USHARAMA

COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

(Approved by A.I.C.T.E & Permanently Affiliated to JNTU, Kakinada)
Accredited by NAAC with "A" Grade
on NH 16, Telaprolu, Krishna Dist – 521109

B.TECH ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE
&
SYLLABUS

(Applicable for the batches admitted from the Academic Year 2019-20)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Usha Rama College of Engineering and Technology

Electrical and Electronics Engineering

Course Structure (UR19)

FIRST SEMESTER (I -YEAR) **Date: 20-08-2020**

I SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	HMC	UR19HM101	Communicative English	2	0	0	2	2
2	BSC	UR19BSC105	Linear Algebra & Calculus	3	1	0	4	4
3	BSC	UR19BSC102	Applied Physics	3	0	0	3	3
4	ESC	UR19ESC106	Fundamentals of Computer Science	3	0	0	3	3
5	ESC	UR19ESC104	Engineering Graphics & Drafting	1	0	3	4	2.5
6	BSC	UR19BSCL103	Applied Physics Lab	0	0	3	3	1.5
7	ESC	UR19ESCL102	Engineering Workshop and IT Workshop	0	0	3	3	1.5
8	HSMC	UR19HML101	Communicative English Lab	0	0	2	2	1
MANDATORY COURSE								
9	BSC	UR19BSCL104	Applied Physics-Virtual Lab*	0	0	0	2	0
			Total	12	1	11	26	18.5
*Internal evaluation								

SECOND SEMESTER (I -YEAR)

II SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	HMC	UR19HMC202	Professional English	2	0	0	2	2
2	BSC	UR19BSC208	Differential Equations & Vector Calculus	3	0	0	3	3
3	BSC	UR19BSC204	Applied Chemistry	3	0	0	3	3
4	ESC	UR19ESC207	Problem Solving & Programming Using C	3	0	0	3	3
5	ESC	UR19BSC109	Numerical Methods and Transforms	3	0	0	3	3
6	ESC	UR19ESC209	Electrical Circuit Analysis-I	3	0	0	3	3
7	ESC	UR19ESCL201	Problem Solving & Programming Using C Lab	0	0	3	3	1.5
8	BSC	UR19BSCL206	Applied Chemistry Lab	0	0	3	3	1.5
9	HMC	UR19HML202	Professional English Lab	0	0	3	3	1.5
			MANDATORY COURSES					
10	MC	UR19MC200	Engineering Exploration Project*	0	0	0	1	0
11	MC	UR19MC203	Constitution of India	0	0	0	2	0
			Total	17	0	9	29	21.5
*Internal evaluation								

THIRD SEMESTER (II-YEAR)

III SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE301	Electrical Machines-I	3	1	0	4	4
2	PCC	UR19PCEE302	Electrical Circuit Analysis-II	3	0	0	3	3
3	PCC	UR19PCEE303	Electro Magnetic Fields	2	1	0	3	3
4	PCC	UR19PCEE304	Electronic Devices and Circuits	3	0	0	3	3
5	PCC	UR19PCME305	Thermal and Hydro Prime Movers	2	0	0	2	2
6	HMC	UR19HM306	Managerial Economics and Financial Analysis	3	0	0	3	3
7	PCC	UR19PCEEL301	Electrical Circuits and Simulation Lab	0	0	3	3	1.5
8	PCC	UR19PCMEL302	Thermal and Hydro Lab	0	0	3	3	1.5
	MANDATORY COURSE							
9	MC	UR19MC301	Environmental Studies	0	0	0	2	0
			Total	16	2	6	26	21
Employability Skills- I*							2	0
*Internal evaluation								

FOURTH SEMESTER (II-YEAR)

IV SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE401	Electrical Machines-II	3	1	0	4	4
2	PCC	UR19PCEE402	Power Systems-I	3	0	0	3	3
3	PCC	UR19PCEE403	Control Systems	2	1	0	3	3
4	PCC	UR19PCEE404	Switching Theory and Logic Design	2	1	0	3	3
5	PCC	UR19PCEE405	Electrical Measurements	3	0	0	3	3
6	PCC	UR19PCEEL401	Electrical Machines-I Lab	0	0	3	3	1.5
7	PCC	UR19PCEEL402	Electronic Devices and Circuits Lab	0	0	3	3	1.5
MANDATORY COURSES								
1	MC	UR19MC401	Professional Ethics and Human Values	0	0	0	2	0
2	PROJ	UR19MPROJ401	Socially Relevant Mini Project	0	0	0	2	0
			Total	14	2	6	26	19
Self Learning *(Technical Certificate)							1	0
*Internal evaluation								

FIFTH SEMESTER (III-YEAR)

V SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE501	Linear and Digital IC Applications	3	0	0	3	3
2	PCC	UR19PCEE502	Power Systems-II	3	0	0	3	3
3	PCC	UR19PCEE503	Power Electronics	3	0	0	3	3
4	PCC	UR19PCEE505	Signals and Systems	3	0	0	3	3
Professional Elective – I								
5	PEC	UR19PEEE501	Industrial Drives and Application	3	0	0	3	3
		UR19PEEE502	Data Base Management System					
		UR19PEEE503	Renewable Energy sources					
		UR19PEEE504	Communication Systems					
		UR19PEEE505	Computer Networks					
6	PCC	UR19PCEEL501	Electrical Machines-II Lab	0	0	3	3	1.5
7	PCC	UR19PCEEL502	Electrical Measurements Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL503	Control Systems Lab	0	0	3	3	1.5
MANDATORY COURSE								
9	ESC	UR19MCEEL501	Virtual Electrical Machines Lab*	0	0	2	2	0
			Total	15	0	9	26	19.5
Employability Skills- II*							2	0
Self Learning *(Technical Certificate)							2	0
*Internal evaluation								

SIXTH SEMESTER (III-YEAR)

VI SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE601	Power Systems Analysis	3	0	0	3	3
2	HMC	UR19HM602	Management Science	3	0	0	3	3
3	PCC	UR19PCEE603	Electrical Drives	3	0	0	3	3
4	PCC	UR19PCEEE504	Microprocessors and Microcontrollers	3	0	0	3	3
Professional Elective – II								
5	PEC	UR19PEEE601	Design of Electrical Apparatus	3	0	0	3	3
		UR19PEEE602	Electric Machine design					
		UR19PEEE603	Electrical Materials					
		UR19PEEE604	IOT applications to Electrical Engineering					

		UR19PEEE605	Digital Signal Processing					
6	OEC		**Open Elective-I**	3	0	0	3	3
7	PCC	UR19PCEEL601	Power Electronics Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL602	Microprocessors and Microcontrollers Lab	0	0	3	3	1.5
MANDATORY COURSES								
9	MC	UR19MC601	Essence of Indian Traditional Knowledge	0	0	0	2	0
10	ESC	UR19ESCL610	Virtual Power Lab*	0	0	2	2	0
12	PROJ	UR19MPROJ611	Socially Relevant Mini Project	0	0	0	2	0
			Total	18	0	6	30	21
*Internal evaluation								

SEVENTH SEMESTER (IV-YEAR)

VII SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE701	Switch Gear and Protection	3	0	0	3	3
2	PCC	UR19PCEE702	Utilization of Electrical Energy	3	0	0	3	3
Professional Elective – III								
3	PEC	UR19PEEE701	Digital Control Systems	3	0	0	3	3
		UR19PEEE702	Electrical and Electronics Instrumentation					
		UR19PEEE703	Electrical Distribution System					
		UR19PEEE704	VLSI Design					
		UR19PEEE705	Cloud Computing					
Professional Elective – IV								
4	PEC	UR19PEEE706	Advanced Control Systems	3	0	0	3	3
		UR19PEEE707	Special Electrical Machines					
		UR19PEEE708	HVDC & EHV AC Transmission System					
		UR19PEEE709	Operating Systems					
		UR19PEEE710	Smart Grid					
5	OEC		**Open Elective – II**	3	0	0	3	3
7	PCC	UR19PCEEL701	Power Systems Lab	0	0	3	3	1.5
8	PCC	UR19PCEEL702	Electrical Simulation Lab	0	0	3	3	1.5
10	PROJ	UR19PROJEE711	Internship	0	0	0	0	2
11	PROJ	UR19PROJEE712	Project Stage-I (Literature Survey, Problem Identification)	0	0	3	0	1.5
			Total	15	0	9	21	21.5

EIGHTH SEMESTER (IV-YEAR)

VIII SEMESTER								
S. No	**Course Category**	**Course Code**	**Course Name**	**L**	**T**	**P**	**Contact Hrs./wk**	**C**
1	PCC	UR19PCEE801	Power System Operation and Control	3	0	0	3	3
Professional Elective – V								
2	PEC	UR19PEEE801	FACTS	3	0	0	3	3
		UR19PEEE802	Power System Deregulation					
		UR19PEEE803	High Voltage Engineering					
		UR19PEEE804	Data Analytics with Python					
		UR19PEEE805	Power Quality					
3	OEC		**Open Elective – III**	3	0	0	3	3
4	PROJ	UR19PROJEE801	Project Stage-II	0	0	9	9	9
							Total	18

Total Credits = 18.5+21.5+21+19+19.5+21+21.5+18=160

List of Open Electives

Open Electives offered by the Dept. of CE

S.No.	Course Code	Open Elective-I
1	UR19OECE 601	Introduction To GIS
2	UR19OECE 602	Environmental Pollution Control
3	UR19OECE 603	Conservation of Water Resources
	Course Code	**Open Elective-II**
4	UR19 OECE 701	Metro Systems and Engineering
5	UR19 OECE 702	Natural Disaster Mitigation and Management
6	UR19OECE 703	Total Quality Management
	Course Code	**Open Elective-III**
7	UR19 OECE 801	Sanitary and Public Health Engineering
8	UR19 OECE 802	Environmental and Industrial Hygiene
9	UR19OECE 803	Green Buildings

Open Electives offered by the Dept. of EEE

S.No.	Course Code	Open Elective-I
1	UR19OEEE601	Neural Networks and Fuzzy Logic
2	UR19OEEE602	Linear Control Systems
3	UR19OEEE603	Electrical Safety Management
	Course Code	**Open Elective – II**
4	UR19OEEE701	Programmable Logic Controllers
5	UR19OEEE702	Energy Audit and Conservation Management
6	UR19OEEE703	Electrical Technology
	Course Code	**Open Elective – III**
7	UR19OEEE801	Non Conventional Energy Sources
8	UR19OEEE802	Industrial Electrical Operation
9	UR19OEEE803	Hybrid Electric Vehicles

Open Electives offered by the Dept. of ME

S.No.	Course Code	Open Elective-I
1	UR19OEME601	Nano Technology
2	UR19OEME602	Robotics
3	UR19OEME603	Power Plant Engineering
	Course Code	**Open Elective-II**
4	UR19OEME701	Operations Research
5	UR19OEME702	Industrial Engineering & Quality control
6	UR19-OEME703	Advanced materials
	Course Code	**Open Elective-III**
7	UR19OEME801	Optimization Techniques
8	UR19OEME802	Green Engineering systems
9	UR19OEME803	Mechatronics

Open Electives offered by the Dept. of ECE

S.No.	Course Code	Open Elective-I
1	UR19OEEC 601	Consumer Electronics
2	UR19OEEC 602	Digital Electronics
3	UR19OEEC 603	Analog and Digital I.C. Applications
	Course Code	**Open Elective-II**
3	UR19OEEC 701	Embedded Systems
4	UR19OEEC 702	Internet of Things (IoT)
5	UR19OEEC 703	Principles of Computer Communications and Networks
	Course Code	**Open Elective-III**
6	UR19OEEC 801	Microcontrollers
7	UR19OEEC 802	Principles of Electronic Communications
8	UR19OEEC 803	Electronics Measurements and Instrumentation

Open Electives offered by the Dept. of CSE

S.No.	Course Code	Open Elective-I
1.	UR19OECS601	Java Programming
2.	UR19OECS602	Data Base Management Systems
3.	UR19OECS603	C++ Programming
	Course Code	**Open Elective-II**
4.	UR19OECS701	Distributed Computing
5.	UR19OECS702	Deep Learning
6.	UR19OECS703	AI and ML for Robotics
	Course Code	**Open Elective-III**
7.	UR19OECS801	AI Tools & Techniques
8.	UR19OECS802	Information Security
9.	UR19OECS803	Big Data

Open Electives offered by the Dept. of IT

S.No.	Course Code	Open Elective-I
1.	UR19OEIT101	Data Structures
2.	UR19OEIT102	Computer Graphics
3.	UR19OEIT103	Data Science
	Course Code	**Open Elective – II**
4.	UR19OEIT201	Operating Systems
5.	UR19OEIT202	Python Programming
6.	UR19OEIT203	Web Technologies
	Course Code	**Open Elective – III**
7.	UR19OEIT301	Information Security
8.	UR19OEIT302	Mobile Application Development
9.	UR19OEIT303	Block Chain Technologies

I Year - I Semester Course Code : UR19HM101

L	T	P	C
2	0	0	2

Internal: 30 Marks External: 70 Marks

COMMUNICATIVE ENGLISH

(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students in English
- Paraphrase and interpret the ideas and thoughts in a dynamic way
- Prioritize the importance of practical learning of English
- Distinguish the various levels of Listening, Speaking, Reading and writing skills
- Construct statements in writing and speaking in professional manner

UNIT – I
Poem: "Life" by Sarojini Naidu
Grammar: Articles
Vocabulary: Prefixes and Suffixes
Writing: Paragraph Writing
Life-Skills: Attitude

UNIT – II
Essay: A Drawer full of Happiness
Grammar: Prepositions
Vocabulary: Homonyms, Homophones, Homographs
Writing: Letter of Request and Apology
Life-Skills: Self- Management

UNIT – III
Short Story: "Half a Rupee Worth" by R.K. Narayan
Grammar: Tenses
Vocabulary: Idiomatic Expressions; Phrasal Verbs
Writing: Letter of Complaint and Appreciation
Life-Skills: Body Language

UNIT – IV
Text: Stephen Hawking – Positivity 'Benchmark'
Grammar: Question Tags, Conjunctions
Vocabulary: One - Word Substitutes, Collocations
Writing: Dialogue and Speech Writing
Life-Skills: Being Assertive

UNIT – V
Poem: Once Upon a Time by Gabriel Okara
Grammar: Degrees of Comparison
Vocabulary: Technical Abbreviations
Writing: E-mail Writing, Preparation of Resume and Letter of application
Life-Skills: Goal Setting, Working in a Team

TEXT BOOK:
'InfoTech English' – Maruti Publications

REFERENCE BOOKS:

Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge University Press
Practical English Usage, Michael Swan, OUP, 1995

NPTEL ONLINE COURSE:

'Enhancing Soft skills & Personality Development

Course Outcomes:

CO1: Apply critical-thinking to develop writing skills
CO2: Understand and evaluate different kinds of prose tests.
CO3: Describe distinct literary characteristics of poems.
CO4: Analyze the major and minor details of a biography.
CO5: Develop grammar and vocabulary skills
CO6: Evaluate the effectiveness in improving life-skills.

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I Year - I Semester	Course Code : UR19BSC101	L	T	P	C
		3	1	0	4

Internal: 30 Marks External: 70 Marks

LINEAR ALGEBRA & CALCULUS

(Common to all branches)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

UNIT – I

Matrices: Solving system of homogeneous and non-homogeneous linear equations by Gauss elimination method. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

UNIT – II

Sequences and Series: Convergence and divergence, Ratio test - Comparison test -Cauchy's root test-. Fourier series, Euler's formulae, conditions for Fourier expansion, Even and Odd functions.

UNIT – III

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (single variable & without proofs).

UNIT – IV

Multivariable calculus: Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

UNIT – V

Multiple Integrals: Double integrals, change of order of integration, double integration in polar coordinates. Evaluation of triple integrals, change of variables.

TEXT BOOK:

1. Higher Engineering Mathematics, B.S.Grewal, Khanna Publishers

Course Outcomes:

CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical Applications

CO2: Find or compute the Fourier series of Fourier series periodic signals.

CO3: Utilize mean value theorems to real life problems.

CO4: Translate the given function as series of Taylor's and Maclaurin's with remainders.

CO5: Familiarize with functions of several variables which are useful in optimization.

CO6: Apply Double integration in evaluating areas bounded by regions.

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I Year - I Semester Course Code : UR19BSC108

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

APPLIED PHYSICS

(EEE & ECE)

Course Objectives:

- Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.
- Understand the physics of Semiconductors and their working mechanism for their utility in sensors.
- Impart the knowledge of materials with characteristic utility in appliances.

UNIT – I

INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings.

DIFFRACTION: Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order – resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT – II

QUANTUM MECHANICS: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT – III

FREE ELECTRON THEORY & BAND THEORY OF SOLIDS : Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states.

Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT – IV

SEMICONDUCTOR PHYSICS: Introduction – Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT – V

MAGNETISM & DIELECTRICS: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Introduction - Dielectic polarization **–** Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

TEXT BOOKS:

1."A Text book of Engineering Physics" by M.N.Avadhanulu,P.G.Kshirsagar - S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

REFERENCE BOOKS:

1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Lasers and Non-Linear optics by B.B. Laud, New Age International Publishers (2008).
3. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
4. Physics for Engineers by M.R. Srinasan, New Age international publishers (2009).

Course Outcomes:

CO1: Explain the need of coherent sources and the conditions for sustained interference and illustrate the resolving power of various optical instruments.
CO2: Explain the fundamental concepts of quantum mechanics and analyze the physical significance Of wave function.
CO3: Explain the various electron theories and interpret the effects of temperature on Fermi Dirac distribution function
CO4: Explain the various energy bands
CO5: Classify the energy bands of semiconductors and outline the properties of n-type and p-type Semiconductors.
CO6: Explain the applications of dielectric and magnetic materials.

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I Year - I Semester Course Code : UR19ESC108

L	T	P	C
1	0	3	2.5

Internal: 30 Marks External: 70 Marks

ENGINEERING GRAPHICS & DRAFTING
(CIVIL/EEE/ECE)

PRE-REQUISITES: Mathematics, Physics

COURSE EDUCATIONAL OBJECTIVE

- Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT – I INTRODUCTION TO ENGINEERING DRAWING:

Introduction: Principles of Engineering Graphics and their significance - Drawing Instruments - Geometrical Constructions.

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Ellipse ,Parabola and Hyperbola by general methods,

Scales: Diagonal scales and Vernier scales

UNIT – II

ORTHOGRAPHIC PROJECTIONS: Principle of orthographic projection-Method of Projections – First and third angle projection methods Projections of Points – Projections of straight lines of different orientations - True lengths and traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes. Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT – IV

ISOMETRIC VIEWS: Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

UNIT – V

COMPUTER AIDED DRAFTING: Introduction – Computer Aided drafting system – Advantages, Applications of AUTOCAD, Drafting software-AUTOCAD-Advantages, Initial setup commands, utility commands, Drawing Aids, Entity Draw commands, Display commands, Edit commands, Lettering & Dimensioning

TEXT BOOKS:

1.N. D. Bhatt, Engineering Drawing, Revised and Enlarged Edition, Charotar publishers,
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

REFERENCE BOOKS:

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers
2. Engineering Graphics for Degree by K.C. John, PHI Publishers
3. Engineering Graphics by PI Varghese, McGrawHill Publishers

Course Outcomes:

CO1: Represent the geometrical objects considering BIS standards.
CO2: Comprehend the basics of orthographic projections and deduce orthographic projections
of a point and a line at different orientations.
CO3: Visualize geometrical planes of different positions in real life environment
CO4: Draw the projection of various of types of solids.
CO5: Imagine orthographic views of various solid objects at different orientations
CO6: Recognize the significance of isometric drawing to relate 2D environment with 3D environment. Learn basics of CAD.

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I Year - I Semester	Course Code : UR19ESC109	L	T	P	C
		3	0	0	3

Internal: 30 Marks External: 70 Marks

FUNDAMENTALS OF COMPUTER SCIENCE
(EEE/CSE/IT)

Course Objectives:

To study different types and working of a digital computer.

- To learn different number systems and representation of floating point numbers.
- To understand the need and working of memory and other peripheral devices.
- To be familiar with the internal organization of a computer.
- To study the interconnection of computers and applications of computer.

UNIT – I INTRODUCTION

History of Digital computers, types of computers, block diagram of a digital computers, various parts of a digital computer. Computer programming — Machine language, assembly language and high-level language programming.

UNIT – II

NUMBER SYSTEMS

Binary, Octal, Decimal and Hexadecimal number systems, conversion of numbers from one system to other system, Fixed point and floating-point representation of numbers, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic Operations

UNIT – III

MEMORY AND PERIPHERALS

Memories: Need for memory, Types of computer memories — magnetic, Dynamic and static memories, RAM, ROM, EPROM and EEPROM memories, Cache memory, Concept of Virtual memory.
Peripheral Devices: Working of Keyboard and Mouse. Types of Printers and it's working. I/O Ports, Addressing I/o devices — programmed I/O, interrupt I/O, DMA.

UNIT – IV

COMPUTER ORGANISATION

Organization of a processor - Registers, ALU and Control unit, Register transfer language, micro operations, Instruction codes, Computer instructions, Instruction formats, Instruction cycle, Memory Reference Instructions, Input — Output instructions, Control memory, Address sequencing, Design of control unit-micro programmed control, hard wired control.

UNIT – V

APPLICATIONS

Various applications of Computers, Networking of Computers, LAN, WAN, MAN, Internet. Internet of Things (loT) applications to electrical engineering.

TEXT BOOKS:

1. Computer Fundamentals By PK Sinha, 6th Edition, BPB publications.
2. Fundamentals of Computers by E. Balagurusamy, McGrawHill edition.
3. Computer Fundamentals by Anitha Goel, Pearson education

Course Outcomes:

CO1: Understand the functioning and programming of computers.

CO2: Convert numbers from one type of system to other type of system.

CO3: Distinguish between different types of memories and learn the mapping of I/O devices.

CO4: Understand the functioning of peripheral devices and addressing I/o devices.

CO5: Demonstrate the internal organization of digital computer.

CO6: Apply digital computers for storing electrical engineering problems.

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I Year - I Semester	Course Code : UR19HML101	L	T	P	C
		0	0	2	1

Internal: 20 Marks External: 30 Marks

COMMUNICATIVE ENGLISH LAB

(Common to all branches)

Course Objectives:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of Activities

1) Introducing yourself
2) Greeting
3) Thanking and Responding to thanks
4) Requesting and Responding to requests
5) Making and Responding to complaints
6) Apologising and accepting apologies
7) Consonants : Plosives, Affricates and Nasals
8) Consonants: Fricatives, Liquids and Glides
9) Vowels: Pure vowels
10) Vowels: Dipthongs
11) Consonant clusters
12) Word Accent
13) Word Stress
14) Intonation

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd ‘Strengthen Your Communication Skills’ published by Maruthi Publications

Course Outcomes:

Upon completion of the course, the student will be able to:

CO1 Apply expressions in day to day life
CO2 Build language proficiency by using patterns
CO3 Develop communication skills through various language activities
CO4 Outline of Letters and Sounds
CO5 Identify consonants and vowel sounds in phonetic script
CO6 Understand pronunciation, stress and intonation

*****

I Year - I Semester	Course Code : UR19BSCL102	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

APPLIED PHYSICS LAB

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.
- To develop intellectual communication skills and discuss the basic principles of scientific concepts in a group.

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Verification of laws of stretched string – Sonometer.
13. Resolving power of grating.
14. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
15. Variation of dielectric constant with temperature.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Text book:

1. A Text book of Practical Physics, Balasubramanian S, Srinivasan M.N, S Chand Publishers, 2017

Course outcomes:

CO1: Handle optical instruments like microscope and spectrometer
CO2: Determine thickness of a hair/paper with the concept of interference
CO3: Estimate the wavelength and resolving power of different colors using diffraction grating
CO4: Demonstrate the elastic response of loaded beams; estimate the frequency of a vibrating system using standing wave pattern.
CO5: Estimate the strength of the magnetic field due to a current carrying coil.
CO6: Estimate the mechanical properties of materials.

*****

I Year - I Semester	Course Code : UR19ESCL101	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

ENGINEERNG WORK SHOP AND IT WORK SHOP

ENGINEERNG WORK SHOP:

Course Objectives:

- To familiarize with the basics of tools and equipments used in fitting, carpentry, Sheet metal and smithy.
- To familiarize with the production of simple modes in the above trades.

NOTE: At least one exercise to be done from each trade.

Trade: Carpentry:

1. Cross –Lap joint
2. Mortise and Tenon joint
3. T-Lap joint

FITTING:

1. V-fit
2. Square fit
3. Dovetail fit

Black Smithy:

1. S-Hook
2. Round rod to square
3. Round rod to Hexagonal headed bolt
4. Making simple parts like chisel.

House Wiring:

1. Parallel/Series connection of three bulbs
2. Stair Case wiring
3. Florescent lamp fitting
4. Measurement of earth resistance

Tin Smithy:

1. Making rectangular tray
2. Making scoop
3. Making hopper
4. Making funnel

IT WORK SHOP:

Course Objectives:

- IT Workshop is to impart basic computer usage and maintenance skills and to introduce you to a suite of productivity tools that will aid in your day to day activities.
- IT workshop works in a learning-by-doing mode. It concentrates more on hands-on experience for the participants rather theoretical classes.
- It enables the participant to make the best use of Microsoft Office Suite in their day-to-day requirements and make use of it to improve the standards in the educational environment.
- The IT Workshop prepares the participant to have a hands-on experience in maintaining and troubleshooting a PC by themselves.

Task1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor

Task2: Every student should individually install MS windows on the personal computer.

Task3: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals.

Task 4: Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 5: Excel Orientation: The importance of MS office 2007/10 tool Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Task 6: Basic power point utilities and tools which helpful to create basic power point presentation. Topic covered during this includes PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both Latex and Power point.

Task 7: Introduction to HTML &Basic syntax of html Attributes, elements, lists, and basic programs, Homepage using HTML Consisting of photo, name, address and education details as a table.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

Upon completion of the course, the student will be able to

CO1: Identify the peripherals, components of CPU along with the functions of CPU.

CO2: Implement the installation of Windows OS and explain about Hardware Troubleshooting.

CO3: Create HTML Homepage and use MS Office like Word, Excel and Power Point Presentation.

CO4: Apply basic Electrical Engineering knowledge for House-wiring Practice.

CO5: Make different components using Fitting and Carpentry.

CO6: Prepare simple jobs as per specifications using Tinsmithy tools and Blacksmithy Tools.

*****

I Year - I Semester	Course Code : UR19MC202	L	T	P	C
		0	0	0	0

Internal: 20 Marks External: 0 Marks
Semester-end: 30 Marks

APPLIED PHYSICS - VIRTUAL LAB

(Any 3 of the following listed 12 experiments)

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To learn the usage of electrical and optical systems for various measurements.

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel –moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

URL: www.vlab.co.in

Course outcomes:

CO1: Handle optical instruments like microscope and spectrometer
CO2: Determine thickness of a hair/paper with the concept of interference

*****

I Year - II Semester Course Code : UR19HM202

L	T	P	C
2	0	0	2

Internal: 30 Marks External: 70 Marks

PROFESSIONAL ENGLISH

(Common to all branches)

Course Objectives:

- Recall and improve the language proficiency of the students inEnglish
- Paraphrase and interpret the ideas and thoughts in a dynamicway
- Prioritize the importance of practical learning ofEnglish
- Distinguish the various levels of Listening, Speaking, Reading and writingskills
- Construct statements in writing and speaking in professionalmanner

UNIT – I

Poem: "Enterprise" by

Nissim Ezekiel **Grammar:**

Types of Sentences

Vocabulary: Synonyms

Writing: Essay Writing

Life-Skills: Values and Ethics

UNIT – II

Text: Like a tree, unbowed:

WangariMaathai**Grammar:** Active Voice

& Passive Voice **Vocabulary:** Antonyms

Writing: Technical Report Writing **Life-Skills:** Time Management

UNIT – III

Text: Stay Hungry – Stay Foolish

Grammar: Common Errors in Articles and Prepositions

Vocabulary: Words Often Confused

Writing: Describing People, Places, Objects, Events

Life-Skills: Motivation

UNIT – IV

Story: The Cop and the Anthem by O. Henry

Grammar: Common Errors in Subject – Verb agreement

Vocabulary: Technical Vocabulary

Writing: Note- Making **Life-Skills:** Rapid Reading

UNIT – V

Short Story: "A Village School Master" by Oliver Gold Smith

Grammar: CommonErrors

Vocabulary: GRE WordList

Writing: Precise Writing / Information Article

Life-Skills: Career Planning

TEXT BOOK:

1. 'InfoTech English' – MarutiPublications

REFERENCE BOOKS:

1. Raymond Murphy, "Murphy's Essential English Grammar" with CD, Cambridge UniversityPress.
2. Practical English Usage, Michael Swan, OUP,1995
3. Remedial English Grammar, F.T. Wood, Macmillan,2007

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Apply critical thinking to develop writing skills
CO2: Evaluate common errors in grammar
CO3: Describe distinct literary characteristics of poems
CO4: Analyze the characteristics of one-act-plays
CO5: Develop correspondence skills and promotional writing skills
CO6: Evaluate the importance of values and ethics for career planning.

*****

I Year - II Semester Course Code : UR19BSC205

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

(Common to all branches)

Course Objectives:

- To enlighten the learners in the concept of differential equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT – I

Linear Differential Equations of Higher Order: Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral with RHS of the forms e^ax, Sinax, Cosax, x^n, e^ax.V and xV. L-C-R Circuit problems.

UNIT – II

First order Partial Differential Equations: Formation of PDE, solutions of Lagrane's linear equation Method of grouping – Method of multipliers, Solution of non-linear PDEs of the forms f(p,q)=0, f(z,p,q)=0, f(x,p)=g(y,q), Z=px+qy+f(p,q).

UNIT – III

Applications of Partial Differential Equations: Method of Separation of variables-One dimensional Wave equation-Two dimensional Heat equation, Laplaceequation.

UNIT – IV

Vector Differential Calculus: Scalar and vector point functions, Gradient, Directional derivative. Divergence, Curl, Physical interpretation of operators.

UNIT – V

Vector Integral Calculus: Line integral-work done, surface and volume integrals, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Divergence theorem (without proof).

TEXT BOOK:

1. Higher Engineering Mathematics, B. S. Grewal.

REFERENCE BOOKS:

1. Advance Engineering in Mathematics, ErwinKreyszig.
2. Vector calculus, Schaum'sseries.

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Apply a range of techniques to find solutions of standard PDEs .
CO4: Classify the nature of the partial differential equations.
CO5: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO6: Estimate the work done against a field and circulation using vector calculus.

*****

I Year - II Semester Course Code : UR19BSC203

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

NUMERICAL METHODS&TRANSFORMS

(ECE/EEE)

Course Objectives:

- To elucidate the different numerical methods to solve nonlinear algebraic equations.
- To familiarize the students with numerical methods of solving the non-linear equations.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

UNIT – I

Solution to algebraic equations: Solution of polynomial and transcendental equations: Bisection method, Regula-Falsi method, Iteration method,Newton-Raphson method.

UNIT – II

Interpolation: Finite differences, interpolation using Newton's forward and backward difference formulae, Gauss forward and backward interpolation formulae, Interpolation with unequal intervals, Newton's divided difference and Lagrange's formulae.

UNIT – III

Numerical integration and Solution of ODE: Numerical integration- trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Ordinary differential equations, Taylor's series, Euler and modifiedEuler's methods. Runge-Kutta method of fourth order for solving first orderODE .

UNIT – IV

Laplace Transforms : Laplace transforms of elementary functions, Properties of Laplace Transforms of derivatives and integrals, Multiplication by t, Division by t, Inverse transforms, Method of Partial fractions, Applications of Ordinary differential equations.

UNIT – V

Fourier Transforms: Fourier integral theorem (without proof),Fourier sine and cosine integral, Fourier transforms, Fourier sine and cosine transforms, Properties of Fourier transforms.

TEXT BOOK:

Higher Engineering Mathematics, B.S. Grewal.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics, Erwin kreyszig,
2. Introductory methods of Numerical Analysis by S.S.Sastri

NPTEL ONLINE COURSE:

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Evaluate approximating the roots of polynomial and transcendental equations by different Algorithms.

CO2: Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal Intervals.

CO3: Apply definite integral of a function by using different numerical methods.

CO4: Solve different algorithms for approximating the solutions of ordinary differential equations to itsanalytical computations.

CO5: Explain the Laplace and Inverse Laplace Transform for different types of functions and Evaluate ordinary differential equations using Laplace transform technique.

CO6: Apply integral expressions for the forwards and inverse Fourier transform to a range of non – periodic waveforms .

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I Year - II Semester Course Code : UR19BSC210

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

APPLIED CHEMISTRY

(EEE & ECE)

Course Objectives:

- Importance of usage of Plastics in household appliances and composites (FRP) in aerospace automotive industries.
- Select the fuels as a source of energy are a basic need of any industry, particularly industries like thermalpower stations, steel industry, fertilizer industry etc., and hence they are introduced.
- Constructions of galvanic cells as well as some batteries used in instruments are introduced. Understand the mechanism of corrosion which itself is explained by electrochemical theory
- With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.
- Explain the computational chemistry and different applications of analytical instruments.

UNIT – I

HIGH POLYMERS AND PLASTICS

Polymerisation : Introduction- Mechanism of polymerization - Stereo regular polymers – methods of polymerization (emulsion and suspension) -Physical and mechanical properties – Plastics as engineering materials : advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (4techniques)- Preparation, properties and applications of Polyethene, PVC, Bakelite and Teflon Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes – Applications of elastomers. Composite materials & Fiber reinforced plastics – Biodegradable polymers – Conducting polymers.

UNIT – II

FUEL TECHNOLOGY

Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Bomb calorimeter – Numerical problems – Coal –– Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knocking agents – Power alcohol – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus – Numerical problems on combustion.

UNIT – III

ELECTROCHEMICAL CELLS AND CORROSION

Part-A:

ELECTROCHEMISTRY

Introduction- Galvanic cells - Reversible and irreversible cells – Single electrode potential – Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell –Lead-Acid storage cells-Li cells. Fuel cells: - Hydrogen Oxygen fuel cells – Methanol Oxygen fuel cells.

Part-B

CORROSION

Corrosion:- Definition – Theories of Corrosion (electrochemical and chemical)-Galvanic

corrosion,Differential aeration corrosion –Factors which influence the rate of corrosion - Protection from corrosion– Cathodic protection - Protective coatings: – Surface preparation – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).

UNIT – IV

CHEMISTRY OF ADVANCED ENGINEERING MATERIALS

Nano materials:- Introduction–Sol-gel method & chemical reduction method of preparation - Carbon nano tubes-Preparation and Applications;**Solar Energy:**- Introduction, application of solar energy, photovoltaic cell: design, working and its importance **Liquid Crystals** :- Types and applications **Non-Elemental Semiconducting Materials:-**Stoichiometric, Controlled valency&Chalcogen photo/semiconductors, Preparation of Semiconductors(Distillation,Zonerefining,Czochralski crystal pulling,epitaxy,diffusion,ion implantation) **Superconductors** :- Type-I & Type-2, properties &applications.

UNIT – V

COMPUTATIONAL CHEMISTRY AND SPECTROSCOPIC STUDIES

COMPUTATIONAL CHEMISTRY: Introduction,Ab Initio studies.

SPECTROSCOPIC STUDIES: Electromagnetic spectrum-UV(laws of absorption,instrumentation,theory of electronic spectroscopy,Frank-condon principle,chromophores and auxochromes,intensity shifts,applications),X-Ray diffraction method , FT-IR(Instrumentation and IR of some organic compounds,applications)-MRI and CT scan(Procedure & Applications).

TEXT BOOKS:

1.Engineering Chemistry by Jain and Jain; DhanpatRaiPublicating Co.
2. Engineering Chemistry by ShikhaAgarwal; Cambridge University Press, 2015 edition.

REFERENCE BOOKS:

1.Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
2. Engineering Chemistry by PrasanthRath, Cengage Learning, 2015 edition.
3. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition
4. Applied Chemistry by H.D. Gesser, Springer Publishers
5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM.

Course Outcomes:

Upon completion of this course, the students will be able to

CO1: Understand the advantages and limitations of plastic materials.

CO2: Describe the need of fuels as a source of energy.

CO3: Explain the theory of construction of batteries.

CO4: Study some methods of corrosion control and Categorize the reasons for corrosion.

CO5: Generalize the importance of advanced engineering materials like Nanomaterials, Liquid Crystals, Principles of Green chemistry, Refractories and Cementing materials.

CO6: Obtainthe knowledge of computational chemistry and understand the principles of different analytical instruments.

*****

I Year - II Semester Course Code : UR19ESC202

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

ELECTRICAL CIRCUIT ANALYSIS-I

(EEE)

Course Objectives:

- To study the concepts of passive elements, types of sources and various network reduction techniques.
- To understand the applications of network topology to electrical circuits.
- To study the concept of magnetic coupled circuit.
- To understand the behavior of RLC networks for sinusoidal excitations.
- To study the performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
- To understand the applications of network theorems for analysis of electrical networks.

UNIT – I

Introduction to Electrical Circuits: Passive components and their V-I relations. Sources (dependent and independent) -Kirchoff's laws, Network reduction techniques. source transformation technique, nodal analysis and mesh analysis..

UNIT – II

Network topology: Definitions of Graph and Tree, Basic cutset and tieset matrices for planar networks, Loop and nodal methods of analysis of networks with independent voltage and current sources, Duality and Dual networks.

UNIT – III

Magnetic Circuits: Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits.Faraday's laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling

Single Phase A.C Systems: Periodic waveforms -Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance real, reactive power and apparent power, waveform of instantaneous power triangle and complex power.

UNIT – IV

Analysis of AC Networks: Extension of node and mesh analysis to AC networks, Numerical problems on sinusoidal steady state analysis, Series and parallel resonance, selectively band width and Quasi factor.

UNIT – V

Network theorems (DC & AC Excitations): Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millman'stheorem .

TEXT BOOK:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,McGraw Hill Company,6 th edition
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd

REFERENCE BOOKS:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Electric Circuits by David A. Bell, Oxford publications
3. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications
4. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co.

NPTEL ONLINE COURSE:

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Design various electrical networks in presence of active and passive elements.
CO2: Express electrical networks with network topology concepts.
CO3: Judge any magnetic circuit with various dot conventions.
CO4: Identify any R, L, C network with sinusoidal excitation.
CO5: Memorize any R, L, network with variation of any one of the parameters i.e R, L, C. and f.
CO6: Identify electrical networks by using principles of network theorems.

*****

I Year - II Semester Course Code : UR19ESC210

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

Problem Solving and Programming Using C

(CE/EEE/ECE/CSE/IT)

Course Objectives:

- The objectives of this course are to make the student familiar with 'problem solving using computers, development of algorithms, usage of basic flowchart symbols and designing flowcharts.
- The students can also understand programming language basic concepts, reading and displaying the data, earn the programming skills using selection, iterative control structures, functions, arrays, pointers and files. After completion of this course the student is expected to analyze the real life problem and write programs in C language to solve theproblems.

UNIT – IINTRODUCTION

Problem Solving: Problem solving aspects, Problem solving techniques, Computer as a Problem solving tool, Algorithms-definition, features, criteria. Flowchart-definition, basic symbols, sample flowcharts. Top down design, Implementation of program verification, The efficiency of algorithms, Analysis of algorithms, computational complexity of algorithm, order(O) notation, Worst case & Average case Analysis.

UNIT – II

Basics of C programming language: Introduction to C, structure of a C program,.basic data types and sizes, constants, variables, unary, binary and ternary operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Input and Output statements, Sample Programs.

SELECTION-DECISION MAKING CONDITIONAL CONTROL STRUCTURES: simple-if, if- else, nested if-else, if- else ladder and switch-case.

ITERATIVE: while-loop, do-while loop and for loop control structures, goto, break and continue statements. Sample Programs.

UNIT – III

FUNCTIONS-basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs :

ARRAYS-concepts, declaration, definition, accessing elements, storing 'elements, 1-D arrays, 2-D arrays and character arrays, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix, Passing 1-D arrays, 2-D arrays to functions, Strings and String Manipulations

UNIT – IV

POINTERS-pointers concepts, initialization of pointer variables, pointers and function arguments, passing by address-dangling memory, address arithmetic, character pointers and

functions, pointers to pointers, pointers and -multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT – V

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration, definition and initialization of structures, accessing 'structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications

FILEHANDLING: Concept of a file, text files and binary files, Formatted I/O, File I/O operations

TEXT BOOKS:

1. How to Solve it by Computer, R. G. Dromey, Pearson Education,2019
2. ProgramminginC,AshokNKamthane,AmitAshokKamthane,3rdEdition,PearsonEducation, 2019

Reference Books:

1. The C programming Language by Dennis Richie and BrianKernighan
2. Programming in C, ReemaThareja,OXFORD
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,Cengage

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Design efficient algorithm for solving a problem.
CO2: Identify various constructs of C programming language efficiently.
CO3: Apply programs using modular approach such as functions.
CO4: Create programs to perform matrix and mathematical applications.
CO5: Understand dynamic memory management and problems using pointers and solving the problems.
CO6: Developreal life applications using structures and also learn about handling the files for storing the data permanently.

*****

I Year - II Semester Course Code : UR19HML202

L	T	P	C
0	0	3	1.5

Internal: 20 Marks External: 30 Marks

PROFESSIONAL ENGLISH LAB

(Common to all branches)

Course Objectives:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

List of activities:

1) Body Language: facial expressions, body posture, gestures
2) Body Language: eye movement, touch and the use of space
3) JAM
4) Extempore
5) Debate: Lincoln-Douglas debate and dos and don'ts
6) Debate: Formal and Informal debate
7) Interview Skills: Formal and Informal Interview
8) Interview Skills: Telephonic interview
9) Group Discussion: Dos and don'ts, general topics
10) Group Discussion: Science and technical topics
11) Presentation: Elimination of stage fear and preparation
12) Presentation on general topics
13) Presentation: using ppt or visual aids.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Reference Manuals:

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd 'Strengthen Your Communication Skills' published by Maruthi Publications

Course Outcomes:

Upon Completion of the course, the student will be able to:

CO1 Understand different types of body language
CO2 Develop communication skills through various language activities
CO3 Apply critical thinking to get main ideas for debate
CO4 Develop audacity to face an interview
CO5 Build knowledge for discussing topics effectively
CO6 Analyze a topic by making a presentation

*****

I Year - II Semester	Course Code : UR19BSCL203	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

Engineering and Applied Chemistry Lab

Course objectives:

- To gain practical knowledge by applying the experimental methods to correlate with the chemistry theory.
- To learn the usage of electrical systems for various measurements.
- Apply the analytical techniques and graphical analysis to the experimental data.

List of Experiments

1. Introduction to Chemistry laboratory-Molarity,Normality,Primary,Secondary standard solutions, Volumetric titrations, Qualitative analysis, Quantitative analysis etc.
2. Trial experiment-Estimation of HCl by using standard Na_2CO_3 solution.
3. Estimation of Total hardness of water by using standard EDTA solution.
4. Estimation of Zinc using standard EDTA solution.
5. Estimation of Copper using standard EDTA solution.
6. Estimation of P^H of the given sample solution using P^H meter.
7. Conductometric titration between Strong acid and Strong base.
8. Conductometric titration between Strong acid and Weak base.
9. Potentiometric titration between Strong acid and Strong base.
10. Potentiometric titration between Strong acid and Weak base.
11. Estimation of $KMnO_4$ using standard Oxalic acid.
12. Determination of Alkalinity of water.
13. Determination of Viscosity of given sample by Ostwald viscometer.
14. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution.
15. Estimation of Copper using standard $K_2Cr_2O_7$ solution.
16. Preparation of Bakelite (Demo).

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

Upon Completion of the course, the student will be able to

CO1: Utilize different Analytical tools and execute experiments involving estimation of raw materials, finished products and environmental samples etc.

CO2: Utilize modern instruments like Conductometer, pH meter and Potentiometer for the analysis of samples.

CO3: Determine the total hardness present in water for its quality in drinking purpose.

CO4: Estimate the Viscosity of oil and assess its suitability as a lubricant.

CO5: Determine the alkalinity present in water for its quality in drinking purpose.

CO6: Identify the adulteration of lemon juice for Vitamin-C.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II, VGS Techno Series
3. Chemistry Practical Manual, Lorven Publications
4. K. Mukkanti (2009) Practical Engineering Chemistry, B.S. Publication.

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I Year - II Semester	Course Code : UR19ESCL202	L	T	P	C
		0	0	3	1.5

Internal: 20 Marks External: 30 Marks

Problem Solving and Programming using C Lab

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that include conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.

Exercise 1

a) Write a C Program to calculate the area of a triangle.
b) Write a C program to find the largest of three numbers using ternary operator.
c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

a) Write a C program to find the 2's complement of a binary number.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and, also, find 'the reverse of the given number.
b) Write a C program to generate the first n terms of the Fibonacci sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4

a) Write a C Program to print the multiplication table of a given number.
b) Write a C Program to read a decimal number and find its equivalent binary number.
c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the given array.
b) Write a C program to implement a liner search on a given set of values.
c) Write a C program to implement binary search on a given set of values.

Exercise 6

a) Write a C program to implement sorting of an array of elements.
b) Write a C program to input two m x n matrices, check the compatibility and perform 'addition and multiplication of them.

Exercise 7

Write a C program that uses functions to perform the following operations:

i. To insert a sub-string into given main string at a given position.
ii. To delete n characters from a given position in a given string.
iii. To replace a character of string either from beginning or ending or at a specified location.

Exercise 8

Write a C program that uses functions to perform the following operations using Structure:

i) Reading a complex number
ii) Writing a complex number
iii) Addition of two complex numbers
iv) Multiplication of two complex numbers

Exercise 9

Write C Programs for the following string operations without using the built in functions

- to concatenate two strings to append a string to another string
- to compare two strings

Exercise 10

a) Write C Program to find the number of characters in a given string including and excluding spaces.
b) Write C Program to copy the contents of one string to another string without using string handling functions.
c) Write C Program to find whether a given string is palindrome or not.
d) Write a C program to find both the largest and smallest number of an array of integers using call by value and call by reference.

Exercise 11

Write a C program using recursion for the following:

a) To display sum of digits of given number
b) To find the factorial of a given integer
c) To find the GCD (greatest common divisor) of two given integers.
d) To find Fibonacci sequence

Exercise 12

a) Write C Program to reverse a string using pointers
b) Write a C Program to compare two 2D arrays using pojnters
c) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.

Exercise 13

Examples which explores the use of structures, union and other user defined variables.

Exercise 14

a) Write a C program. which copies one file to another.
b) Write a C program to count the number of characters and number of lines in a file.
c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

Note: Minimum 12 experiments of duration 3 periods must be completed for the eligibility to

appear for the semester end examinations. In case if the student fails to get eligibility for semester end exams in the current semester, he has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

Course Outcomes:

Upon the completion of the course, the student will be able to:

CO1: Apply and practice logical ability to solve the problems.

CO2: Identify C programming development environment, compiling, debugging, and linking and executing a program using the development environment.

CO3: Analyze the complexity of problems, modularize the problems into small modules and then convert them into programs.

CO4: Apply the in-built functions and customized functions for solving the problems.

CO5: Create C programs using pointers, memory allocation techniques.

CO6: Use files for dealing with variety of problems.

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I Year - II Semester Course Code : UR19MC200

L	T	P	C
0	0	0	0

Internal: 20 Marks External: 0 Marks

Semester-end: 30 Marks

ENGINEERING EXPLORATION PROJECT

COURSE OBJECTIVES:

- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating illdefined problems.
- Undergo several design challenges and work towards the final design challenge.

Apply Design thinking on the following Streams to

- Project Stream 1: Electronics, Robotics, IOT and Sensors
- Project Stream 2: Computer Science and IT Applications
- Project Stream 3: Mechanical and Electrical tools
- Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.

HOW TO PURSUE THE PROJECT WORK?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human-centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

TASKS TO BE DONE:

Task 1: Everyone is a Designer

- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems

- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems.

Task 4: Empathizing

- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating

- Continue Design Challenge and learn how to brainstorm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping

- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing

- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8:

- Final Report Submission and Presentation

Note: The colleges may arrange for Guest Speakers from Various Design Fields: Graphic Design, Industrial Design, Architecture, Product Design, Organizational Design, etc to enrich the students with Design Thinking Concept.

REFERENCES:

1. Tom Kelly, *The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm* (Profile Books, 2002)

2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness, 2009)

3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing, 2017)

OTHER USEFUL DESIGN THINKING FRAMEWORKS AND METHODOLOGIES:

- Human-Centered Design Toolkit (IDEO); https://www.ideo.com/post/design-kit
- Design Thinking Boot Camp Bootleg (Stanford D-School); https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Collective Action Toolkit (frogdesign); https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Educators (IDEO); https://designthinkingforeducators.com/

I Year - II Semester	Course Code : UR19MC203	L	T	P	C
		0	0	0	0

Internal: 100 Marks External: 0 Marks

CONSTITUTION OF INDIA

(CE,EEE, ME & ECE)

Course Objectives:

- To Enable the student to understand the importance ofconstitution
- To understand the structure of executive, legislature andjudiciary
- To understand philosophy of fundamental rights andduties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of india and election commission ofindia.
- To understand the central and state relation financial andadministrative.

UNIT – I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT – II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and CentralSecretariat,LokSabha,RajyaSabha,TheSupremeCourtandHighCourt:PowersandFunctions;

UNIT – III

State Government and its Administration Governor - Role and Position -CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT – IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT – V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women.

TEXT BOOKS:

1.Subash Kashyap, Indian Constitution, National Book Trust
2.J.A. Siwach, Dynamics of Indian Government & Politics

REFERENCE BOOKS:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2.D.C. Gupta, Indian Government and Politics
3.H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
4.J.C. Johari, Indian Government and Politics Hans

5.J. Raj Indian Government and Politics
6.M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice –
Hall of India Pvt. Ltd.. New Delhi
7.Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil
Right), Challenges to Civil Rights Guarantees in India, Oxford University Press2012.

NPTEL ONLINE COURSE:

Course Outcomes:

Upon completion of the course, the students will be able to

CO1: Explain the concept of Indian constitution and Evaluate Preamble Fundamental Rights and Duties

CO2: Judge the structure of Indian government, Differentiate between the state and central government.

CO3: Explain the role of President and Prime Minister and Know the Structure of Supreme Court and High court.

CO4: Analyze the role Governor and Chief Minister and explain the role of state Secretariat

CO5: Explain theroleofMyerandelectedrepresentativesofMunicipalities,EvaluateZillapanchayat block levelorganization

CO6: Identify the roles of Election Commission apply knowledge and Evaluate various commissions of viz SC/ST/OBC andwomen.

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II Year - III Semester **COURSE CODE: UR19PCEE301** **L T P C**
3 1 0 4

Electrical Machines-I

Internal Marks: 30
External Marks: 70

Course Objectives:

1. Appreciate the principles of electromagnetic energy conversion and understand the construction details of DC machine.
2. Understand the principle of operation and performance of DC generators. iii. Learn the characteristics and performance of DC generators.
3. Learn the characteristics and performance of DC motors.
4. Learn the speed control and testing methods of DC motors.
5. Learn the basic ideas of design of DC machines.

UNIT-I
Electromechanical Energy Conversion and introduction to DC machines
Principles of electromechanical energy conversion – singly excited and multi excited system – Calculation of force and torque using the concept of co-energy. Construction and principle of operation of DC machine – EMF equation for generator – Classification of DC machines based on excitation – OCC of DC shunt generator.

UNIT-II
Performance of D.C. Machines
Torque and back-emf equations of dc motors– Armature reaction and commutation – characteristics of separately-excited, shunt, series and compound motors - losses and efficiency-applications of dc motors.

UNIT-III
Starting, Speed Control and Testing of D.C. Machines
Necessity of starter – Starting by 3 point and 4 point starters – Speed control by armature voltage and field control – testing of DC machines - brake test, Swinburne's method – principle of regenerative or Hopkinson's method - retardation test -- separation of losses.

UNIT-IV
Single-phase Transformers
Types and constructional details - principle of operation - emf equation - operation on no load and on load – lagging, leading and unity power factors loads - phasor diagrams of transformers – equivalent circuit – regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – All day efficiency.

UNIT-V
Single-phase Transformers Testing
Tests on single phase transformers – open circuit and short circuit tests – Sumpner's test – separation of losses – parallel operation with equal voltage ratios – auto transformer - equivalent circuit – comparison with two winding transformers.

3-Phase Transformers

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

TEXT BOOKS

1. Electric Machinary – A. E. Fritzgerald, C. Kingsley and S. Umans, Mc Graw-Hill Companies, 5th editon.
2. Electrical Machines – P.S. Bimbra.3rd edition, Khanna Publishers

REFERENCE BOOKS

1. Performance and Design of D.C Machines – by Clayton & Hancock, 2nd edition, BPB. Publishers.
2. Electrical Machines -S.K. Battacharya, Mc Graw-Hill Companies, 4th editon.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata Mc Graw – Hill Publishers, 3rd edition, 2004.
4. Electromechanics – I (D.C. Machines) S. Kamakshaiah Hi-Tech Publishers, 2nd edition.

Course Outcomes:

1. Able to explain the concepts of electromagnetic energy conversion.
2. Able to explain the operation of dc generator, armature reaction and commutation.
3. Able to analyze the characteristics and performance of dc generators.
4. Able to explain the torque developed and performance of dc motors.
5. Able to analyze the speed control and testing methods of dc motors.
6. Able to propose design aspects of a dc machine.

II Year -III Semester **COURSE CODE: UR19PCEE302** **L T P C**
3 0 0 3

ELECTRICAL CIRCUIT ANALYSIS-II

Internal Marks: 30
External Marks: 70

Learning Objectives:

1. To study the concepts of balanced and unbalanced three-phase circuits.
2. To study the transient behavior of electrical networks with DC, pulse and AC excitations.
3. To study the performance of a network based on input and output excitation/response.
4. To understand the realization of electrical network function into electrical equivalent passive elements.
5. To understand the application of fourier series and fourier transforms for analysis of electrical circuits.

UNIT-I

Balanced Three phase circuits

Phase sequence- star and delta connection - relation between line and phase voltages and currents - analysis of balanced three phase circuits - measurement of active and reactive power, Numerical problems.

Unbalanced Three phase circuits

Analysis of three phase unbalanced circuits: Loop method – Star-Delta transformation technique, Two wattmeter methods for measurement of three phase power. Numerical problems

UNIT-II

Transient Analysis in DC and AC circuits

Transient response of R-L, R-C, R-L-C circuits for DC and AC excitations, Solution using differential equations and Laplace transforms. Numerical problems

UNIT-III

Two Port Networks

Two port network parameters – Z, Y, ABCD and Hybrid parameters and their relations, Cascaded networks. Numerical problems

UNIT-IV

Network synthesis

Positive real function - basic synthesis procedure - LC immittance functions - RC impedance functions and RL admittance function - RL impedance function and RC admittance function - Foster and Cauer methods. Numerical problems

UNIT-V

Fourier analysis and Transforms

Fourier theorem- Trigonometric form and exponential form of Fourier series, Conditions of symmetry- line spectra and phase angle spectra, Analysis of electrical circuits to non sinusoidal

periodic waveforms. Fourier integrals and Fourier transforms – properties of Fourier transforms physical significance of the Fourier Transform and its application to electrical circuits. Numerical problems

TEXT BOOKS:

1. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6 th edition
2. Network synthesis: Van Valkenburg, 3rd edition, Prentice-Hall of India Private Ltd

REFERENCE BOOKS:

1. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
2. Introduction to circuit analysis and design by TildonGlisson. Jr, Springer Publications.
3. Circuits by A.Bruce Carlson, Cengage Learning Publications
4. Network Theory Analysis and Synthesis by SmarajitGhosh, PHI publications
5. Networks and Systems by D. Roy Choudhury, New Age International publishers
6. Electric Circuits by David A. Bell, Oxford publications
7. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi,DhanpatRai&Co

8. Electrical Circuits and Network by KS. Suresh Kumar NIT Calicut, PEARSON education, 4th edition

Course Outcomes:

1. Students are able to solve three- phase circuits under balanced and unbalanced condition
2. Students are able find the transient response of electrical networks for different types of excitations.
3. Students are able to find parameters for different types of network.
4. Students are able to realize electrical equivalent network for a given network transfer function.
5. Students are able to extract different harmonics components from the response of a electrical network.
6. Students can understand to solve non linear problems.

II Year -III Semester **COURSE CODE: UR19PCEE303** **L T P C**
2 1 0 3

ELECTRO MAGNETIC FIELDS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. Electromagnetic field is the foremost pre-requisite course for most of the subjects in Electrical Engineering.
2. To study the properties of conductors and dielectrics, calculate the capacitance of different configure-various and understand the concept of conduction and convection current densities.
3. The enunciation of basics of electrical elements R, L and C that are the building blocks of any electrical device or in the illustration of Energy transfer from mechanical to electrical and vice versa its role is crucial.
4. To develop the concept of self and mutual inductances and the energy stored.
5. To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops.
6. This course also includes the famous works of Coulomb, Ampere, Faraday, Maxwell etc. to the field of Electrical Engineering.

UNIT – I

Electrostatics:

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 — Maxwell's first law, div (D)=ρv Laplace's and Poison's equations and Solution of Laplace's equation in one variable.

UNIT – II

Conductors – Dielectrics and Capacitance:

Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field – Behaviour of conductors in an electric field – Conductors and Insulators Polarization – capacitance of parallel plates, spherical and coaxial cables with composite dielectrics –Energy stored and energy density in a static electric field – Current density – Ohm's law in point form .

UNIT – III

Magneto statics and Ampere's Law:

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 –Ampere's circuital law– Point form of Ampere's circuital law –Field due to a circular loop, rectangular and square loops, Maxwell's third equation, Curl (H)=J.

UNIT – IV

Force in Magnetic fields:

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

UNIT – V

Self and Mutual inductance:

Self and Mutual inductance – 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:

Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂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 Electromagnetics" by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon. 2006.
2. "Electromagnetic Field Theory" by Yaduvir Singh, 4th edition, Pearson Education.

REFERENCE BOOKS:

1. "Principles of Electro Magnetics" by Sadiku, Oxford Publications,4th edition.
2. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd., 2nd edition.
3. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford higher education.
4. Electro magnetism : Problems with solutions by Ashutosh Pramanik, PHI Publications.

Course Outcomes:

1. Ability to calculate electric field and potentials using guass's law or solving Laplace's or Possion's equations.
2. Learn how to calculate capacitance, energy stored in dielectrics and get's the concept of conduction and convection currents.
3. Ability to find magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations.
4. Students can calculate the magnetic forces and torque produced by currents in magnetic field.
5. Will the able to calculate self and mutual inductances and the energy stored in the magnetic field.
6. Students will gain knowledge on time varying fields and get ability to calculate induced Emf. Concepts of displacement current and Poynting vector and associated problems are solved.

II Year -III Semester **COURSE CODE: UR19PCEE304** **L T P C**
3 0 0 3

ELECTRONIC DEVICES AND CIRCUITS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To learn the basics of semiconductor physics.
2. To study the construction details, operation and characteristics of various semiconductor diodes.
3. To understand the operation and analysis of rectifiers with and without filters. Further study the operation of series and shunt regulators using zener diodes.
4. To understand the basics of FET, Thyristors, Power IGBTs and Power MOSFETs.
5. To understand the concepts of positive and negative feedbacks and their role in amplifiers and oscillators.

UNIT I

Diode and Applications: Diode - Static and Dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances, Diode Applications: Switch-Switching times. Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers With Capacitive Filter, Clippers-Clipping at two independent levels, Clampers-Clamping Operation, types, Clamping Circuit Theorem, Comparators.

UNIT II

Bipolar Junction Transistor (BJT): Principle of Operation and characteristics -Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III

Transistor Biasing and Stabilization: Bias Stability, Fixed Bias, Collector to Base bias, Self Bias, Bias Compensation using Diodes and Transistors.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV

Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Biasing of FET, FET as Voltage Variable Resistor, MOSFET Construction and its Characteristics in Enhancement and Depletion modes.

UNIT V

FET Amplifiers: Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers, Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices: Zener Diode**-**Characteristics, Voltage Regulator; LED, PNP Diodes, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXT BOOKS:

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, 3rd edition, Tata Mc-Graw Hill.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9thEdition, 2006.

REFERENCE BOOKS:

1. Electronic Devices and Circuits by David A. Bell, 4th edition, Oxford University Press.
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA Mc Graw Hill, Second Edition.
3. Electronics devices and circuits by Atul P. Godse, Uday, Bakshi, Technical Publication.

Course Outcomes:

1. Students are able to understand the basic concepts of semiconductor physics, which are useful to understand the operation of diodes and transistors.
2. Students are able to explain the operation and characteristics of PN junction diode and special diodes.
3. Ability to understand operation and design aspects of rectifiers and regulators.
4. Students are able to understand the operation and characteristics of FET, Thyristors, Power IGBTs and Power MOSFETs.
5. Students are able to understand the merits and demerits of positive and negative feedback and the role of feedback in oscillators and amplifiers.
6. Students are able to understand the importance of different feedback.

II Year - III Semester **COURSE CODE: UR19PCME305** **L T P C**
2 0 0 2

THERMAL AND HYDRO PRIME MOVERS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To make the student understand the types of prime movers, which can be connected to generators for power production and should obtain the skills of performing the necessary calculations with respect to the functioning of the prime movers.
2. To make the student learn about the constructional features, operational details of various types of internal combustion engines through the details of several engine systems and the basic air standard cycles, that govern the engines.
3. To train the student in the aspects of steam formation and its utilities through the standard steam data tables and charts. To make the student correlate between the air standard cycles and the actual cycles that govern the steam turbines.
4. To make the student learn about the constructional features, operational details of various types of hydraulic turbines.
5. To teach the student about the fundamental of fluid dynamic equations and its applications fluid jets.

Part-A: Thermal prime movers

UNIT- I

I.C Engines

Classification, working principles – valve and port timing diagrams – air standard cycles – Engine systems line fuel injection, carburetion, ignition, cooling and lubrication – Engine performance evaluation.

UNIT -II

Properties of Steam and use of Steam Tables- T-S and H-S Diagrams. Analysis of Various Thermodynamic Processes under gone by Steam.

Vapor Power Cycles: Carnot Cycle-Rankine Cycle- Thermodynamic Variables Effecting Efficiency and output of Rankine Cycle-. Analysis of simple Rankine Cycle and Re-heat cycle.

Steam Turbines: Schematic layout of steam power plant Classification of Steam Turbines- Impulse Turbine and Reaction Turbine

UNIT -III

Gas Turbines

Simple gas turbine plant-ideal cycle, closed cycle -open cycle-. Efficiency, Work ratio and optimum pressure ratio for simple gas turbine cycle. Actual cycle, analysis of simple cycles & cycles with inter cooling, reheating and Regeneration.

Part-B: Hydro prime movers

UNIT- IV

IMPACT OF JETS AND PUMPS

Impulse momentum equation, Impact of Jet on stationary and moving vanes (flat and curved). Pumps: Types of pumps, Centrifugal pumps: Main components, Working principle, Multi stage pumps.

UNIT- V

HYDRAULIC TURBINES

Classification of turbines; Working principle, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.

HYDRO POWER

Components of Hydro electric power plant: pumped storage systems, load curve, load factor, capacity factor, utilization factor, diversity factor, load – duration curve, firm power, secondary power.

TEXT BOOKS:

1. Thermal Engineering by Rajput, Lakshmi publications
2. Thermal engineering by M.L.Mathur and F.S.Mehta, Jain Brothers.
3. "Hydraulics & Fluid Mechanics", P.N. Modi and S.M. Seth, TEXT BOOKS House, Delhi
4. "Fluid Mechanics & Hydraulic Machinery" A.K.Jain, , Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. "Fluid Mechanics" by Victor. L. Streeter.
2. "Introduction to Fluid Mechanics" Edward .J. Shaughnessy Jr.
3. "Fluid Mechanics & Its Applications", Vijay Gupta, Santhosh. K.Gupta.
4. "Fluid Mechanics & Fluid power Engineering, Dr D.S. Kumar.
5. "Water Power Engineering" M.M Desumukh.

Course Outcomes:

1. Further, the student shall be able to calculate the performance of different types of internal combustion engines.
2. To train the student to calculate the performance of steam turbines using velocity diagrams.
3. To impart the knowledge of gas turbine fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines.
4. To impart the knowledge of various types of pumps, their constructional features, working and performance.
5. Further, the student shall be able to calculate the performance of hydraulic turbines.
6. To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.

II Year -III Semester **COURSE CODE: UR19HM306** **L T P C**
3 0 0 3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To understand the concept and nature of Managerial Economic s and its relationship with other disciplines, Concept of Demand and Demand forecasting
2. To understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis
3. To understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods.
4. To know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles.
5. To understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation.
6. To understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different meth

Unit – I:

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement- Demand forecasting and its Methods.

Unit – II:

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions- Cobb-Douglas Production function-Economics of Sale-Cost Concepts- Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs- Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis- Determination of Break-Even Point (Simple Problem).

Unit – III:

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing.

Unit – IV:

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

Unit – V:

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements- Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow cash flow statements (Simple Problems)

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital- Capitalization-Meaning of Capital Budgeting-Need for Capital Budgeting- Techniques of Capital Budgeting-Traditional and Modern Methods.

TEXT BOOKS

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.
3. Prof. J.V.Prabhakara Rao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCE BOOKS:

1. V. Maheswari : Managerial Economics, Sultan Chand.
2. Suma Damodaran : Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. Vanitha Agarwal : Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja : Financial Accounting for Managers, Pearson.
6. Maheswari : Financial Accounting, Vikas Publications.
7. S. A. Siddiqui & A. S. Siddiqui : Managerial Economics and Financial Analysis, New Age International Publishers, 2012

Course Outcomes:

1. The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand
2. One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs
3. One has to understand the nature of different markets and Price Output determination under various market conditions
4. One should equipped with the knowledge of different Business Units
5. The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
6. The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making

II Year -III Semester **COURSE CODE: UR19PCEEL301**

L	T	P	C
0	0	3	1.5

ELECTRICAL CIRCUITS AND SIMULATION LAB

Internal Marks: 20
External Marks: 30

Course Objectives:

1. To verify and demonstrate various theorems, locus diagrams, resonance and two port networks.
2. To determine self and mutual inductance of a magnetic circuit, parameters of a given coil and measurement of 3- phase power
3. To simulate integrator circuit, differentiator circuit, Boost converter, Buck converter, full convertor and PWM inverter.

Any 6 of the following experiments are to be conducted:

1) Verification of Thevenin's and Norton's Theorems
2) Verification of Superposition theorem and Maximum Power Transfer Theorem
3) Verification of Compensation Theorem
4) Verification of Reciprocity , Millmann's Theorems
5) Locus Diagrams of RL and RC Series Circuits
6) Series and Parallel Resonance
7) Determination of Self, Mutual Inductances and Coefficient of coupling
8) Z and Y Parameters
9) Transmission and hybrid parameters
10) Parameters of a choke coil.
11) Determination of cold and hot resistance of an electric lamp.
12) Measurement of 3-phase Power by two Wattmeter Method for balanced and unbalanced loads

Any 4 of the following PSPICE experiments are to be conducted:

1. Simulation of transient response of RLC circuits
a. Response to pulse, step, sinusoidal inputs
2. Verification of Thevenin's and Norton's Theorems of given circuir.
3. Verification of Superposition theorem of given circuir.
4. Verification of maximum power transfer of given circuir.
5. Verification of Reciprocity of given circuir.

Course Outcomes:

1. Able to perform theorems, locus diagrams, resonance and two port networks.
2. To determine mutual inductance of a magnetic circuit.
3. To understand operation of Boost converter, Buck converter, full convertor and PWM inverter.

Note:

Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he/she has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

II Year -III Semester **COURSE CODE: UR19PCMEL302**

L	T	P	C
0	0	3	1.5

THERMAL AND HYDRO LAB

Internal Marks: 20
External Marks: 30

Course Objectives:

1. To impart practical knowledge on the performance evaluation methods of various internal combustion engines.
2. To gain knowledge on flow measuring equipment.
3. To have practical knowledge on hydraulic turbines and pumps.

SECTION A - THERMAL ENGINEERING LAB

1. I.C. Engines valve / port timing diagrams.
2. I.C. Engines performance test on 4 -stroke Diesel engine.
3. I.C. Engines performance test on 2-stroke petrol engine.
4. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol Engine
5. Determination of FHP by retardation and motoring test on IC engine
6. I.C. Engines heat balance on petrol / Diesel engines.
7. Economical speed test of an IC engine
8. Study of boilers

SECTION B – HYDRAULIC MACHINES LAB

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Reciprocating Pump.
7. Calibration of Venturimeter.
8. Calibration of Orifice meter.
9. Determination of loss of head due to sudden contraction in a pipe line.

Course Outcomes:

1. Able to understand performance evaluation methods of various internal combustion engines.
2. To understand operation of flow measuring equipment practically.
3. To understand working and operation of hydraulic turbines and pumps.

Note:

Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he/she has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

II Year -III Semester	COURSE CODE: UR19MC301	L T P C 0 0 0 0

ENVIRONMENTAL STUDIES

Internal Marks: 100
External Marks: 0

Course Objectives:

1. Overall understanding of the natural resources
2. Basic understanding of the ecosystem and its diversity
3. Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
4. An understanding of the environmental impact of developmental activities
5. Awareness on the social issues, environmental legislation and global treaties.

UNIT – I

Multidisciplinary nature of Environmental Studies: Definition, Scope andImportance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, Carbon Credits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem – Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT – II

Natural Resources: Natural resources and associated problems Forest resources–Use and over–exploitation, deforestation–Timber extraction–Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Sustainable mining of Granite, Literate, Coal, Sea and River sands.

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT – III

Biodiversity and its conservation:

Definition: genetic, species and ecosystem diversity classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-

wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV

Environmental Pollution: Definition, Cause, effects and control measures of air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.

Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.

UNIT – V

Social Issues and the Environment: Urban problems related to energy –Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Environmental Protection Act –Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act - Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism, Green Campus – Green business and Green politics. The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

TEXT BOOKS:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada.
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai.

REFERENCE BOOKS:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, ShaashiChawla, TMH, New Delhi.
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi.
4. Perspectives in Environment Studies, AnubhaKaushik, C P Kaushik, New Age International Publishers, 2014.

Course Outcomes:

Upon completion of the course, the students will be able to

1. Identify the natural resources, ecology, Biodiversity, and conservation of natural resources.
2. Explain various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.

3. Judge the social issues both rural and urban environment and the possible means to combat the challenges.
4. Identify the Environmental Impact Assessment and environmental legislations of India and global initiatives towards sustainable development.
5. Analyze the concept of Biodiversity and its conservation.
6. Survey the concept of Solid Waste Management.

II Year -IV Semester **COURSE CODE: UR19PCEE401** **L T P C**
3 1 0 4

ELECTRICAL MACHINES – II

Internal Marks: 30
External Marks: 70

Course Objectives:

1. Appreciate the concept of operation and performance of single phase transformers.
2. Understand the methods of testing of single-phase transformer.
3. Distinguish between single-phase and three-phase transformers.
4. Understand the concept of operation and performance of 3-phase induction motor.
5. Appreciate the relation between torque and slip, performance of induction motor and induction generator.
6. Understand the basic concepts of design of transformers and 3-phase induction motors.

UNIT-I
3-phase Induction Motors
Construction details of cage and wound rotor machines - production of rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor current and pf at standstill and during running conditions - rotor power input, rotor copper loss and mechanical power developed and their interrelationship – equivalent circuit – phasor diagram

UNIT-II
Characteristics, starting and testing methods of Induction Motors
Torque equation - expressions for maximum torque and starting torque - torque slip characteristic - double cage and deep bar rotors - crawling and cogging – speed control of induction motor with V/f method – no load and blocked rotor tests - circle diagram for predetermination of performance– methods of starting – starting current and torque calculations – induction generator operation (Qualitative treatment only)

UNIT – III:
Single Phase Motors
Single phase induction motors – Constructional features and equivalent circuit–Double revolving field theory–Starting methods, shaded pole motors, AC Series motor.

UNIT–IV:
Construction, Operation and Voltage Regulation of Synchronous generator
Constructional features of non–salient and salient pole type – Armature windings – Distributed and concentrated windings – Distribution– Pitch and winding factors –E.M.F equation– Improvements of waveform and armature reaction–Voltage regulation by synchronous impedance method– MMF method and Potier triangle method–Phasor diagrams– Two reaction analysis of salient pole machines and phasor diagram.

UNIT –V:

Parallel operation of synchronous generators

Parallel operation with infinite bus and other alternators – Synchronizing power – Load sharing – Control of real and reactive power– Numerical problems.

Synchronous motor – operation, starting and performance

Synchronous Motor principle and theory of operation– Phasor diagram – Starting torque– Variation of current and power factor with excitation –Synchronous condenser – Mathematical analysis for power developed– Hunting and its suppression – Methods of starting – Applications circuit (qualitative treatment only).

TEXT BOOKS:

1. Electrical Machines – P.S. Bimbra., 3rd edition, Khanna Publishers
2. Electrical Machines by D P.Kothari, I .J .Nagarth,Mc GrawHill Publications, 4th edition

REFERENCE BOOKS:

1.Electrical Machines by R.K.Rajput, Lakshmi publications,Fifth edition
2.Electrical Machines by J.B.Guptha. 4th edition, S.K.Kataria & Sons

Course Outcomes:

1. Able to explain the operation and performance of single phase transformer.
2. Able to explain the regulation losses and efficiency of single phase transformer.
3. Able to explain types of three phase transformer connection, tap changing methods and 3-phase to 2-phase transformation.
4. Able to explain the operation and performance of three phase induction motor.
5. Able to analyze the torque-speed relation, performance of induction motor and induction generator.
6. Able to explain design procedure for transformers and three phase induction motors.

II Year -IV Semester **COURSE CODE: UR19PCEE402** **L T P C**
3 0 0 3

POWER SYSTEMS-I

Internal Marks: 30
External Marks: 70

Course Objectives :

1. To study the principle of operation of different components of a thermal power stations.
2. To study the principle of operation of different components of a Nuclear power stations.
3. To study the concepts of DC/AC distribution systems and voltage drop calculations.
4. To study the constructional and operation of different components of an Air and Gas Insulated substations.
5. To study the constructional details of different types of cables.
6. To study different types of load curves and tariffs applicable to consumers.

UNIT-I

Thermal Power Stations

Selection of site, general layout of a thermal power plant showing paths of coal, steam, water, air, ash and flue gasses, ash handling system, Brief description of components: Boilers, Super heaters, Economizers, electrostatic precipitators steam Turbines turbo alternators, Condensers, feed water circuit, Cooling towers and Chimney.

UNIT-II

Nuclear Power Stations

Location of nuclear power plant, working principle, nuclear fission, nuclear fuels, nuclear chain reaction, nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding, nuclear waste disposal.

UNIT-III

Renewable power plants:

Solar power generation. Photovoltaic and solar, concentrators. Wind power generation: Types of wind mills, wind generators, tidal, biomass, geothermal and micro, hydel power plants, fuel cells.

UNIT-IV

Substation:

Classification of substations: Air insulated substations- Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements
Gas insulated substations (GIS) – Advantages , different types , single line diagram , Bus bar arrangement, construction aspects of GIS, Substation automation.

UNIT-V

Economic Aspects of Power Generation

Economic Aspects - Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, power capacity factor and plant use factor, Base and peak load plants.

Tariff Methods- Costs of Generation and their division into Fixed, Semi-fixed and Running Costs, Desirable Characteristics of a Tariff Method, Tariff Methods: Simple rate, Flat Rate, Block-Rate, two-part, three–part, and power factor tariff methods.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagarand A. Chakrabarti, Dhanpat Rai 5th edition & Co. Pvt. Ltd.
2. Generation, Distribution and Utilization of Electric Energy by C.L.Wadhawa, 4th edition, New age International (P) Limited, Publishers.

REFERENCE BOOKS:

1. Electrical Power Distribution Systems by - V. Kamaraju, TataMcGraw Hill, New Delhi.
2. Elements of Electrical Power Station Design by – M V Deshpande, PHI, New Delhi.

Course Outcomes:

1. Students are able to identify the different components of thermal power plants.
2. Students are able to identify the different components of nuclear Power plants.
3. Students are able to distinguish between AC/DC distribution systems and also estimate voltage drops of distribution systems.
4. Students are able to identify the different components of air and gas insulated substations.
5. Students are able to identifys ingle core and multi core cables with different insulating materials.
6. Students are able to analyze the different economic factors of power generation and tariffs.

II Year -IV Semester **COURSE CODE: UR19PCEE403** **L T P C**
2 1 0 3

CONTROL SYSTEMS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function.
2. To analyze the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers.
3. To investigate the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
4. To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
5. To discuss basic aspects of design and compensation of linear control systems using Bode plots.
6. Ability to formulate state models and analyze the systems. To present the concepts of Controllability and Observability.

UNIT – I
MATHEMATICAL MODELING OF CONTROL SYSTEMS

Open Loop and closed loop control systems and their differences, Classification of control systems, transfer function of linear system, Differential equations of electrical networks, Translational and Rotational mechanical systems, Transfer Function of DC
Servo motor - AC Servo motor , Block diagram algebra – Signal flow graph - Reduction using Mason's gain formula.

UNIT-II
TIME RESPONSE ANALYSIS

Standard test signals - Time response of first order systems –Time response of second order systems - Time domain specifications - Steady state errors and error constants – Feed-Back Characteristics, PID controllers.

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UNIT – III
STABILITY AND ROOTLOCUS TECHNIQUE

The concept of stability – Routh's stability criterion –limitations of Routh's stability – The root locus concept - construction of root loci (Simple problems). Effect of open loop poles and zeros on rootlocus.

UNIT–IV
FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams- transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Stability criterion, Sinusoidal transfer function, Minimum and non-minimum phase systems.

UNIT–V

CLASSICAL CONTROL DESIGN TECHNIQUES

Lag, Lead, Lag-Lead compensators, design of compensators – using Bode plots.

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, state space representation of transfer function, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Modern Control Engineering, Kotsuhiko Ogata, 4th edition, Prentice Hall of India.
2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India, 2nd Edition.
3. Control Systems Engineering, Norman S.Nise, 6th edition, Wiley publication.

REFERENCE BOOKS:

1. Control Systems, Manik Dhanesh N, 3rd edition, Cengage publications .
2. Control Systems principles and design, M.Gopal, Tata Mc Graw Hill education Pvt Ltd., 4th Edition.
3. Control Systems Engineering, S.Palani, 4th edition, Tata Mc Graw Hill Publications.

Course Outcomes:

1. Ability to represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.
2. Ability to derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
3. Capability to determine time response specifications of second order systems and to determine error constants.
4. Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
5. Capable to analyze the stability of LTI systems using frequency response methods.
6. Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.

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II Year -IV Semester **COURSE CODE: UR19PCEE404** **L T P C**
2 1 0 3

SWITCHING THEORY AND LOGIC DESIGN

Internal Marks: 30
External Marks: 70

Course Objectives:
This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits
4. To design combinational logic circuits, sequential logic circuits.
5. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.

UNIT – I
REVIEW OF NUMBER OF SYSTEMS & CODES:
i) Representation of numbers of different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed members, problem solving. ii) 4 bit codes, BCD, Excess-3, 2421, 84-2-1 9's compliment code etc., iii) Logic operations and error detection & correction codes; Basic logic operations -NOT, OR, AND, NAND-NAND and NOR-NOR realizations. Universal building blocks, EX-OR, EX-NOR - Gates, Standard SOP and POS, Forms, Gray code, error detection, error correction codes (parity checking, even parity, odd parity, Hamming code).

UNIT – II
MINIMIZATION TECHNIQUES:
Boolean theorems, principle of complementation & duality, De-morgan theorems, minimization of logic functions using Boolean theorems, minimization of switching functions using K-Map up to 6 variables, tabular minimization, code-converters using K-Map etc..

UNIT – III
COMBINATIONAL LOGIC CIRCUITS DESIGN:
Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit, look-a-head adder circuit, Design of decoder, demultiplexer, 7 segment decoder, higher order demultiplexing, encoder, multiplexer, higher order multiplexing, realization of Boolean functions using decoders and multiplexers, priority encoder, 4-bit digital comparator.

UNIT – IV

INTRODUCTION OF PLD's :

PROM, PAL, PLA-Basics structures, realization of Boolean function with PLDs, programming tables of PLDs, merits & demerits of PROM, PAL, PLA comparison, realization of Boolean functions using PROM, PAL, PLA, programming tables of PROM, PAL, PLA.

UNIT – V

SEQUENTIAL CIRCUITS I:

Classification of sequential circuits (synchronous and asynchronous); basic flip-flops, truth tables and excitation tables (nand RS latch, nor RS latch, RS flip-flop, JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals). Conversion from one flip-flop to flip-flop. Design of ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register.

SEQUENTIAL CIRCUITS II :

Finite state machine; Analysis of clocked sequential circuits, state diagrams, state tables, reduction of state tables and state assignment, design procedures. Realization of circuits using various flip-flops.

TEXT BOOKS:

1. Switching Theory and Logic Design by Hill and Peterson 3rd edition, Mc-Graw Hill TMH edition.
2. Switching Theory and Logic Design by A. Anand Kumar, 4th edition, PHI publications
3. Digital Design by MM Mano, 6th edition, Pearson publication .

REFERENCE BOOKS:

1. Modern Digital Electronics by RP Jain, 2nd edition, TMH.
2. Fundamentals of Logic Design by Charles H. Roth Jr, 3rd edition, Jaico Publishers.
3. Micro electronics by Milliman, 4th edition, TMH edition.

Course Outcomes:

1. Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD.
2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
5. Students able to understand registers.
6. To implement synchronous state machines using flip-flops.

II Year -IV Semester **COURSE CODE: UR19PCEE405** **L T P C**
3 0 0 3

ELECTRICAL MEASUREMENTS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To study the principle of operation and working of different types of instruments. measurement of voltage and current.
2. To study the working principle of operation of different types of instruments for measurement of power and energy
3. To understand the principle of operation and working of dc and ac potentiometers.
4. To understand the principle of operation and working of various types of bridges for measurement of parameters –resistance, inductance, capacitance and frequency.
5. To study the principle of operation and working of various types of magnetic measuring instruments.
6. To study the applications of CRO for measurement of frequency, phase difference and hysteresis loop using Lissajous patterns

UNIT–I:
Measuring Instruments
Classification – Deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type, dynamometer and electrostatic instruments – Expression for the deflecting torque and control torque – Errors and compensations–CT and PT**:** Ratio and phase angle errors – Numerical problems.

UNIT –II:
Measurement of Power and Energy
Single phase and three phase dynamometer wattmeter – LPF and UPF – Expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Type of P.F. Meters – Single phase and three phase dynamometer and moving iron type Single phase induction type energy meter – Driving and braking torques – errors and compensations — Three phase energy meter – Weston type synchro-scope.

UNIT – III:
Potentiometers
Principle and operation of D.C. Crompton's potentiometer – Standardization – Measurement of unknown resistance – Measurement of unknown Current – Measurement of unknown oltage.AC Potentiometers**:** polar and coordinate types – Standardization – Applications.

UNIT – IV:

Measurements of Parameters

Method of measuring low, medium and high resistance – Sensitivity of Wheat stone's bridge – Carey Foster's bridge– Kelvin's double bridge for measuring low resistance– Loss of charge method for measurement of high resistance – Megger– Measurement of earth resistance – Measurement of inductance – Quality Factor – Maxwell's bridge–Anderson's bridge– Measurement of capacitance and loss angle — Schering Bridge.

UNIT – V:

Magnetic Measurements

Ballistic galvanometer – Equation of motion – Flux meter – Constructional details–Core loss measurements by bridges and potentiometers.

Digital Meters

Digital Voltmeter–Successive approximation – Measurement of phase difference – Frequency – – Ramp and integrating type– Digital frequency meter–Digital multimeter–Digital Tachometer.

Text Books:

1. Electrical Measurements and measuring Instruments – by E.W. Golding and F.C.Widdis, fifth Edition, Wheeler Publishing.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.
3. Electronic Instrumentation and Measurements by DA Bell, 3rd edition Oxford Higher Education

Reference Books:

1. Electrical & Electronic Measurement & Instruments by A.K.Sawhney Dhanpat Rai & Co.Publications.
2. Electrical and Electronic Measurements and instrumentation by R.K.Rajput, S.Chand.
3. Electrical Measurements – by Buckingham and Price, Prentice – Hall
4. Electrical Measurements by Forest K. Harris. John Wiley and Sons

Course Outcomes:

1. Able to choose right type of instrument for measurement of voltage and current for ac and dc.
2. Able to choose right type of instrument for measurement of power and energy –
3. able to calibrate energy meter by suitable method
4. Able to calibrate ammeter and potentiometer.
5. Able to select suitable bridge for measurement of electrical parameters
6. Able to use the ballistic galvanometer and flux meter for magnetic measuring instruments And also measure frequency and phase difference between sign.

II Year -IV Semester **COURSE CODE: UR19PCEEL401**

L	T	P	C
0	0	3	1.5

ELECTRICAL MACHINES-I LAB

Internal Marks: 20
External Marks: 30

Course Objectives:

1. To plot the magnetizing characteristics of DC shunt generator and understand the mechanism of self-excitation.
2. To control the speed of the DC motors.
3. Determine and predetermine the performance of DC machines.

The following experiments are required to be conducted compulsory experiments:

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

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

9. Load test on DC series generator. Determination of characteristics.
10. Retardation test on DC shunt motor. Determination of losses at rated speed.
11. Separation of losses in DC shunt motor.
12. Speed control of DC shunt motor by Field and armature Control.

Course Outcomes:

1. Students understand predetermine the performance of DC machines
2. Students understand control the speed of DC motor.
3. Students understand Brake test.
4. Students understand efficiency calculation on DC Shunt machine.
5. Students understand performance curves os DC compound motor.
6. Students understand Critical field resistance of DC shunt generator.

Note:

Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he/she has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

II Year -IV Semester **COURSE CODE: UR19PCEEL402**

L	T	P	C
0	0	3	1.5

ELECTRONIC DEVICES AND CIRCUITS LAB

Internal Marks: 20
External Marks: 30

Course Objectives:

1. To impact practical knowledge on Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
2. To gain knowledge by soldering simple electronics circuits.
3. To have practical knowledge on analog, digital multimeter, function generator, RPS.

PART A: Electronic Workshop Practice

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Soldering Practice- Simple circuits using active and passive components.
4. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

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PART B: List of Experiments

1. P-N Junction Diode Characteristics
Part A: Germanium Diode (Forward bias& Reverse bias)
Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
Part A: V-I Characteristics
Part B: Zener Diode as Voltage Regulator
3. Rectifiers (without and with c-filter)
Part A: Half-wave Rectifier
Part B: Full-wave Rectifier
4. BJT Characteristics(CE Configuration)
Part A: Input Characteristics
Part B: Output Characteristics
5. FET Characteristics(CS Configuration)
Part A: Drain Characteristics
Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
Electrical and Electronics Engineering
9. CRO Operation and its Measurements
10. BJT-CE Amplifier
11. Emitter Follower-CC Amplifier
12. FET-CS Amplifier

Course Outcomes:

1. Students understand testing of R,L,C components, coil, relay.
2. Students identify diodes, BJT, JFET, LEDs, LCDs, SCR and UJT.
3. Students understand operation of analog and digital multimeter.
4. Students understand operation of function generator, RPS and CRO.

Note:

Minimum 12 experiments of duration 3 periods must be completed for the eligibility to appear for the semester end examinations.

In case if the student fails to get eligibility for semester end exams in the current semester, he/she has to take the permission of HOD and complete the required number of experiments and appear for semester end exam as and when conducted.

II Year –IV Semester	COURSE CODE: UR19MC401	L	T	P	C
		0	0	0	0

PROFESSIONAL ETHICS AND HUMAN VALUES

Course Objectives:

1. To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
2. Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

UNIT I: Human Values:
Morals, Values and Ethics – Integrity –Trustworthiness - Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty -Courage – Value Time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality-Character.

UNIT: II: Principles for Harmony:
Truthfulness – Customs and Traditions -Value Education – Human Dignity – Human Rights – Fundamental Duties - Aspirations and Harmony (I, We & Nature) – Gender Bias – Emotional Intelligence – Salovey – Mayer Model – Emotional Competencies – Conscientiousness.

UNIT III: Engineering Ethics and Social Experimentation:
History of Ethics - Need of Engineering Ethics - Senses of Engineering Ethics- Profession and Professionalism —Self Interest - Moral Autonomy – Utilitarianism – Virtue Theory - Uses of Ethical Theories - Deontology- Types of Inquiry –Kohlberg's Theory - Gilligan's Argument – Heinz's Dilemma - Comparison with Standard Experiments — Learning from the Past – Engineers as Managers – Consultants and Leaders – Balanced Outlook on Law - Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV: Engineers' Responsibilities towards Safety and Risk:
Concept of Safety - Safety and Risk – Types of Risks – Voluntary v/sInvoluntary Risk – Consequences - Risk Assessment – Accountability – Liability - Reversible Effects – Threshold Levels of Risk - Delayed v/sImmediate Risk - Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V: Engineers' Duties and Rights:
Concept of Duty - Professional Duties – Collegiality - Techniques for Achieving Collegiality – Senses of Loyalty - Consensus and Controversy - Professional and Individual Rights – Confidential and Proprietary Information - Conflict of Interest-Ethical egoism – Collective Bargaining – Confidentiality - Gifts and Bribes - Problem solving-Occupational Crimes-Industrial Espionage- Price Fixing-Whistle Blowing.

Globalization and MNCs –Cross Culture Issues - Business Ethics – Media Ethics -Environmental Ethics – Endangering Lives - Bio Ethics - Computer Ethics - War Ethics – Research Ethics - Intellectual Property Rights. Related Cases Shall be dealt where ever necessary.

References:

1. Professional Ethics by R. Subramaniam – Oxford Publications, New Delhi.
2. Ethics in Engineering by Mike W. Martin and Roland Schinzinger - Tata McGraw-Hill –2003.
3. Professional Ethics and Morals by Prof.A.R.Aryasri, DharanikotaSuyodhana – Maruthi Publications.
4. Engineering Ethics by Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
5. Human Values & Professional Ethics by S. B. Gogate, Vikas Publishing House Pvt. Ltd., Noida.
6. Engineering Ethics & Human Values by M.Govindarajan, S.Natarajan and V.S. Senthil Kumar-PHI Learning Pvt. Ltd – 2009.
7. Professional Ethics and Human Values by A. Alavudeen, R.Kalil Rahman and M.Jaya kumaran – University Science Press.
8. Professional Ethics and Human Values by Prof.D.R.Kiran-Tata McGraw-Hill - 2013
9. Human Values And Professional Ethics by Jayshree Suresh and B. S. Raghavan, S.Chand Publications

Course Outcomes:

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

1. It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
2. It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.
3. Understands about Need of Engineering Ethics, Profession and Professionalism and Balanced Outlook on Law
4. Demonstrates the risk factors and also the Designing facts for Safety.
5. Understand the Concepts of Duty and Problem solving-Occupational Crimes.
6. Understands the different ethics like Bio Ethics, Computer Ethics, War and research Ethics

II Year - IV Semester	COURSE CODE: UR19MPROJEE401	L	T	P	C
		0	0	0	0

SOCIALLY RELEVANT MINI PROJECT

Internal Marks: 20
Semester-end Marks: 30
External Marks: 0

Guidelines:

1. Students should select a problem which addresses some basic home, office or other real life Applications and submit abstract.
2. The electrical and electronic circuit for the selected problem should have at least 15 to 20 components.
3. Students should understand testing of various components.
4. Soldering of components should be carried out by students.
5. Students should develop a necessary circuit connection.
6. Students should see that final circuit submitted by them is in working condition.
7. Report contains 5-10 pages to be submitted by students.
8. Group of maximum three students can be permitted to work on a single mini project.
9. The mini project must have hardware part. The software part is optional.
10. Department may arrange demonstration with poster presentation of all mini projects developed by the students at the end of semester.
11. It is desirable that the electrical and electronic circuit/systems developed by the students have some novel features.