also demonstrates the knowledge of different Bio-gas digesters and factors influencing its yield.

4. Aware of the potential of geothermal energy in India and will be able to characterize different types of geothermal wells.

5. Aware of the different methods of kinetic energy extraction from Ocean waves and tides and thermal energy extraction from Oceans.

6. Demonstrates the knowledge of Direct Energy Conversion in different phenomena viz., Joule Thomson effect, Seebeck effect, Peltier effect etc. and the principle of operation of Fuel Cells.

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.

REFERENCES:

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

L	T	P/D	C
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IV Year B.Tech – I Sem

CODE: 7CC11 **DIGITAL SIGNAL PROCESSING**
(PROFESSIONAL ELECTIVE-II)

After studying this course, the students will be able to

1. Distinguish between CT and DT signals and systems and understand the growing need of DSP and study the concepts of discrete time signals and systems.
2. Represent periodic DT signals as a Fourier series; non-periodic DT signals as a Fourier Transform and use a powerful mathematical tool called DFT.
3. Compute the Fourier Transform of DT signals using the FFT algorithms.
4. Realize a digital filter in several forms and structures for a given transfer function H (z).
5. Distinguish IIR and FIR filters; Design each type by several methods once the desired specifications are given.
6. Understand the need and implement the multirate sampling techniques.

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.

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 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 Multirate signal processing. Introduction to DSP Processors

TEXT BOOKS:

1. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006
2. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.

IV Year B.Tech – I Sem.

Code: 7A724 **DIGITAL CONTROL SYSTEMS**

(Professional Elective – II)

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**		**x**	

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with different mathematical methods of optimization.

Course outcomes:

Students will be able to

1. Understand the Sampling And Reconstruction.
2. Understand the Z – Transforms.
3. Understand the State Space Analysis.
4. Know about Stability Analysis.
5. Understand the Design Of Discrete Time Control System By Conventional Methods.
6. Study about State Feedback Controllers And Observers.

UNIT – I SAMPLING AND RECONSTRUCTION

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT-II THE Z – TRANSFORMS

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms.

Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM

Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT – III STATE SPACE ANALYSIS

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and its Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

CONTROLLABILITY AND OBSERVABILITY

Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function

UNIT – IV STABILITY ANALYSIS

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT– V DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS

Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – VI STATE FEEDBACK CONTROLLERS AND OBSERVERS

Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition

REFERENCES:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control and State Variable Methods by M.Gopal, TMH.

IV Year B.Tech – I Sem.

Code: 7A737 **ADVANCED POWER ELECTRONICS**

(Professional Elective – II)

L	T	P	C
3	-	-	3

1	2	3	4	5	6	7	8	9	10	11	12
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UNIT – I - MODERN POWER SEMICONDUCTOR DEVICES:

Modern power semiconductor devices- MOS turn off Thyristor (MTO)-Emitter Turn off Thyristor (ETO) – Integrated Gate- Commutated Thyristor (IGCT) – MOS – controlled Thyristors (MCTs) – Static Induction Circuit – comparison of their features.

UNIT – II - PHASE CONTROLLED RECTIFIERS:

Principle of phase controlled converter operation, single phase full converters, dual converters, three phase full and semi converters, reactive power, power factor improvements – extinction angle control, symmetrical angle control and PWM control.

UNIT – III - DC-DC CONVERTERS:

Study of class – A, B, C, and D choppers, non – isolated DC-DC converters, buck boost, buck-boost converters under continuous and discontinuous conduction operation.

UNIT – IV – ISOLATED DC-DC CONVERTERS:

Isolated DC-DC converters forward, fly-back, push-pull, half-bridge and full –bridge converters Relationship between I / P and O/P voltages. Expression for filter inductor and capacitors.

UNIT – V - INVERTERS:

Single phase and three – phase inverters, 120^0 and 180^0 modes of operation, PWM techniques: single, multiple and sinusoidal PWM techniques, selective harmonic elimination, space vector modulation, current source inverter, multi- Current source inverter, techniques for reduction of harmonics.

UNIT –VI – MULTILEVEL INVERTERS:

Diode clamped multi level inverters, capacitors clamped multilevel inverters, cascaded H bridge inverter, SPWM, SVPWM and other modulation techniques, applications of multilevel inverters, techniques for reduction for harmonics.

TEXT BOOKS:

1. Power Electronics – Circuits, Devices & Applications: M.H.Rashid, PHI
2. Power Electronics: Converters, Applications: Ned Mohan, T.M. Undeland, William P.Robbins, John Wiley & Sons.

REFERENCES:

1. Switch Mode Power Supply Handbook: Keith H.Billing, MC Graw Hill International Edition 1996.
2. Switching Power supply Design: Abrahan L.Pressman, Mc.Graw Hill International Second Edition, 1996.

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IV Year B.Tech – I Sem

Code: 7A729 **POWER SYSTEM DEREGULATION**

(PROFESSIONAL ELECTIVE-III)

UNIT – I: OVERVIEW OF KEY ISSUES IN ELECTRIC UTILITIES:
Introduction –Restructuring models –Independent system operator (ISO) –Power Exchange -Market operations –Market Power –Standard cost –Transmission Pricing –congestion Pricing –Management of Inter zonal/Intra zonal Congestion.

UNIT- II: OASIS: OPEN ACCESSES SAME-TIME INFORMATION SYSTEM:
Structure of OASIS -Posluing of Information –Transfer capability on OASIS –Definitions Transfer Capability Issues –ATC –TTC –TRM –CBM calculations –Methodologies to calculate ATC

UNIT – III: ELECTRICITY PRICING:
Introduction –electricity Price Volatility Electricity Price Indexes –challenges to Electricity Pricing – Construction of Forward Price Curves –Short-time Price Forecasting.

UNIT – IV: POWER SYSTEM OPERATION IN A COMPETITIVE ENVIRONMENT:
Introduction –Operational Planning Activities of ISO-The ISO in Pool Markets –The ISO in Bilateral Markets – Operational Planning Activities of a Genco

UNIT – V: ANCILLARY SERVICES MANAGEMENT:
Introduction –Reactive Power as an Ancillary Service –a review –Synchronous Generators as Ancillary Service Providers.

UNIT – VI: RELIABILITY AND DEREGULATION:
Reliability Analysis, The network Model, Reliability Costs, Hierarchical Levels, Reliability and Deregulation, Performance Indicators

TEXT BOOKS:

1. Kankar Bhattacharya, Math H.J. Boller, JaapE.Daalder, Operation of Restructured Power System, Klum, er Academic Publisher –2001.
2. AshikurBhuiya: Power System Deregulation: Loss Sharing in Bilateral Contracts and Generator Profit Maximization, Publisher VDM Verlag, 2008.
3. Mohammad Shahidehpour, and Muwaffaqalomoush, Restructured Electrical Power systems, Marcel Dekker, Inc. 2001.
4. Loi Lei Lai; ―Power system Restructuring and Deregulation, Jhon Wiley & Sons Ltd., England.

IV year B.Tech – I Sem

Code: 7A713 **POWER SEMI CONDUCTOR DRIVES**

(PROFESSIONAL ELECTIVE – III)

L	T	P	C
3	-		3

1	2	3	4	5	6	7	8	9	10	11	12
	x	x	x								

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.
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, speed control of Induction motor with V/ F control and its speed torque Characteristics
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.

REFERENCES:

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, 2nd Edition.

IV year B.Tech – I Sem

CODE: 7A739 **OPTIMAL CONTROL SYSTEMS**

(PROFESSIONAL ELECTIVE-III)

L	**T**	**P**	**C**
3	**-**		**3**

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**	**x**					**x**		**x**	

UNIT I:

An overview of optimization problem - concepts and terms related to optimization - constrained and unconstrained problems and their solutions using different techniques.

UNIT II

Convex set and convex function - convex optimization problem - quadratic optimization problem - Karush - Kuhn - Tucker (KKT) necessary and sufficient conditions for quadratic programming problem.

UNIT III

Interior point method for convex optimization - linear programming - primal and dual problems and basic concept of multi - objective optimization problem. Concept of functional, different types of performance indices, Euler - Lagrange equation.

UNIT IV

Calculus of variation to optimal control problem - Fundamental concepts, functionals of a single function, functional involving several independent functions, necessary conditions for optimal control, linear regulator problems. Linear quadractic regulator, remarks on weighting matrices, solution of Riccati equation.

UNIT V & VI

Frequency domain interpretation of linear quadratic regulator, robustness studies. Dynamic programming, Pontrygin's minimum principle, time optimal control, concept of system and signal norms, statement of problem and its solution.

TEXT BOOKS:

1. Jasbir S. Arora, Introduction to optimum design, Elesevier, 2005.
2. A Ravindran, K.M. Ragsdell, and G.V. Reklaitis, Engineering optimization : Methods and applications, Wiley India Edition.
3. Donald E.Kirk, Optimal Control Theory an Introduction, Prentice - Hall Network series – First edition, 1970.

REFERENCE BOOKS:

1. D.S. Naidu, Optimal control systems, CRC Press, First edition, 2002.
2. Arturo Locatelli, Optimal control: An Introduction, Birkhauser Verlag, 2001.
3. S.H.Zak, Systems and Control, Indian Edition, Oxford University, 2003.
4. Niclas Anreasson, Anton Evgrafov and Michael Patriksson, An introduction to continuous optimization, Overseas Press (India) Pvt. Ltd.

IV year B.Tech – I Sem

CODE: 7CC34 **COMMUNICATION THEORY**

(PROFESSIONAL ELECTIVE-III)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

UNIT I: AMPLITUDE MODULATION

Introduction to Analog Communications, Need for Modulation, Amplitude Modulation-Time Domain, Generation of AM Waves: Square Law Modulator, Detection of AM Waves: Envelope Detector, Double sideband suppressed carrier and single sideband modulation, Time domain representation of DSB-SC and SSB-SC signals, . Comparison of AM techniques, Commercial Applications of AM.

UNIT-II: ANGLE MODULATION

Types of Angle Modulation, Frequency modulation-Narrowband FM and wideband FM, Time domain representation of FM and PM, Relationship between FM and PM signals, Generation of FM signals- direct (parametric variation method) and indirect (Armstrong method) methods, Detection of FM signals , Comparison of FM & AM, Commercial Applications of FM,PM.

UNIT-III: TRANSMITTERS AND RECIEVERS

Radio Transmitters, Classification of Transmitters, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter.

Radio Receiver-types-Tuned Radio Frequency receivers and super-heterodyne receivers, RF section and characteristics, Intermediate frequency, Image frequency and its rejection ratio, receiver characteristics-Automatic gain control, Commercial AM & FM band specifications

UNIT-IV: ELEMENTS OF DIGITAL COMMUNICATION SYSTEMS

Model of Digital Communication Systems, Advantages of digital communication systems, Digital Representation of Analog signal, Sampling Theorem.

PULSE CODE MODULATION:

Analog Pulse Modulation: PAM generation and demodulation, PWM, PPM, Comparison of analog pulse modulations, PCM Generation and Reconstruction, Quantization Noise, Non uniform Quantization, DPCM, DM, TDM

UNIT-V: DIGITAL MODULATION TECHNIQUES

Introduction, Amplitude Shift Keying, ASK Modulator, Non-coherent and Coherent ASK Detector, Frequency Shift Keying, FSK Modulator, Non-coherent and Coherent FSK Detector, Phase Shift Keying, BPSK, Coherent PSK Detection, DPSK, Comparison of Digital modulation systems. Introduction to Multiple access techniques

UNIT-VI: SOURCE CODIG AND CHANNEL CODING

Introduction, Advantages, Shannon's theorem for Channel capacity, Huffman coding, Shannon-Fano coding, Error detection and correction capabilities of Linear Block Codes, Decoding, Convolution Codes: Encoding using state, tree and trellis, Decoding using viterbi diagrams.

TEXT BOOKS:

1. B. P. Lathi, *Modern Analog and Digital Communication*, 3rd Ed., Oxford University Press
2. K. Sam Shanmugham, *Digital and Analog Communication Systems*, John Wiley & Sons
3. Simon Haykin, *Digital communications* -, John Wiley, 2005
4. H. Taub and D. Schilling, *Principles of Communication Systems* –, TMH, 2003
5. A. Bruce Carlson, & Paul B. Crilly, "*Communication Systems – An Introduction to Signals & Noise in Electrical Communication"*,McGraw-Hill International Edition, 5th Edition, 2010.

REFERENCES:

1. John Proakis, *Digital Communications* –, TMH, 1983.
2. Singh & Sapre, Communication *Systems Analog & Digital* –, TMH, 2004.
3. Sklar: *Digital Communication*, 2nd Ed., Pearson Education
4. "Digital Communications", J.S Chitode, Technical publication, Pune

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x	**x**		**x**								

B. Tech. IV Year I semester

Code: 7FC23 **Data Base Systems**

(Open Elective – III)

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

Course Outcomes:

1. Students will learn basics of databases and understand the architecture of database management systems.
2. Students will learn about good database design techniques and database theories behind.
3. Understand conceptual database designs, and functional dependencies and normalization.
4. Students will understand the Mathematical foundation for relational databases.
5. Student will be able to understand concept of Constraints, Views and will be able to create dynamic databases.
6. 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 Le

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L	**T**	**P/D**	**C**
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III Year II semester

CODE: 7ZC24 **INNOVATION & DESIGN THINKING**

(Common to all Branches)

(OPEN ELECTIVE-III)

Course Objective: The objective of the course is to make students understand the nature of Innovation, creativity and IPRs, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcomes:

1. The students gain the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
2. The students will get exposure on creative methods of ideation and the importance of protecting the ideas.
3. The students gain knowledge on design thinking and types of thinking.
4. The students gain familiarity on emerging technologies like Internet of things (IOT).
5. The students understand the process of building the startup.
6. The students gain knowledge on various startup funding and also to branding building for the startup.

UNIT – I: INTRODUCTION TO INNOVATION:

Meaning of Innovation, Difference between innovation and invention, Difference between Innovation and Creativity, Need to be Creative , Importance of Innovation, Innovation as a Competitive Advantage, Innovation Continuum, Innovation Cycle, Disruptive Innovation, , Breakthrough innovations and its consequences on the society, Challenges in Innovation.

UNIT – II: CREATIVE THINKING:

Types of Creative Thinking, Creative Thinking Process, Components of Creativity, Characteristics of a Creative Mindset, New product ideas, Idea generation methods, Principles of Idea Generation, Difference between Idea Generation and Brainstorming, Killing the ideas through Stage Gate Models, Process of Reverse Thinking. Intellectual Property Rights, Importance of IPR, Role of WIPO, Case Studies on Patents and Infringement of Rights.

UNIT – III: DESIGN THINKING & LIBERAL ART:

Concept of Design Thinking, Difference between Designer and Scientist, Stages of Design Thinking, Difference between Convergent Thinking and Divergent Thinking. Definition of Liberal Art and its Importance of Liberal Art, Role of Art and Culture to Innovate Business.

UNIT – IV: EMERGING TECHNOLOGIES:

Meaning of Internet of Things, Components of IoT, Benefits of IoT, Types of Product – Service hybrid, examples of IoT enabled Innovations, Impact of IoT on Business, Future of IoT. Case Study on IoT. Innovation Leadership & Network: - Leadership, Skills and Characteristics of an Innovation Leadership, Meaning of Innovation Network, Significant of Innovation Network, Define Social Media Analysis, Steps to Build an Innovation Network.

UNIT –V: BUILDING STARTUP

Kelly Johnsons KISS Principle, Road map for building a startup, identify, analyze and evaluate
funding, advantages of crowd funding. Pricing strategies. Determining factors for Monetizing Innovation, Process of Monetization, Fixing the price of an Innovative Project. Detailed study on market potential, pitfalls and Negative effects of Monetizing innovation. Reasons for failure of Monetization of Innovation.

UNIT-VI: STARTUP FUNDING & BRANDING

Sources of funding: Bootstrapping, Angel Investors, Crowd funding, Venture capitalists, Advantages of crowd funding, Schemes of Government through Startup India, role of Institutional support and Commercial Banks. Introduction to branding a startup and developing branding strategies.

REFERENCES:

1) Peter Drucker (1993), “Innovation and Entrepreneurship”, Hyper Business Book.
2) C.K. Prahalad, M.S. Krishnan, The new age of Innovation – TATA McGRAW-HILL Edition 2008.

3) “Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
4) Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.
5) Vasanth Desai: Entrepreneurship, HPH, 2009
6) Barringer: Entrepreneurship, Pearson, 2009.
7) H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
8) John M Nicholas “Project Management for Business and Technology” Prentice Hall of India Pvt. Ltd.
9) Stay Hungry Stay Foolish, Rashmi Bansal and published by IIM., Ahmedabad

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B. Tech. IV Year I semester

CODE: 7ZC15 FINANCIAL INSTITUTIONS, MARKETS AND SERVICES

(OPEN ELECTIVE – III)

Course Objective: The objective of the course is to provide to students an understanding of Financial Markets, the major Institutions involved and the Services offered within this framework.

Course Outcomes:

1. This unit enables the students to understand the financial structure and the financial sector reforms after 1991.
2. The unit gives the exposure on the role of RBI and the Regulating and credit policies adopted by the RBI.
3. The students get awareness on the role of Non-Banking financial institutions and the role of financial institutions in India.
4. The unit educates the students to know the role of regulatory bodies like SEBI and also to know the capital and money market instruments
5. The unit equips the students to understand about the asset fund based financial services
6. The students will get exposure about the investment banking and merchant banking.

UNIT I: INTRODUCTION:

The structure of financial system, Equilibrium in financial markets, Indicators of Financial Development, Financial system and Economic Development, Financial Sector Reforms after 1991.

UNIT II: BANKING INSTITUTIONS:

Structure and Comparative performance, Functions and Role of RBI, Competition, Interest rates, Spread; Bank Capital Adequacy norms; Banking Innovations – BPLR to Base rate, Core Banking System, Financial Inclusion, Current rates: Policy rates, Reserve Ratios, Exchange rates, Lending/ Deposit rates.

UNIT III: NON BANKING FINANCIAL INSTITUTIONS:

Structure and functioning of Unit Trust of India and Mutual Funds, Growth of Indian Mutual funds and their Regulation, Role of AMFI. Performance of Non-Statutory Financial Organizations: IFCI, IRBI, NABARD, SIDBI and SFCs.

UNIT IV: FINANCIAL AND SECURITIES MARKETS:

Role and functions of SEBI, Structure and functions of Call Money Market, Government Securities Market – T-bills Market, Commercial Bills Market, Commercial paper and Certificate of Deposits; Securities Market – Organization and Structure, Listing, Trading and Settlement, SEBI and Regulation of Primary and Secondary Markets.

UNIT V: ASSET/FUND BASED FINANCIAL SERVICES:

Lease Finance, Consumer Credit and Hire purchase Finance, Factoring - Definition, Functions, Advantages, Evaluation, Forfeiting, Bills Discounting, Housing Finance, Venture Capital Financing. Fee-based Advisory services: Stock Broking, Credit Rating.

UNIT VI: INVESTMENT BANKING AND MERCHANT BANKING:

Investment Banking: Introduction, Functions and Activities, Underwriting, Banker to an Issue, Debenture Trustees and Portfolio managers, Challenges faced by Investment Bankers.

Merchant Banking: Definition, Merchant Banks Vs Commercial Banks, Services of Merchant Banks.

REFERENCES:

1. L.M. Bhole: Financial Institutions and Markets, TMH, 2009.
2. E. Gordon, K. Natarajan: Financial Markets and Services, Himalaya Publishing House, 2013.
3. Vasant Desai: Financial Markets and Financial Services, Himalaya,2009
4. Pathak: Indian Financial Systems, Pearson, 2009
5. M.Y. Khan: Financial Services, TMH, 2009.

6. S. Gurusamy: Financial Services and System, Cengage,2009
7. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson, 2009.
8. Gomez, Financial Markets, Institutions and Financial Services, PHI, 2012.
9. R M Srivatsava: Dynamics of Financial Markets and Institutions in India, Excel, 2013.

L	T	P/D	C
3	-	0	3

B. Tech. IV Year I semester

CODE: 7ZC27 **INDIAN HISTORY, CULTURE AND GEOGRAPHY**

(Common to all branches)

(OPEN ELECTIVE – III)

1	2	3	4	5	6	7	8	9	10	11	12
x			x					x			

Course Objectives: To equip the students with necessary knowledge relate to ancient, medieval and modern Indian and its culture and also facts relating to existence of earth.

Course Outcomes:

1. To appreciate and understand our Indian History, Culture and Indian heritage.
2. To understand secularism of our country.
3. To appreciate and understand the social reformers who brought revolutionary changes in Indian society.
4. To understand earth evolution and world climatic change.
5. To understand India Oceanography,
6. Able to enhance and understand Indian monsoons, Indian agriculture.

UNIT I: ANCIENT INDIAN HISTORY

Fundamental Unity of Indian Harappan and Vedic Civilization – Evolution of Caste System – ainism and Buddhism – Gandhara Art., Political unification of India under Mauryas and Guptas, Historical evolution of Satavahanas., Contribution of Pallavas and Cholas to Art – Chola Administrative Systems .

UNIT II: MEDIEVAL INDIA AND CULTURE

Influence of Islam on Indian Culture – The Sufi, Bhakthi and Vishnavite movements, Historical Achievements of Vijayanagara Rulers, Contribution of Shershah and Akbar to the evolution of administration system in India – Cultural Development under Mughals.

UNIT III: MODERN INDIA

Western Impact on India – Introduction of Western Education – Social and Cultural awakening and social reform movements – Raja Rama Mohan Roy – Dayananda Saraswathi – Theosophical Society – Ramakrishna Paramahamsa and Vivekananda – Iswara Chandra Vidyasagar and Veeresalingam – Emancipaition of women and struggle against Caste. Rise of Indian Nationalism – Mahatma Gandhi – Non Violence and Satyagraha – Eradication of untouchability – Legacy of British rule.

UNIT IV: GEO MORPHOLOGY AND CLIMATOLOGY

The Origin and Evolution of the Earth, Interior of the Earth, Distribution of Oceans and Continents, Minerals and Rocks, Geomorphic Processes, Landforms and their Evolution Composition and Structure of Atmosphere, Solar Radiation, Heat Balance and Temperature. Atmospheric Circulation and Weather Systems, World Climate and Climate Change.

UNIT V: OCEANOGRAPHY

Water (Oceans), Movements of Ocean Water, Physical features of India viz., The Mountains in the North , The Northern Plains, The Peninsular Plateau, The Great Indian Desert, The Coast; and The Islands.

UNIT VI: PHYSICAL FEATURES OF INDIA AND INDIA'S MONSOON

India's monsoon, winter, summer (pre-monsoon), rainy (monsoon), autumn (post-monsoon), Indian Agriculture, Agriculture and colonialism, Indian Agriculture after Independence Major Crops and yields, Horticulture, Organic farming.

REFERENCES:

1. Sharma .R.S., (2011).Indian Ancient past., Oxford Publications.
2. Nitin Singhaniya.,(2017). Indian Culture and Heritage., Publisher: Mcgraw TestPrep., Second Edition.
3. Certificate of Physical and Human Geography, Goh Cheng Leong, Oxford University Press.
4. Bipin Chandra.(2000). India's Struggle for Independence., Penguin Global Publishers
5. Saveendra Singh: Physical Geograpghy., Prayag Pustak Bhavan ISBN-10: 8186539298, 1st Edition Number of Pages : 641 Pages Publication : Year 2006.

6. Majumdar, R. C. et al. *An Advanced History of India* London: Macmillan. 1960. ISBN 0-333-90298-X
7. Basham, A.L: The wonder that was India, New York: Grove Press, 1954. (OUP, Madras 1983)
8. Basham, A.L: Cultural heritage of India, Vols.I to IV, Oxford University Press, Delhi, 1975.

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

B. Tech. IV Year I Semester

CODE: 7A779 **PROJECT - I**

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

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

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

1. Develop plans with relevant people to achieve the project's goals
2. Break work down into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Estimate the human and physical resources required, and make plans to obtain the necessary resources
5. Allocate roles with clear lines of responsibility and accountability with team spirit.
6. Design and develop the software or prototype to meet societal needs.

A project shall be carried out by a group of students consisting of 2 to 3 in number in fourth year first semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

Out of total 100 marks for project work (in the final year second semester), 30 marks shall be for Internal Evaluation and 70 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.

Division of marks for internal assessment – 30 marks
Division of Marks for External Evaluation – 70 Marks

B. Tech. IV Year I Semester

CODE: 7A787 **SUMMER INDUSTRY INTERNSHIP – II**

L	T	P/D	C
-	-	-	1

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Pre-Requisites: All Courses till this semester

Course Outcomes:

At the end of this course, the student will be able to

- Use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- 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.
- 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.
- Improve their communicative skills and team skills largely improve.
- Work as an individual and in a team.

A summer industry internship project shall be carried out by a group of students consisting of 2 to 3 in number during summer fourth year first semester at industries. This work shall be carried out under the guidance of the faculty assigned as internal guide as well as external guide at industry where students are carrying out summer industry internship project. Project shall consist of design, fabrication, software development or building of prototype. This can be of interdisciplinary nature also.

There will be 100 marks in total with 30 marks of internal evaluation and 70 marks of external
The **internal evaluation** shall consist of:

Day to day work (internal guide 10M external guide : 5M) : 15 marks

Report : 05 marks

Demonstration / presentation (internal presentation is evaluated by HOD, senior faculty and internal guide) : 10 marks

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30 marks

End examination : 70 Marks.

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External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. 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.

IV year B.Tech – I Sem

Code: 7A782 **MEASUREMENTS AND INSTURMENTATION LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

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-Φ 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-Φ 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

2. Calibration and Testing of single phase energy Meter
3. Calibration of dynamometer power factor meter
4. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter
5. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
6. Measurement of % ratio error and phase angle of given C.T. by comparison.
7. Schering Bridge & Anderson Bridge.
8. Measurement of 3 phases reactive power with single-phase wattmeter.
9. Measurement of parameters of a choke coil using 3 voltmeter and 3 ammeter methods.
10. Calibration LPF wattmeter – by Phantom testing
11. Measurement of 3 phase power with single watt meter and 2 No's of C.T.
12. LVDT and capacitance pickup – characteristics and Calibration.

IV Year B.Tech – I Sem

Code: 7A783 **POWER SYSTEMS LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

Course Objective:

Understand the concepts and determination of Equivalent circuit of a 3-windingtransformer., determination of sequence impedances of a cylindrical rotor synchronous machine, determination of Sub-transient reactance`s of Salient Pole Synchronous Machine, determination of Positive, Negative and zero sequence reactance of 3 ph Transformers. Understand Fault Analysis of a 3phaseAlternator, IDMT Characteristics, Testing of Generator/Transformer and Differential Protection.

Course Outcomes:

Students will able to

1. Ability to determination of Equivalent circuit of a 3-windingtransformer.
2. Ability to determination of sequence impedances of a cylindrical rotor synchronous machine.
3. Ability to Fault Analysis of a 3phaseAlternator.
4. Ability to determination of Sub-transient reactance`s of Salient Pole Synchronous Machine.
5. Ability to determination of Positive, Negative and zero sequence reactance of 3 ph Transformers.
6. Ability to determination of IDMT Characteristics of over Current Relay
7. Ability to determination of Characteristics of Percentage biased of Static/Electro Magnetic differential Relay
8. Ability to Performance and Testing of Generator/Transformer Protection System.
9. Ability to Performance and Testing of Transmission line Model 220KV/ 400Km.
10. Ability to determination of Differential Protection on Single Phase Transformer.

LIST OF EXPERIMENTS

1. Determination of Equivalent circuit of a 3-windingtransformer.
2. Determination of sequence impedances of a cylindrical rotor synchronous machine.
3. Fault Analysis of a 3phaseAlternator, (LG, LL, LLG, LLLG faults).
4. Determination of Sub-transient reactance`s of Salient Pole Synchronous Machine.
5. Determination of Positive, Negative and zero sequence reactance of 3 ph Transformers.
6. IDMT Characteristics of Over Current Relay
7. Characteristics of Percentage biased of Static/Electro Magnetic differential Relay
8. Performance and Testing of Generator/Transformer Protection System.
9. Performance and Testing of Transmission line Model 220KV/ 400Km.
10. Differential Protection on Single Phase Transformer.

IV Year B.Tech – I Sem

Code: 7A784 **POWER SYSTEMS SIMULATION LAB**

L	T	P	C
		2	1

1	2	3	4	5	6	7	8	9	10	11	12
	x	**x**		**x**						**x**	

Course Objective:

Understand the concepts and develop of formation of Y-bus and Z-bus, Guass Seidal method, SIMULINK model for a single area load frequency problem, three phase inverter, automatic voltage regulator, Lag compensator.

Course Outcomes:

Students will able to

1. Ability to write a program for formation of Y-bus and Z-bus.
2. Ability to write a program for a power flow study on a given power system network using Guass Seidal method.
3. Ability to Develop a SIMULINK model for a single area load frequency problem.
4. Ability to develop a program to solve swing equation.
5. Ability to simulate single phase and three phase full converter.
6. Ability to Develop a SIMULINK model for a two area load frequency problem
7. Ability to simulate a three phase inverter
8. Ability to develop a program for PID controller.
9. Ability to Develop a SIMULINK model for a automatic voltage regulator.
10. Ability to Design a Lag compensator through SIMULINK.

Conduct any 10 Experiments

1. Formation of Y-bus, Z-bus and Y bus formation using Sparsity technique.
2. Power flow study on a given power system network using Guass-Seidal method for 5bus system, IEEE 14bus system and IEEE 30bus system.
3. A SIMULINK model for a single area load frequency problem and simulate with and without controller.
4. Develop a program to solve swing equation.
5. a) Simulation of three Phases full converter using RL & E loads.
   b) Simulation of Single Phase full converter using RL & E loads.
6. A simulink model for a two area load frequency problem and Simulate with and without controller.
7. Simulation of 3-phase inverter with PWM controller.
8. Program for PID controller.
9. A SIMULINK model for automatic voltage regulator with and without Controller.
10. Design a Lag compensator through SIMULINK.

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x	x		x								

IV Year B.Tech – II Sem

Code: 7A835 ELECTRICAL AND HYBRID VEHICLES

(PROFESSIONAL ELECTIVE-IV)

Course Outcome:

After learning the course the students should be able to:

1. Understand working of Electric Vehicles and recent trends
2. Analyze different power converter topology used for electric vehicle application
3. Develop the electric propulsion unit and its control for application of electric vehicles

UNIT – I: ELECTRIC AND HYBRID ELECTRIC VEHICLES:

Configuration of Electric Vehicles, Performance of Electric Vehicles, Traction motor characteristics, Tractive effort and Transmission requirement, Vehicle performance, Tractive effort in normal driving, Energy consumption Concept of Hybrid Electric Drive Trains, Architecture of Hybrid Electric Drive Trains, Series Hybrid Electric Drive Trains, Parallel hybrid electric drive trains

UNIT – II: ENERGY STORAGE FOR EV AND HEV:

Energy storage requirements, Battery parameters, Types of Batteries, Modeling of Battery, Fuel Cell basic principle and operation, Types of Fuel Cells, PEMFC and its operation, Modeling of PEMFC, Super Capacitors

UNIT – III: ELECTRIC PROPULSION:

EV consideration, DC motor drives and speed control, Induction motor drives, Permanent Magnet Motor Drives, Switch Reluctance Motor Drive for Electric Vehicles, Configuration and control of Drives

UNIT – IV: DESIGN OF ELECTRIC AND HYBRID ELECTRIC VEHICLES

Series Hybrid Electric Drive Train Design: Operating patterns, control strategies, Sizing of major components, power rating of traction motor, power rating of engine/generator, design of PPS

UNIT – V: PARALLEL HYBRID ELECTRIC DRIVE TRAIN DESIGN:

Control strategies of parallel hybrid drive train, design of engine power capacity, design of electric motor drive capacity, transmission design, energy storage design

UNIT – VI: POWER ELECTRONIC CONVERTER FOR BATTERY CHARGING

Charging methods for battery, Termination methods, charging from grid, The Z-converter, Isolated bidirectional DC-DC converter, Design of Z- converter for battery charging, High-frequency transformer based isolated charger topology, Transformer less topology

REFERENCE BOOKS:

1. M. Ehsani, Y. Gao, S. Gay and Ali Emadi, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals, Theory, and Design, CRC Press, 2005
2. Iqbal Husain, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003
3. Sheldon S. Williamson, Energy Management Strategies for Electric and Plug-in Hybrid Electric Vehicles, Springer, 2013.
4. C.C. Chan and K.T. Chau, Modern Electric Vehicle Technology, OXFORD University Press, 2001.
5. Chris Mi, M. Abul Masrur, David Wenzhong Gao, Hybrid Electric Vehicles Principles And Applications With Practical Perspectives, Wiley Publication, 2011.

IV year B.Tech – II Sem

Code: 7A817 **HIGH VOLTAGE ENGINEERING**

(PROFESSIONAL ELECTIVE-IV)

L	T	P	C
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1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**						**x**			**x**

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-DISTRUCTIVE 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, 3rd Edition.
2. High Voltage Engineering Fundamentals – E. Kuffel, W.S. Zaengl, J. Kuffel by Elsevier, 2nd 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.

B.Tech IV Year – II Sem.

Code: 7A827 **REACTIVE POWER COMPENSATION & MANAGEMENT**

(Professional Elective-IV)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Objective:

This subject deals with reactive power control and management.

Course outcomes:

Students will be able to

1. Understand the load compensation.
2. Understand the Steady – State Reactive Power Compensation in Transmission System.
3. Understand the Reactive Power Coordination.
4. Know about Demand Side Management.
5. Understand the User Side Reactive Power Management
6. Study about Reactive Power Management In Electric Traction Systems And Arc Furnaces.

UNIT-I: LOAD COMPENSATION

Objectives and specifications – reactive power characteristics – inductive and capacitive approximate biasing – Load compensator as a voltage regulator – phase balancing and power factor correction of unsymmetrical loads-examples.

UNIT-II: STEADY – STATE REACTIVE POWER COMPENSATION IN TRANSMISSION SYSTEM

Uncompensated line – types of compensation – Passive shunt and series and dynamic shunt compensation – examples.

Transient state reactive power compensation in transmission systems:

Characteristic time periods – passive shunt compensation – static compensations- series capacitor compensation –compensation using synchronous condensers – examples

UNIT-III: REACTIVE POWER COORDINATION

Objective – Mathematical modeling – Operation planning – transmission benefits – Basic concepts of quality of power supply – disturbances- steady –state variations – effects of under voltages – frequency –Harmonics, radio frequency and electromagnetic interferences.

UNIT-IV: DEMAND SIDE MANAGEMENT

Load patterns – basic methods load shaping – power tariffs- KVAR based tariffs penalties for voltage flickers and Harmonic voltage levels.

Distribution side Reactive power Management:

System losses –loss reduction methods – examples – Reactive power planning – objectives – Economics Planning capacitor placement – retrofitting of capacitor banks.

UNIT-V: USER SIDE REACTIVE POWER MANAGEMENT

KVAR requirements for domestic appliances – Purpose of using capacitors – selection of capacitors – deciding factors – types of available capacitor, characteristics and Limitations.

UNIT-VI: REACTIVE POWER MANAGEMENT IN ELECTRIC TRACTION SYSTEMS AND ARC FURNACES:

Typical layout of traction systems – reactive power control requirements – distribution transformers- Electric arc furnaces – basic operations- furnaces transformer –filter requirements – remedial measures –power factor of an arc furnace.

REFERENCES:

1. Reactive power control in Electric power systems by T.J.E. Miller, John Wiley and sons, 1982.
2. Reactive power Management by D.M. Tagare, Tata McGraw Hill, 2004.

B.Tech IV Year – II Sem.

CODE: 7CC35 **FUNDAMENTALS OF VLSI AND EMBEDDED SYSTEMS**

(Professional Elective-IV)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**										

Prerequisites: *STLD, Programming concepts of any language*

Course Objectives:

The objectives of this course are

- *To provide basic knowledge in embedded system design using Embedded C.*
- *To introduce syntax, lexical conventions, data types and memory related to Verilog HDL.*
- *To design, test and implementation of the digital hardware using various modeling styles.*

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

CO1	*Understand levels of design description, concurrency, simulation and synthesis.*
CO2	*Apply language constructs, data types, operators available in verilog HDL.*
CO3	*Design combinational logic and sequential logic in gate level modeling.*
CO4	*Demonstrate the use of development software for a particular application and choosing appropriate OS.*
CO5	*Understanding and building basic embedded system using 8051.Understanding its design*
CO6	*Design of embedded systems and implementation of switch reading.*

UNIT – I: LANGUAGE CONSTRUCTS AND CONVENTIONS:

Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Operators. Verilog Module structure.

UNIT – II: MODELING AT DATA FLOW LEVEL:

Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

BEHAVIORAL MODELING: Introduction, Initial Construct, Always Construct, Assignments with delays, Blocking and Non blocking Assignments

UNIT – III: MODELING AT DATA FLOW LEVEL: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

BEHAVIORAL MODELING: Introduction, Initial Construct, Always Construct, Assignments with delays, Blocking and Non blocking Assignments

UNIT – IV: PROGRAMMING EMBEDDED SYSTEMS IN C

Introduction ,What is an embedded system, Which processor should you use, Which programming language should you use, Which operating system should you use, How do you develop embedded software, Conclusions

UNIT – V : The 8051 Architecture:

Architecture of 8051 Micro controller, Memory Organization. Special Function Registers. Input /Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input /Output, Interrupts.

UNIT – VI: READING SWITCHES

Introduction, Basic techniques for reading from port pins, Example: Reading and writing bytes, Example: Reading and writing bits (simple version), Example: Reading and writing bits (generic version),

ADDING STRUCTURE TO THE CODE

Introduction, Object-oriented programming with C, The Project Header (MAIN.H), The Port Header (PORT.H), Example: Restructuring the 'Hello Embedded World' example, Example: Restructuring the goat-counting example, Further examples, Conclusions

TEXT BOOKS:

1. T.R. Padmanabhan and B. Bala Tripura Sundari, Design through Verilog HDL – WSE, 2004 IEEE Press.
2. Embedded C - Michael J. Pont, 2nd Ed., Pearson Education, 2008

REFERENCE BOOKS:

1. J. Bhaskar, A Verilog Primier, BSP, 2003.
2. PICmicro MCU C-An introduction to programming, The Microchip PIC in CCS C - Nigel Gardner

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**										

IV Year B.Tech – II Sem

CODE: 7A820 ELECTRICAL DISTRIBUTION SYSTEMS
(PROFESSIONAL ELECTIVE – V)

L	**T**	**P**	**C**
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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:

By the end of the unit the student will be able to

1) Know the importance of terms used in distribution system such as load factor, loss factor etc and how these are interred related.
2) Know the importance of different voltages in primary & secondary distribution systems and types of feeders in our country.
3) Identify the importance of location of optimal sub –station through theoretical methods.
4) Calculate power loss and voltage drop in balanced lines and derivations connected with these.
5) Understand various types of protective devices and where and how these are used and the general procedure to coordinate protective devices.
6) 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 – 1 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 2nd edition.
2. Electric Power Distribution – A.S. Pabla, Tata Mc Graw-hill, 4th edition.

REFERENCES:

1. Electrical Power Distribution and Automation – S.Sivanagaraju, V.Sankar, Dhanpat Rai publishers.
Rai & Co, 1st edition.
2. Electrical Power Distribution Systems – V.Kamaraju, Right Publishers, 2nd edition.

IV Year B.Tech – II Sem.

Code: 7A826 **PROGRAMMABLE LOGIC CONTROLLERS**

(Professional Elective – V)

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**		**x**								

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3	**-**	**-**	**3**

UNIT – I: PLC: Characteristics, Operation, function, Types of PLC, Architecture Of PLC Applications of PLC, PC v/s PLC.

UNIT –II: Overview of I/O system. Classification: serial, parallel, discrete, analog special. Direct I/O, Parallel I/O, Serial I/O, discrete input modules: DC input, AC input, Rectifier with filter, Isolation, logic section. Discrete output modules: operating principals, Analog input modules: single ended, differential input, Common AC source, isolation, protection. Configuration, power line conditioner.

UNIT – III: Ladder diagram: of logic gates, multiplexer, Ladder diagram for different logical conditions or logical equations or truth table, Timers: types of timer, Characteristics. Function of timer in PLC. Classification of a PLC timer. Ladder diagram using timer, PLC counter. Ladder diagram using counter.

UNIT – IV: Introduction of Management Hierarchy of an industry. Industrial control process . Parallel and Serial communication interface. Simplex, Half duplex, full duplex. RS 232- DB-25 connector, DB-9 connector, RS 422, EIA 485 interface, Introduction of industrial network. Bus topology, Ring topology, Star topology, Tree topology.

UNIT – V: basic Concept, History and Hierarchy of DCS, Functions of each level. Advantages and Disadvantages, Architecture of SCADA .Working of SCADA.

UNIT – VI: PLC, DCS and SCADA suitability .Applications: Thermal power plant, Irrigation and Cement factory.

TEXT BOOKS:

1. Programmable Logic Controllers and Industrial Automation an Introduction Mitra, Madhuchanda; Gupta, Samarjit Sen Param International Publishing (India) Pvt. Ltd., New Delhi, Latest edition.

2. Programmable logic controllers: principles and applications Webb, John W.; Reis, Ronald A. PHI Learning Pvt. Ltd. New Delhi, Latest edition.

3 Programmable logic controls: principles and applications NIIT PHI Learning Pvt. Ltd. New Delhi, Latest edition.

4. Practical SCADA for Industry Bailey, David; Wright, Edwin Newnes , Burlington, MA

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x	**x**		**x**								

IV Year B.Tech – II Sem.

Code: 7A833 **SWITCH MODE POWER CONVERSION**

(Professional Elective – V)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

Course Objective:

Understand the concepts of buck, boost converters, voltage, current fed converters, phase modulation technique, buck, boost, design of drive circuits for switching devices and mechanisms of loop stabilization.

Course Outcomes:

Students will able to

1. Describe Basic topologies of buck, boost converters, buck-boost converters, and cuk converter.
2. Explain Voltage mode and current mode control of converters.
3. Explain types of resonant converters, methods of control and phase modulation technique.
4. Explain Application of state-space averaging to switching converters.
5. Understand Design of filter inductor & capacitor, and power transformer.
6. Understand mechanisms of loop stabilization.

UNIT- I: DC/DC CONVERTERS:

Basic topologies of buck, boost converters, buck-boost converters, and cuk converter, isolated DC/DC converter topologies—forward, and fly-back converters, half and full bridge topologies, modeling of switching converters.

UNIT –II: CURRENT MODE AND CURRENT FED TOPOLOGIES:

Voltage mode and current mode control of converters, peak and average current mode control, its advantages and limitations, voltage and current fed converters.

UNIT – III: RESONANT CONVERTERS:

Need for resonant converters, types of resonant converters, methods of control, phase modulation technique with ZVS in full-bridge topology, series resonant converter and resonant transition converter.

UNIT – IV: CONVERTER TRANSFER FUNCTIONS:

Application of state-space averaging to switching converters, derivation of converter transfer functions for buck, boost, and fly-back topologies.

UNIT – V: POWER CONVERTER DESIGN:

Design of filter inductor & capacitor, and power transformer, Ratings for switching devices, current transformer for current sensing, design of drive circuits for switching devices, considerations for PCB layout.

UNIT –VI: CONTROLLER DESIGN:

Introduction, mechanisms of loop stabilization, shaping E/A gain vs. frequency characteristic, conditional stability in feedback loops, stabilizing a continuous mode forward converter and discontinuous mode fly-back converter, feed-back loop stabilization with current mode control, the right-half plane zero.

TEXT BOOKS:

1. Ned Mohan Tore M. Undeland: Power Electronics: Converters, Applications, and Design, Edition3, John Wiley & Sons, 2007.
2. Abraham I. Pressman, Switching Power Supply Design‖, Mc Graw Hill International, Second Edition, 1999.
3. P.C. Sen: Modern Power Electronics, S. Chand-2004.
4. Andrzej M. Trzynadlowski Introduction to Modern Power Electronics, 2nd Edition, illustrated Publisher John Wiley & Sons, 2010.
5. Muhammad H. Rashid, Power electronics hand book, ISBN: 81 8147 367 1.

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x	**x**		**x**								

IV Year B.Tech – II Sem.

CODE: 7C831 **ARTIFICIAL NEURAL NETWORKS**

(Professional Elective – V)

L	**T**	**P**	**C**
3	**-**	**-**	**3**

The student who has completed this course will

CO1- Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations

CO2- Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.

CO3- Demonstrate awareness and a fundamental understanding of Expert Systems and its applications

CO4- Demonstrate fundamental understanding of models of machine learning.

CO5- Apply basic principles of supervised learning

CO6- Apply basic principles of unsupervised learning

UNIT 1: FOUNDATIONS FOR AI

AI: Application areas, AI Basics - Search techniques Depth First Search, Breadth First Search, Divide and Conquer, Greedy Method, A*, AO*, Branch and Bound, Gradient Descent, NN basics (Perceptron and MLP, FFN, Back propagation), Knowledge and Reasoning.

UNIT II: ARTIFICIAL NEURAL NETWORKS

Use of ANN, Evolution of NN, Biological Neuron, Basics of ANN, Activation Function, McCulloh-Pitts Neuron Model.

UNIT III: EXPERT SYSTEM

Need and Justification for ES, Characteristics and Components of ES, Expert System Development, Application and Case Studies.

UNIT IV: FOUNDATIONS FOR ML

ML Fundamentals & Techniques overview, Basics of Vectors and Matrices, Data Preprocessing,
Machine Learning terminology, ML Classification - Model Assumptions, Probability estimation, Required data processing M-estimates, Feature selection: Mutual information K-Nearest Neighbors

UNIT V: SUPERVISED LEARNING

Linear Regression, Logistic Regression, Decision Tree and issues, Bayesian Classification, Hidden Mark, Case Based Reasoning

UNIT VI: UNSUPERVISED LEARNING

Clustering Types and Methods, Expectation Maximization, Self Organizing Maps, Adaptive Resonance Theory

TEXT BOOKS

1. Artificial Intelligence And Machine Learning By VINOD CHANDRA S.S., ANAND HAREENDRAN S., PHI Learning India, 2014, ISBN-978-81-203-4934-6
2. Machine Learning by Vincy Joseph Anuradha Srinivasaraghavan, 2019,Wiley India Pvt Ltd., ISBN – 978-81-265-7851-1
3. Artificial Intelligence Making a System Intelligent by Dr. Nilakshi Jain, 2019,Wiley India Pvt Ltd., ISBN – 978- 81-265-7994-5

REFERENCE BOOKS

1. Artificial Intelligence: A Modern Approach, by Stuart Russell and Peter Norvi, Stuart Russell and Peter Norvig, 2010. Pearson Education, Inc. ISBN: 978-0-13-604259-4
2. Artificial Intelligence (3rd Edition)by Patrick Henry Winston
3. Pattern Recognition and Machine Learning by Christopher M Bishop.

IV Year B.Tech – II Sem

CODE: 7A883 **PROJECT - II**

L	T	P/D	C
0	0	10	5

1	2	3	4	5	6	7	8	9	10	11	12
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**

Course Objectives:

To enhance the knowledge on selecting a project, learn related tools and enhance programming and communication skills for employability.

Course Outcomes: At the end of this course, the student will be able to

1. Develop plans with relevant people to achieve the project's goals
2. Break work down into tasks and determine handover procedures
3. Identify links and dependencies, and schedule to achieve deliverables
4. Estimate the human and physical resources required, and make plans to obtain the necessary resources
5. Allocate roles with clear lines of responsibility and accountability with team spirit.
6. Design and develop the software or prototype to meet societal needs

A project shall be carried out by a group of students consisting of 2 to 3 in number in fourth year second semester. This work shall be carried out under the guidance of the faculty assigned as internal guide and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

Out of total 100 marks for project work (in the final year second semester), 30 marks shall be for Internal Evaluation and 70 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.

Division of marks for internal assessment – 30 marks
Division of Marks for External Evaluation – 70 Marks