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 ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE
&
SYLLABUS

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE
ELECTRONICS AND COMMUNICATION ENGINEERING
(Applicable for batches admitted from 2019-2020)

I SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	HMC	UR19HM101	Communicative English	2	0	0	2	2
2	BSC	UR19BSC101	Linear Algebra & Calculus	3	1	0	4	4
3	BSC	UR19BSC108	Applied Physics	3	0	0	3	3
4	ESC	UR19ESC104	Basic Electrical Engineering	3	0	0	3	3
5	ESC	UR19ESC108	Engineering Graphics and Drafting	1	0	3	4	2.5
6	HMC	UR19HML101	Communicative English Lab	0	0	2	2	1
7	BSC	UR19BSCL102	Applied Physics Lab	0	0	3	3	1.5
8	ESC	UR19ESCL101	Engineering Workshop & IT Workshop	0	0	3	3	1.5
Mandatory Course								
9	MC	UR19MC102	Applied Physics-Virtual Lab*	0	0	0	2	0
Total				**12**	**1**	**11**	**26**	**18.5**
***Internal Evaluation**								

II SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	HMC	UR19HM202	Professional English	2	0	0	2	2
2	BSC	UR19BSC203	Numerical Methods & Transforms	3	0	0	3	3
3	BSC	UR19BSC205	Differential Equations & Vector Calculus	3	0	0	3	3
4	BSC	UR19BSC210	Applied Chemistry	3	0	0	3	3
5	ESC	UR19ESC203	Network Analysis	3	0	0	3	3
6	ESC	UR19ESC210	Problem Solving and Programming using C	3	0	0	3	3
7	HMC	UR19HML202	Professional English Lab	0	0	3	3	1.5
8	BSC	UR19BSCL203	Engineering and Applied Chemistry Lab	0	0	3	3	1.5
9	ESC	UR19ESCL202	Problem Solving and Programming using C 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**								

III SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC301	Electronics Devices and Circuits	3	0	0	3	3
2	PCC	UR19PCEC302	Switching Theory and Logic Design	3	0	0	3	3
3	PCC	UR19PCEC303	Signals and Systems	3	0	0	3	3
4	PCC	UR19PCEC304	Random Variables and Stochastic Process	3	0	0	3	3
5	ESC	UR19ESEC301	Object Oriented Design and Programming using Java	3	0	0	3	3
6	HMC	UR19HM301	Managerial Economics & Financial Analysis	3	0	0	3	3
7	PCC	UR19PCECL301	Electronics Devices and Circuits - Lab	0	0	3	3	1.5
8	PCC	UR19PCECL302	Switching Theory and Logic Design -Lab	0	0	2	2	1
Mandatory Course								
9	MC	UR19MC301	Environmental studies*	0	0	0	3	0
Total				**18**	**0**	**5**	**26**	**20.5**
***Internal Evaluation**								

IV SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC401	Analog Circuits	3	0	0	3	3
2	PCC	UR19PCEC402	Analog Communications	3	0	0	3	3
3	PCC	UR19PCEC403	Control Systems	3	0	0	3	3
4	PCC	UR19PCEC404	Electromagnetic Waves and Transmission Lines	3	0	0	3	3
5	ESC	UR19ESEC401	Computer Architecture and Organization	3	0	0	3	3
6	HMC	UR19HM402	Management and Organizational Behavior	3	0	0	3	3
7	PCC	UR19PCECL401	Analog Circuits – Lab	0	0	3	3	1.5
8	PCC	UR19PCECL402	Analog Communications - Lab	0	0	3	3	1.5
Mandatory Courses								
9	MC	UR19MCEC401	MOOCS-I*	0	0	0	0	0
10	PROJ	UR19MPROJEC401	Socially relevant Mini Project-I*	0	0	0	2	0
Total				**18**	**0**	**6**	**26**	**21**
***Internal Evaluation**								

V SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC501	Integrated Circuits and applications	3	0	0	3	3
2	PCC	UR19PCEC502	Microprocessor and Microcontrollers	3	0	0	3	3
3	PCC	UR19PCEC503	Digital Communications	3	0	0	3	3
4	PCC	UR19PCEC504	Antennas and Wave Propagation	3	0	0	3	3
Professional Elective (PE1)								
5	PEC	UR19PEEC501	Information Theory & Coding	3	0	0	3	3
		UR19PEEC502	Data structures and Algorithms					
		UR19PEEC503	Embedded Systems					
		UR19PEEC504	Neural Networks and Fuzzy Logic Control					
		UR19PEEC505	Electronic Measurements and Instrumentation					
6	PCC	UR19PCECL501	Integrated Circuits and applications - Lab	0	0	3	3	1.5
7	PCC	UR19PCECL502	Microprocessor and Microcontrollers Lab	0	0	3	3	1.5
8	PCC	UR19PCECL503	Digital Communications Lab	0	0	3	3	1.5
Mandatory Course								
9	MC	UR19MCEC501	MOOCS-II*	0	0	0	0	0
10	MC	UR19MC502	Professional Ethics and Human Values*	0	0	0	0	0
Total				**15**	**0**	**9**	**24**	**19.5**
Employability Skills- I*							2	0
***Internal Evaluation**								

VI SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC601	Internet of Things	3	0	0	3	3
2	PCC	UR19PCEC602	VLSI Design	3	0	0	3	3
3	PCC	UR19PCEC603	Digital Signal Processing	3	0	0	3	3
Professional Elective (PE2)								
4	PEC	UR19PEEC601	Cellular & Mobile Communications	3	0	0	3	3
		UR19PEEC602	Global Position System (GPS)					
		UR19PEEC603	Electromagnetic Interference & Compatibility (EMI/EMC)					
		UR19PEEC604	Biomedical Signal processing					
		UR19PEEC605	MIMO Systems					
5	OEC	---	**Open Elective –I (OE1)**	3	0	0	3	3
6	PCC	UR19PCECL601	Internet of Things Lab	0	0	3	3	1.5
7	PCC	UR19PCECL602	VLSI Lab	0	0	3	3	1.5
8	PCC	UR19PCECL603	Digital Signal Processing Lab	0	0	3	3	1.5
Mandatory Courses								
9	MC	UR19MCEC601	IPR and Patents*	0	0	0	3	0
10	PROJ	UR19MPROJEC601	Socially relevant Mini Project-II*	0	0	0	2	0
Total				**15**	**0**	**9**	**29**	**19.5**
Employability Skills- II*							2	0
***Internal Evaluation**								

VII SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC701	Microwave and Optical communications	3	0	0	3	3
2	PCC	UR19PCEC702	Data Communications & Computer networks	3	0	0	3	3
Professional Elective (PE3)								
3	PEC	UR19PEEC701	Telecommunication Switching Systems	3	0	0	3	3
		UR19PEEC702	Digital IC Design					
		UR19PEEC703	ASIC and FPGA Design					
		UR19PEEC704	Digital Imaging and Video Processing					
		UR19PEEC705	Embedded Real Time Operating Systems					
Professional Elective (PE4)								
4	PEC	UR19PEEC706	Radar Engineering	3	0	0	3	3
		UR19PEEC707	Low power VLSI Design					
		UR19PEEC708	DSP processors and Architectures					
		UR19PEEC709	Simulation & Mathematical Modeling					
		UR19PEEC710	Software Defined Radio					
5	OEC	---	**Open Elective-II (OE2)**	3	0	0	3	3
6	PCC	UR19PCECL701	Microwave and Optical communications Lab	0	0	3	3	1.5
7	PCC	UR19PCECL702	Data Communications & Computer networks Lab	0	0	3	3	1.5
8	PROJ	UR19PROJEC701	Project Stage-I	0	0	3	3	1.5
9	PROJ	UR19PROJEC702	Summer internship	0	0	0	0	2
Total				**15**	**0**	**9**	**24**	**21.5**

VIII SEMESTER								
S.No	**Course Category**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs./Wk**	**C**
1	PCC	UR19PCEC801	Wireless Networks	3	0	0	3	3
Professional Elective (PE5)								
2	PEC	UR19PEEC801	Satellite Communications	3	0	0	3	3
		UR19PEEC802	VLSI Testing & Testability					
		UR19PEEC803	Machine Learning & Artificial Intelligence					
		UR19PEEC804	Computer Vision					
		UR19PEEC805	Network Security & Cryptography					
3	OEC	---	**Open Elective-III (OE3)**	3	0	0	3	3
4	PROJ	UR19PROJEC801	Project Stage-II	0	0	18	18	9
Total				**9**	**0**	**18**	**27**	**18**

Total Credits = 18.5+21.5+21+21+20+19+21+18 = 160

List of Open Electives

Open Electives offered by the Dept. of CE

S.No.	Course Code	Open Elective – I
1.	UR19OECE601	Introduction To GIS
2.	UR19OECE602	Environmental Pollution Control
3.	UR19OECE603	Conservation of Water Resources
	Course Code	**Open Elective – II**
4.	UR19OECE701	Metro Systems and Engineering
5.	UR19OECE702	Natural Disaster Mitigation and Management
6.	UR19OECE703	Total Quality Management
	Course Code	**Open Elective – III**
7.	UR19OECE801	Sanitary and Public Health Engineering
8.	UR19OECE802	Environmental and Industrial Hygiene
9.	UR19OECE803	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.	UR19OEME703	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.	UR19OEEC601	Consumer Electronics
2.	UR19OEEC602	Digital Electronics
3.	UR19OEEC603	Analog and Digital I.C. Applications
	Course Code	**Open Elective – II**
4.	UR19OEEC701	Embedded Systems
5.	UR19OEEC702	Internet of Things (IoT)
6.	UR19OEEC703	Principles of Computer Communications and Networks
	Course Code	**Open Elective – III**
7.	UR19OEEC801	Microcontrollers
8.	UR19OEEC802	Principles of Electronic Communications
9.	UR19OEEC803	Electronic 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 BOOKS:
'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.

*****

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 BOOKS:

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.

*****

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.

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.

*****

I Year - I Semester Course Code : UR19ESC104

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

BASIC ELECTRICAL ENGINEERING
(ECE)

Course Objectives:

- To learn the basic principles of electrical law's and analysis of networks.
- To understand the principle of operation and construction details of DC machines.
- To understand the principle of operation and construction details of transformer.
- To understand the principle of operation and construction details of alternator and 3-Phase induction motor.
- To understand the principles and construction of various measuring instruments.

UNIT – I
ELECTRICAL CIRCUITS:
Basic definitions, Types of elements, Classification of different sources, Ohm's Law, Kirchhoff's Laws, Resistive networks, Inductive networks, capacitive networks, Series, Parallel circuits.(simple problems)

UNIT – II GENERATION OF ELECTRIC POWER

Conventional sources: Hydroelectric plant, Thermal Power Plant, Nuclear Power Plant and function of each component.
Non conventional sources : Solar energy- Operating principle , Photovoltaic cell concepts, Cell, module, array , Series and parallel connections , Applications – layout of solar thermal power plant

UNIT – III DC AND AC MACHINES

DC MACHINES
Principle of operation of DC generator – emf equation – types of DC machine.
DC Motor-principle of operation-torque equation of DC motor –applications – three point starters, speed control methods.

AC MACHINES
Principle of operation of a 3 phase induction motor, Types of Rotors-Torque equation- Slip Torque Characteristics, simple problems (descriptive treatment Only) Alternators- principle of operation – synchronous motor.

UNIT – IV TRANSFORMERS
Classification of transformers based on construction, Principle of operation of single phase transformers – emf equation – losses – efficiency and regulation, OC and SC tests on transformers

TEXT BOOKS:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.
3. Electric Circuits- A. Sudhakar & Shyammohan S. Palli, Tata Mc-Graw- Hill,2005.
4. S.Rao,Prof.H.L.Saluja"Electrical safety and fire safety Engineering and safety management",

Khanna publishers,New Delhi,1998.

REFERENCE BOOKS:

1. Electrical Technology by Surinder Pal Bali, Pearson Publications.
2. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group
3. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition
4. Electrical Engineering – Prasad, Sivanagaraju, Cengage Learning

Course Outcomes:

CO1: Able to analyze the various electrical networks.
CO2: Able to understand the various conventional and Non conventional sources of energy.
CO3: Able to understand the operation of DC generator, DC Motor, 3-point starter and Speed Control methods.
CO4: Able to analyze the performance of transformer.
CO5: Able to explain the operation of 3-phase alternator and 3-phase induction motors.
CO6: Able to explain the working principle of various measuring instruments and safety measures to Avoid electric hazards.

*****

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.

*****

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 : UR19MC102	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 : 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

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 .

*****

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 : 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 thermal power 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 : UR19ESC203

L	T	P	C
3	0	0	3

Internal: 30 Marks External: 70 Marks

NETWORK ANALYSIS

(ECE)

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 Circuit: Basic definition of MMF, flux and reluctance. Analogy between electrical and magneticcircuits.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's theorem .

TEXT BOOKS:

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.

Course Outcomes:

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

CO1: Identify various electrical networks in presence of active and passive elements.
CO2: Classify electrical networks with network topology concepts.
CO3: Judge any magnetic circuit with various dot conventions.
CO4: Point out any R, L, C network with sinusoidal excitation.
CO5: Identify any R, L, network with variation of any one of the parameters i.e R, L, C. and f.
CO6: Explain 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.

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.

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.

*****

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.

*****

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.

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.

*****

B.Tech. III Semester	COURSE CODE: UR19PCEC301	L	T	P	C
		3	0	0	3

ELECTRONIC DEVICES AND CIRCUITS

Internal Marks: 30
External Marks: 70

Course Objectives:
1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of components.
3. To know the switching characteristics of components.
4. To give understanding of various types of amplifier circuits.

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.

TEXTBOOKS

1. Electronic Devices and Circuits - Jacob Millman, McGraw Hill Education.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11thEdition, Pearson, 2009.

REFERENCE BOOKS

1. The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press, 2018
2. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S.PrakashRao, 2 Ed., McGraw Hill, 2008.
4. Electronic Devices and Circuits, S. Salivahanan, N.Suresh Kumar, AVallvaraj, 2nd Edition, TMH.

Course Outcomes:

Upon completion of the Course, the students will be able to:

1. Know the characteristics of various components.
2. Understand the utilization of components for the design of circuits.
3. Understand the biasing techniques.
4. Design and analyze small signal amplifier circuits.
5. Understand the JFET and design the FET Amplifiers.
6. Know the working of special purpose devices.

B.Tech. III Semester	COURSE CODE: UR19PCEC302	L	T	P	C
		3	0	0	3

SWITCHING THEORY AND LOGIC DESIGN

Internal Marks: 30
External Marks: 70

Course Objectives:

1. To understand common forms of number representation in logic circuits.
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3. To understand the concepts of combinational logic circuits and sequential circuits.
4. To understand the Realization of Logic Gates Using Diodes & Transistors.

UNIT I

Number Systems: Number systems, Complements of Numbers, Codes-Weighted and Non-Weighted codes and its Properties, Parity check code and Hamming code.

Boolean Algebra: Basic Theorems and Properties, Switching Functions-Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, EX-OR gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT II

Minimization of Boolean Functions: Karnaaugh Map Method - Up to five Variables, Don't Care Map Entries, Tabular Method,

Combinational Logic Circuits: Adders, Subtractors, comparators, Multiplexers, Demultiplexers, Encoders, Decoders and Code converters, Hazards and Hazard Free Relations.

UNIT III

Sequential Circuits Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.

Registers and Counters: Shift Registers– Left, Right and Bidirectional Shift Registers, Applications of Shift Registers - Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

UNIT IV

Sequential Machines: Finite State Machines, Synthesis of Synchronous Sequential Circuits- Serial Binary Adder, Sequence Detector, Parity-bit Generator, SynchronousModulo N – Counters, Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT V

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and

CMLLogic Families and its Comparison, Classification of Integrated Circuits.

TEXT BOOKS

1. Switching and Finite Automata Theory –ZviKohavi&Niraj K. Jha, 3rdEdition,Cambridge, 2010.
2. Modern Digital Electronics – R. P. Jain, 3rd edition, Tata McGraw-Hill, 2007.

REFERENCE BOOKS

1. Digital Design- Morris Mano, PHI, 4th Edition,2006
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R.Peterson, 3rd Ed,John Wiley & Sons Inc.
3. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
4. Switching Theory and Logic Design – A Anand Kumar, PHI,2013

Course Outcomes:

Upon completing this course, the student will be able to
1. Understand the numerical information in different forms and BooleanAlgebra theorems.
2. Postulates of Boolean algebra and to minimize combinational functions.
3. Design and analyze combinational and sequential circuits.
4. Understand and designRegisters and Counters.
5. Know the realization logic gates based on diode and transistor.
6. Know the logic families and about Integrated circuits

B.Tech. III Semester	COURSE CODE: UR19PCEC303	L	T	P	C
		3	0	0	3

SIGNALS AND SYSTEMS

Internal Marks: 30
External Marks: 70

Course Objectives:

This subject gives the basics of Signals and Systems required for all Electrical Engineeringrelated courses.The objectives of this subject are to:

1. Classify signals and systems and their analysis in time and frequency domains.
2. Study the concepts of distortion less transmission through LTI systems, convolution andcorrelation properties.
3. Understand Laplace and Z-transforms their properties for analysis of signals and systems.
4. Identify the need for sampling of CT signals, types and merits and demerits of each type.

UNIT I

Signal Analysis: Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation usingOrthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions,Orthogonality in Complex functions, Classification of Signals and systems, Exponential andSinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT II

Fourier Series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series,Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, ComplexFourier spectrum.

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, FourierTransform of standard signals, Fourier Transform of Periodic Signals, Properties of FourierTransform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

UNIT III

Signal Transmission through Linear Systems: Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI)System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filtercharacteristic of Linear System, Distortion less transmission through a system, Signal bandwidth,System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wienercriterion for physical realization, Relationship between Bandwidth and rise time, Convolutionand Correlation of Signals, Concept of convolution in Time domain and Frequency domain,Graphical representation of Convolution.

UNIT IV

Laplace Transforms and Z–Transforms:

Laplace Transforms: Laplace Transforms (L.T), Inverse Laplace Transform, Concept of Region of Convergence(ROC) for Laplace Transforms, Properties

of L.T, Relation between L.T and F.T of a signal,Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and ZTransforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes ofsignals, Inverse Z-transform, Properties of Z-transforms.

UNIT V

Sampling Theorem: Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing,Introduction to Band Pass Sampling.

Correlation: Cross Correlation and Auto Correlation of Functions, Properties of Correlation Functions,Energy Density Spectrum, Parsevals Theorem, Power Density Spectrum, Relation betweenAutocorrelation Function and Energy/Power Spectral Density Function, Relation betweenConvolution and Correlation, Detection of Periodic Signals in the presence of Noise byCorrelation, Extraction of Signal from Noise by Filtering

TEXT BOOKS

1. Signals, Systems & Communications - B.P. Lathi, BSP, 2013.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawabi, 2 Ed.

REFERENCE BOOKS

1. Signals and Systems – Simon Haykin and Van Veen, Wiley 2 Ed.,
2. Signals and Systems – A. Rama Krishna Rao, 2008, TMH
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH InternationalEdition.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004,PE.
5. Signals and Systems – K. DeerghaRao, Birkhauser, 2018.

Course Outcomes:

Upon completing this course, the student will be able to:

1. Understand the basic elementary signals and systems and its properties.
2. Understand the Fourier Series and Fourier Transform.
3. Know and the design oflinear systems and its response.
4. Identify the significance of LT, ZT and their relationships.
5. Understand the significance of sampling types and its applications.
6. Know the properties of correlation.

B.Tech. III Semester	COURSE CODE: UR19PCEC304	L	T	P	C
		3	0	0	3

RANDOM VARIABLES AND STOCHASTIC PROCESS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. This gives basic understanding of random signals and processing.
2. Utilization of Random signals and systems in Communications and Signal Processingareas.
3. To known the Spectral and temporal characteristics of Random Process.
4. To Learn the Basic concepts of Noise sources.

UNIT I

Probability &Random Variables: Probability introduced through Sets and Relative Frequency:Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, ProbabilityDefinitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay'sTheorem, Independent Events.

Random Variables: Definition, Conditions for a Function to be a Random Variable, Discrete,Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT II

Operations on Single & Multiple Random Variables – Expectations: Expected Value of a Random Variable, Function of a Random Variable,Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable - Monotonic and Non-monotonic Transformations of Continuous and Discrete Random Variable, Vector Random Variables, JointDistribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Intervalconditioning, Statistical Independence, Sum of Two and more Random Variables, Central LimitTheorem, Equal and Unequal Distribution.Expected Value of a Function of Random Variables- Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT III

Random Processes – Temporal Characteristics: The Random Process Concept, Classificationof Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and

Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT IV

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT V

Noise Sources & Information Theory: Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties. Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade -off between bandwidth and SNR.

TEXT BOOKS

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4thEdition, 2001.
2. Principles of Communication systems by Taub and Schilling (TMH),2008

REFERENCE BOOKS

1. Random Processes for Engineers-Bruce Hajck, Cambridge unipress,2015
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S.UnnikrishnaPillai, PHI, 4th Edition, 2002.
3. Probability, Statistics & Random Processes-K .Murugesan, P. Guruswamy, AnuradhaAgencies, 3rd Edition, 2003.
4. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.

Course Outcomes:

Upon completing this course, the student will be able to
1. Understand the concepts of Probability and Random Variables.
2. Know the Operations on single & multiple random variables – expectations.

3. Know the concepts of cross correlation and covariance.
4. Understand the concepts of Random Processes and its temporal and spectral Characteristics.
5. Know the concepts of Noise sources in communication theory.
6. Learn the concepts in Information theory.

B.Tech. III Semester	COURSE CODE: UR19ESEC301	L	T	P	C
		3	0	0	3

OBJECT ORIENTED DESIGN AND PROGRAMMING USING JAVA

Internal Marks: 30
External Marks: 70

Course Objectives:
1. To familiarize with the concepts of object oriented programming.
2. To impart the knowledge of AWT components in creation of GUI.

UNIT I

Fundamentals of OOP and JAVA: Need of OOP, principles of OOP languages, procedural languages vs. OOP, Java virtual machine, java features.Java Programming constructs: variables, primitive data types, identifiers, keywords, Literals, operators, arrays, type conversion and casting.

UNIT II

Class Fundamentals and Inheritance: Class fundamentals, declaring objects, methods, constructors, this keyword, overloading methods and constructors, access control. Inheritance- Basics, types, using super keyword, method overriding, dynamic method dispatch, abstract classes, using final with inheritance, Object class.

Interfaces and Packages: Interfaces: Defining an interface, implementing interfaces, nested interfaces, variables in interfaces and extending interfaces. Packages: Defining, creating and accessing a package.

UNITIII

Exception Handling and Multithreading: Exception Handling- exception-handling fundamentals, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, user-defined exceptions.Multithreading - Introduction to multitasking, thread life cycle, creating threads, synchronizing threads, thread groups.

UNITIV

Applets and Event Handling: Applets- Concepts of Applets, differences between applets and applications, life cycle of an applet, creating applets.Event Handling- Events, event sources, event classes, event listeners, Delegation event model, handling mouse and keyboard events, adapter classes.

UNIT V

AWT: The AWT class hierarchy, user interface components- label, button, checkbox, checkboxgroup, choice, list, textfield, scrollbar, layout managers – flow, border, grid, card, gridbag.

TEXT BOOKS

1. Herbert Schildt, “Java The Complete Reference”, 7th edition, TMH.
2. SachinMalhotra, SaurabhChoudhary, “Programming in Java”, 2nd

edition,Oxford.

REFERENCE BOOKS

1. Joyce Farrel, AnkitR.Bhavsar, “Java for Beginners”, 4th edition, Cengage Learning.
2. Y.Daniel Liang, “Introduction to Java Programming”, 7th edition, Pearson.
3. P.Radha Krishna, “Object Oriented Programming through Java”, Universities Press.

Course Outcomes:

Upon successful completion of the course, the students will be able to
1.Apply Object Oriented approach to design software.
2.Know the class fundamentals and Inheritance.
3.Create user defined interfaces and packages for a given problem.
4.Develop code to handle exceptions.
5.Know the Implementation of multi tasking with multi threading.
6.Design and develop applets for web applications and GUI programs using AWT components.

B.Tech. III Semester	COURSE CODE: UR19HM301	L	T	P	C
		3	0	0	3

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. The Learning objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
2. To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
3. To learn different Accounting Systems, preparation of Financial Statement and uses of different tools forperformance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

UNITI

Introduction to Managerial Economics and Demand Analysis: Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects – Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demandforecasting and Methods of forecasting.

UNITII

Production and Cost Analysis: Concept of Production function- Cobb-Douglas Production function- Leontief production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs –Cost –Volume-Profit analysis-Determination of Breakeven point(simple problems)- Managerial significance and limitations of Breakeven point.

UNIT III

Introduction to Markets, Theories of the Firm & Pricing Policies: Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson's models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitivepricing and Priority Pricing.

UNITIV

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 and cash flow statements (Simple Problems)

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(payback period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, InternalRate of Return Method and Profitability Index)

TEXT BOOKS

1. Dr. N. AppaRao, 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.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and FinancialAnalysis', Ravindra Publication.

REFERENCE BOOKS

1. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis,Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: 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 InternationalPublishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. PankajTandonA Text Book of Microeconomic Theory, Sage Publishers, 2015
10. ShailajaGajjala and UshaMunipalle, Universities press, 2015

Course Outcomes:

Upon successful completion of the course, the students will be able to
1.Get the knowledge of managerial economics and demand analysis.
2. Knowing the production and cost analysis.
3. Understand the Input-Output-Cost relationships and estimation of the least cost combination of inputs and nature of different markets its pricing

policies.
4. Understand Price Output determination under various market conditions.
5. Know differentbusiness organisations and its business cycles.
6. Prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

B.Tech. III Semester	COURSE CODE: UR19PCECL301	L	T	P	C
		0	0	3	1.5

ELECTRONIC DEVICES AND CIRCUITS LAB

Internal Marks: 20
External Marks: 30

Course Objectives:
1. Know the functionality of electronic components.
2. Observe the characteristics of circuits designed based on electronic components in Multisim software and on bread board.

List of Experiments:
Design (any six) and Simulation (any Ten) using Multisim or Pspice or Equivalent SimulationSoftware:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Zener diode characteristics and Zener as voltage Regulator
3. Half Wave Rectifier with & without filters
4. Full Wave Rectifier with & without filters
5. Measurement of h-parameters of transistor in CB, CE, CC configurations
6. Input and Output characteristics of FET in CD configuration
7. SCR Characteristics.
8. Common Emitter Amplifier Characteristics
9. Common Base Amplifier Characteristics
10. Common Source Amplifier Characteristics
11. Types of Clippers and at different reference voltage
12. Types of Clampers and at different reference voltage
13. The steady state output waveform of clampers for a square wave input
14. Comparison Operation of different types of Comparators

Equipment Required:
1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

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 able to

1.Measure voltage,frequency and phase of any waveform using CRO and resistor colour coding.

2.Generation of sine, square and triangular waveforms with required frequency and amplitude using function generator.

3.Design and analysis of circuits like PN junction diode,Zener diode and rectifiers,clippers and clampers,comparators.

4.Design and analysis of various amplifier configurations in multisim and breadboard

5.To compare Operation of different types of Comparators

6.Measurement of h-parameters of transistor in CB, CE, CC configurations

B.Tech. III Semester	COURSE CODE: UR19PCECL302	L	T	P	C
		0	0	2	1

SWITCHING THEORY AND LOGIC DESIGN -LAB

Internal Marks: 20
External Marks: 30

Course Objectives:
Student able to know the
1.Design of digital circuits based on logic gates on trainer kit and corresponding software.

List of Experiments:

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Generation of clock using NAND / NOR gates
4. Design a 4 – bit Adder / Subtractor
5. Design and realization a 4 – bit gray to Binary and Binary to GrayConverter
6. Design and realization of a 4 bit pseudo random sequence generator using logic gates.
7. Design and realization of an 8 bit parallel load and serial out shift register using flip-flops.
8. Design and realization a Synchronous and Asynchronous counters using flip-flops
9. Design and realization of Asynchronous counters using flip-flops
10. Design and realization 8x1 using 2x1 MUX
11. Design and realization 2 bit comparator
12. Verification of truth tables and excitation tables
13. Realization of logic gates using DTL, TTL, ECL, etc.
14. State reduction techniques for State machines

Equipment required for Laboratory:
1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

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

the eligibility to appear for the semesterend 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:

After the completion of the lab course the student will be able to:

1. Design and realization of logic gates on trainer kit and software.
2. Design of digital circuits based on logic gates adder/subtractor.
3. Design of registers and counters, flip-flops.
4. Design and realization of DTL,TTL,ECL techniques
5. To Verification of truth tables and excitation tables
6. Design and realization 2 bit comparator.

B.Tech. III Semester	COURSE CODE: UR19MC301	L	T	P	C
		0	0	0	0

ENVIRONMENTAL STUDIES

Internal Marks: 100
External Marks: 0

Course Objectives:
The objectives of the course is to impart
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 and Importance –Sustainability:Stockholm and Rio Summit–Global Environmental Challenges: Global warming and climate change, CarbonCredits, acid rains, ozone layer depletion, population growth and explosion, effects. Role of InformationTechnology in Environment and Human Health.
Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers anddecomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecologicalpyramids. - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grasslandecosystem, Desert ecosystem, Aquaticecosystems.

UNIT II
Natural Resources: Natural resources and associated problemsForest resources – Use and over – exploitation, deforestation – Timberextraction – Mining, dams and other effectson forest and tribal peopleWater resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water,dams – benefits and problemsMineral 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, salinityEnergy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energysources Vs Oil and Natural Gas Extraction.Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosionand desertification. Role of an individual in conservation of natural resources.Equitable use of resources forsustainable 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 amega-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, Waterpollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. -Pollution case studies, Sustainable Life Studies.

Solid Waste Management: Sources, Classification, effects and controlmeasures of urban and industrial solidwastes. Consumerism and wasteproducts, Biomedical, Hazardous and e – waste management.

UNIT V

Social Issues and the Environment: Urban problems related toenergy - Water conservation, rain waterharvesting-Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues andpossible 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 inenforcement 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 toEnvironmental 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, OxfordUniversity 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 completing this course, the student should have knowledge on

1.The natural resources and their importance for the sustenance of the life

and recognize the need to conservethe natural resources
2.The concepts of the ecosystem and its function in the environment. The need for protecting the producersand consumers in various ecosystems and their role in the food web
3.The biodiversity of India and the threats to biodiversity, and conservation practices to protect thebiodiversity
4.Various attributes of the pollution and their impacts and measures to reduce or control the pollution alongwith waste management practices
5.Social issues both rural and urban environment and the possible means to combat the challenges
6.The environmental legislations of India and the first global initiatives towards sustainable development.

B.Tech. IV Semester	COURSE CODE: UR19PCEC401	L	T	P	C
		3	0	0	3

ANALOG CIRCUITS

Internal Marks: 30
External Marks: 70

Course Objectives:

1. Learn the concepts of high frequency analysis of transistors.
2. To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
3. To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.
4. To construct various multi-vibrators using transistors and sweep circuits.

UNIT I

Multistage Amplifiers: Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage amplifiers, Cascade amplifier, Darlington pair.

Transistor at High Frequency: Hybrid - model of Common Emitter transistor model, f_α, β and unity gain bandwidth, Gainbandwidth product.

UNIT II

Feedback Amplifiers: Concepts of feedback – Classification of feedback amplifiers – General characteristics of negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations.

UNIT III

Oscillators: Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LCtype Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

UNIT IV

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class C Amplifiers.

Tuned Amplifiers: Single Tuned Amplifiers – Q-factor, frequency response of tuned amplifiers, Concept of stagger tuning and synchronous tuning

UNIT V

Multivibrators: Types of Triggering, Analysis and Design of Bistable, Monostable, AstableMultivibrators and Schmitt trigger using Transistors.

TEXT BOOKS

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education, 2nd Ed., 2010
2. Electronic Devices Conventional and current version -Thomas L. Floyd, Pearson, 2015.

REFERENCE BOOKS

1. Electronic Devices and Circuits, David A. Bell – 5th Ed., Oxford, 1986.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Ed.,Pearson, 2009.
3. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and MothikiS. PrakashRao, 2 Ed., TMH, 2008.
4. Pulse, Switching and Digital Circuits –David A. Bell, 5th Ed, Oxford, 2015.

Course Outcomes:

Upon completing this course, the student will be able to
1. Design the multistage amplifiers
2. Understand the concepts of High Frequency Analysis of transistors.
3. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.
4. Design and realize different types of Oscillatorsandunderstand the frequency and amplitude stability of Oscillators.
5. Design and realize different classes of Power amplifiers and tuned amplifiers useable for audio and Radio applications.
6.Design of multi-vibrators, time base generators for various applications.

B.Tech. IV Semester	COURSE CODE: UR19PCEC402	L	T	P	C
		3	0	0	3

ANALOG COMMUNICATIONS

Internal Marks: 30
External Marks: 70

Course Objectives:
Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Distinguish the figure of merits of various analog modulation methods
4. Develop the ability to classify and understand various functional blocks of radio transmitters and receivers
5. Familiarize with basic techniques for generating and demodulating various pulsemodulated signals

UNIT I
Amplitude Modulation: Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT II
DSB & SSB Modulation: Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop. Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generatingAM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III
Angle Modulation: Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT IV
Transmitters & Receivers: Radio Transmitter -Classification of Transmitter,

AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.Radio Receiver -Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting. Communication Receivers, extensions of superheterodyne principle and additional circuits.

UNIT V

Noise: Review of noise and noise sources, noise figure**,** Noise in Analog communication Systems, Noise in DSB& SSB System, Noise in AM System, Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis &De-emphasis

Pulse Modulation: Time Division Multiplexing,, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM, TDM Vs FDM

TEXT BOOKS

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCE BOOKS

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Communication Systems– R.P. Singh, SP Sapre, Second Edition TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.
5. Electronic Communication systems – Tomasi, Pearson.

Course Outcomes:

After undergoing the course, students will be able to
1. Understandthe concepts of modulation and demodulation schemes
2. Know the comparison and applications of modulation techniques.
3. Design of radio transmitter for amplitude and frequency modulation.
4. Design of various types of radio receivers for communication systems.
5. Understand the concepts of noise and various types of noise sources in analog communication systems.
6. Know the pulse modulation techniques and multiplexing techniques.

B.Tech. IV Semester	COURSE CODE: UR19PCEC403	L	T	P	C
		3	0	0	3

CONTROL SYSTEMS

Internal Marks: 30
External Marks: 70

Course Objectives:
The Objectives of this course are
1. To introduce the principles and applications of control systems in everyday life.
2. To introduce the basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems.
3. To understand different aspects of stability analysis of systems in frequency domain and time domain.

UNIT I
Introduction: Concepts of Control Systems- Open Loop and closed loop control systems and their differences examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.
Transfer Function Representation: Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples –Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

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

UNIT III
Stability Analysis: The concept of stability, Routh stability criterion, qualitative stability and conditional stability.
Root Locus Technique: The root locus concept, construction of root loci, effects of adding poles and zeros to G(s) H(s) on the root loci.
Frequency Response Analysis: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT IV
Stability Analysis In Frequency Domain: Polar Plots, Nyquist Plots and

applications of Nyquist criterion for stability –Effects of adding poles and zeros.

Classical Control Design Techniques: Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT V

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

TEXT BOOKS

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCE BOOKS

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. Control Systems by S.Kesavan,Hitech Publications.
5. "Modeling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler,Thomson Publishers.

Course Outcomes:

After completing this course, the student will be able to

1. Know the open and closed loop control systems
2.Modeling of transfer function derivations for translational and rotational systems.
3.Understand the Time response analysis and frequency response analysis.
4.Get the knowledge on Stability Analysis, Root Locus Technique
5.Understand the time response analysis, stability analysis, frequency response analysis of different ordered systems through their characteristic equation and time-domain specifications.
6. Get the knowledge on state space analysis of Continuous Systems.

B.Tech. IV Semester	COURSE CODE: UR19PCEC404	L	T	P	C
		3	0	0	3

ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

Internal Marks: 30
External Marks: 70

Course Objectives:
The main objectives of this course are to understand:
1. Fundamentals of steady electric and magnetic fields using various laws.
2. The concept of static and time varying Maxwell equations and power flow using pointing theorem.
3. Wave characteristics in different media for normal and oblique incidence.
4. Various concepts of transmission lines and impedance measurements.

UNIT I
Review of Co-ordinate Systems,Electrostatics: Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT II
Magneto Statics: Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy. Illustrative Problems
Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface: Dielectric-Dielectric and Dielectric-Conductor Interfaces. Illustrative Problems.

UNIT III
EM Wave Characteristics – I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types. Illustrative Problems
EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance. Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor, Illustrative Problems.

UNIT IV

Transmission Lines – I: Types, Parameters, T&Π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Loading - Types of Loading. Illustrative Problems.

UNIT V

Transmission Lines – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. Low loss radio frequency lines and UHF Transmission lines, UHF Lines as Circuit Elements; Impedance Transformations λ/4, λ /2, λ/8 Lines – Smith Chart – Construction and Applications, Quarter wave transformer, Stub Matching-single & double, Illustrative Problems.

TEXT BOOKS

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCE BOOKS

1. Electromagnetic Fields and Wave Theory –GSN Raju, Pearson Education 2006
2. Engineering Electromagnetics:Nathan Ida, Springer(India)Pvt.Ltd., New Delhi, 2nd ed., 2005.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
4. Electromagnetic Field Theory and Transmission Lines: G SasiBhushanaRao,Wiley India 2013
5. Transmission Lines and Networks–UmeshSinha,SatyaPrakashan (Tech. IndiaPublications), New Delhi, 2001.
6. Electromagnetic waves and transmission lines – R S Rao, PHI, EEE edition

Course Outcomes:

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

1. Understand various fundamental laws in electrostatics and magnetostatics.
2. Get knowledge on Maxwell equations in both static and time varying fields.
3. Understand the electromagnetic wave characteristics for various media and pointing theorem.
4. Understand the concepts of transmission lines for electromagnetic wave propagation.
5. Know the development and measurementsusing smith chart of various parameters.
6. Design of single stub, double stub by using smith chart.

B.Tech. IV Semester	COURSE CODE: UR19ESEC401	L	T	P	C
		3	0	0	3

COMPUTER ARCHITECTURE AND ORGANIZATION

Internal Marks: 30
External Marks: 70

Course Objectives:
1. Understand the architecture of a modern computer with its various processing units and also the Performancemeasurement of the computer system.
2. In addition to this the memory management system of computer.

UNIT I
Basic Structure of Computers: Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.

UNITII
Machine Instruction and Programs: Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions

UNIT III
Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations
Input/Output Organization: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access,Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)

UNIT IV:
The Memory Systems: Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING
Secondary Storage: Magnetic Hard Disks, Optical Disks,

UNIT V
Processing Unit: Fundamental Concepts: Register Transfers, Performing an Arithmetic OR Logic Operation, Fetching a Word from Memory, Execution of Complete Instruction, Hardwired Control
Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field

TEXT BOOKS

1. Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.
2. Computer Architecture and Organization, John P. Hayes, 3rd Edition, McGraw Hill.

REFERENCE BOOKS

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - SivaraamaDandamudi Springer Int. Edition.
4. “Computer Organization and Design: The Hardware/Software Interface” by David A. Patterson and John L.Hennessy.
5. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.

Course Outcomes:

After undergoing the course, students will be able to
1. Understand the basic structure of computers
2. Know the various types of machine instructions
3. Understand input and output organisation of devices and buses
4. Get the knowledge on memory management systems
5. Get the knowledge on secondary storage devices.
6. Understand the concepts of processing unit and micro programmed control unit.

B.Tech. IV Semester	COURSE CODE: UR19HM402	L	T	P	C
		3	0	0	3

MANAGEMENT AND ORGANIZATIONAL BEHAVIOR

Internal Marks: 30
External Marks: 70

Course Objectives:
1. To familiarize with the process of management and to provide basic insight into select contemporary management practices
2. To provide conceptual knowledge on functional management and strategic management**.**

UNIT I
Introduction to Management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process- Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behaviour Effectiveness(GLOBE) structure

UNIT II
Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

UNIT III
Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationlizing change through performance management.

UNIT IV
Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)
Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies, theories of Multinational Companies.

UNIT V
Contemporary Management Practice: Basic concepts of MIS, MRP, Justin-Time(JIT) system, Total Quality Management(TQM), Six sigma and

Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

TEXT BOOKS

1. Dr. P. Vijaya Kumar &Dr. N. AppaRao, 'Management Science' Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, Management Science' TMH 2011.

REFERENCE BOOKS

1. Koontz &Weihrich: 'Essentials of management' TMH 2011
2. Seth &Rastogi: Global Management Systems, Cengagelearning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. KanishkaBedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler& Armstrong: Principles of Marketing, Pearson publications
6. BiswajitPatnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Strategic Management, Cengage learning
8. PremChadha: Performance Management, Trinity Press(An imprint of Laxmi Publications Pvt. Ltd.) Delhi 2015.
9. Anil Bhat&AryaKumar: Principles of Management, Oxford University Press, New Delhi, 2015.

Course Outcomes:

After completion of the Course, the student will
1. Acquire the knowledge on management functions.
2. Get the knowledge on global leadership and organizational behaviour.
3. Familiarize with the concepts of Operational Management
4. Understand the concepts of Functional management
5. Understand the concepts of Marketing and its Functions
6. Understand the concepts of project management and strategic managementand Familiarize with the concepts of Contemporary Management Practice.

B.Tech. IV Semester	COURSE CODE: UR19PCECL401	L	T	P	C
		0	0	3	1.5

ANALOG CIRCUITS LAB

Internal Marks: 20
External Marks: 30

Course Objectives:

1.To illustrate the students different analog electronic circuit and their application in practice.
2. To impart knowledge on assessing performance of analog electronic circuit through monitoring of sensitive parameters.
3. To evaluate the use of computer-based analysis tools to review performance of semiconductor device circuit.

List of Experiments:

1. Current Shunt Feedback amplifier
2. Voltage Series Feedback amplifier
3. Cascade amplifier
4. Darlington Pair
5. RC Phase shift Oscillator
6. Hartley and Colpitt's Oscillators
7. Class A power amplifier
8. Class B Complementary symmetry amplifier
9. Two Stage RC Coupled Amplifier
10. Wien Bridge Oscillator using Transistors
11. Design a BistableMultivibrator and draw its waveforms
12. Design an AstableMultivibrator and draw its waveforms
13. Design a MonostableMultivibrator and draw its waveforms
14. Response of Schmitt Trigger circuit for loop gain less than and greater than one
15. The output- voltage waveform of Boot strap sweep circuit
16. The output- voltage waveform of Miller sweep circuit
17. Pulse Synchronization of An Astable circuit
18. Response of a transistor Current sweep circuit

Equipment required:
Software:
i. Multisim/ Equivalent Industrial Standard Licensed simulation software tool.

ii. Computer Systems with required specifications

Hardware:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

Note: The students are required to design the circuit and perform the simulation using Multisim/ Equivalent Industrial Standard Licensed simulation software tool**.** Further they are required to verify the result using necessary hardware equipment.

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

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

1. Identify relevant information to supplement to the Analog Electronic Circuit.
2. Set up testing strategies and select proper instruments to evaluate performance characteristics of analogelectronic circuit.
3. Choose testing and experimental procedures on different types of analogelectronic circuit and analyse their operation different operating conditions.
4. Evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.
5. Prepare professional quality textual and graphical presentations of laboratory data and Computational results, incorporating accepted data analysis and synthesis methods, Mathematical software tools.
6. FindResponse of a transistor Current sweep circuit

B.Tech. IV Semester	COURSE CODE: UR19PCECL402	L	T	P	C
		0	0	3	1.5

ANALOG COMMUNICATIONS LAB

Internal Marks: 20
External Marks: 30

Course Objectives:
1.To analyze various modulation techniques in communications.
2.To analyze various spectrums using spectrum analyzer.
3.To analyze receiver characteristics.

List of Experiments:
The students have to calculate the relevant parameters
(a. Hardware, b. MATLAB Simulink, c. MATLAB Communication tool box)

1.Amplitude Modulation - Mod. & Demod.

2.AM - SSB SC - Modulation

3.Spectrum Analysis of Modulated signal using Spectrum Analyser

4.Diode Detector

5.Pre-emphasis & De-emphasis

6.Frequency Modulation and Demodulation

7. Balanced Modulator.
8.Frequency Synthesizer
9.Synchronous detector
10.AGC Circuits

11.Sampling Theorem

12.Pulse Amplitude Modulation - Mod. &Demod.

13.PWM, PPM - Mod. &Demod.

14.PLL

15.Radio receiver characteristics

Equipments& Software required:
Software:
i.) Computer Systems with latest specifications
ii) Connected in Lan (Optional)
iii) Operating system (Windows XP)
iv) Simulations software (Simulink & MATLAB)
Equipment:
1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components

5. Multimeters
6. Spectrum Analyser

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

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

1.Getting knowledge on matlab to write matlab code for modulation techniques in analog communications and its related circuits.
2. Comprehend the fundamentals in explain the functionality of modulation and demodulation environment.
3. Analyze the concepts, write and simulate the concepts of AM and AM Demodulation process in Communication.
4. Know the origin and simulation of FM and FM-Demodulation process in communication.
5. Acquaint with AM and FM basic functionalities.
6. Design of AGC circuits and sampling theorem concepts.

B.Tech. IV Semester	COURSE CODE: UR19MCEC401	L	T	P	C
		0	0	0	0

MOOCS-I

Internal Marks: 100
External Marks: 0

Guidelines:

1. The student shall be qualified in two certificate courses not less than 40 hours duration each during his course of study. The two certificate courses, shall be pursued through MOOCs platform like SWAYAM-NPTEL online courses, Coursera online courses, BEC certification courses etc.
2. Students who have qualified in the examination conducted by the MOOC providers are exempted from appearing in the internal and semester end evaluations conducted by the institution in that category.
3. In case a student fails to complete the MOOCs course offered by MOOCs providers, he/she may be allowed to register again for the same with any of the providers from the list approved by the department.
4. For the courses under this category, those students who have not registered under MOOCs platform and are able tolearn by themselves shall appear for internal evaluation for 30 marks and semester end examination for 70 marks in the VIII semester

B.Tech. IV Semester	COURSE CODE: UR19MPROJEC401	L	T	P	C
		0	0	0	0

SOCIALLY RELEVANT MINI PROJECT-I

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.
2. The electronic circuit for the selected problem should have at least 20 to 25 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 PCB for the circuit.
6. Students should see that final circuit submitted by them is in working condition.
7. 5-10 pages report 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 electronic circuit/systems developed by the students have some novel features.