COURSE STRUCTURE

I- BTECH I SEM									
COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS02	ENGINEERING CHEMISTRY	BSC	3	1	0	3	30	70	100
AS20-04ES01	ELECTRONIC DEVICES AND CIRCUITS	ESC	3	1	0	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	0	0	2	30	70	100
AS20-02PC01	ELECTRICAL CIRCUITS-I	PCC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS03	ENGINEERING CHEMISTRY LAB	ESC	0	0	2	1	30	70	100
AS20-04ES05	ELECTRONIC DEVICES AND CIRCUITS LAB	ESC	0	0	3	1	30	70	100
AS20-00HS02	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
VALUE ADDED COURSE									
AS20-00HS03	SOFT SKILLS-I	HSMC	2	0	0	0	25	75	100
TOTAL						**17.5**			

I BTECH II SEM									
COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS08	APPLIED PHYSICS	BSC	3	1	0	3	30	70	100
AS20-05ES01	PROGRAMMING FOR PROBLEM SOLVING	ESC	3	1	0	3	30	70	100
AS20-03ES02	ENGINEERING GRAPHICS AND DESIGN	ESC	2	0	3	3.5	30	70	100
AS20-02PC02	POWER SYSTEMS-I	PCC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS09	APPLIED PHYSICS LAB	BSC	0	0	3	1.5	30	70	100
AS20-05ES02	PROGRAMMING FOR PROBLEM SOLVING LAB	ESC	0	0	3	1.5	30	70	100
AS20-03ES04	ENGINEERING PRACTICES	ESC	0	0	4	2	30	70	100
VALUE ADDED COURSE									
AS20-00HS04	SOFT SKILLS-II	HSMC	2	0	0	0	25	75	100
TOTAL						**20.5**			

II BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00HS07	UNIVERSAL HUMAN VALUES-II	BSC	3	1	0	3	30	70	100
AS20-02PC03	ELECTRICAL CIRCUITS-II	ESC	3	1	0	3	30	70	100
AS20-02PC04	DC MACHINES	PCC	3	1	0	3	30	70	100
AS20-02PC05	ELECTRO MAGNETIC THEORY	PCC	3	1	0	3	30	70	100
AS20-04ES09	ANALOG ELECTRONICS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-02PC06	ELECTRICAL CIRCUITS LAB	PCC	0	0	3	1.5	30	70	100
AS20-02PC07	DC MACHINES LAB	PCC	0	0	3	1.5	30	70	100
AS20-04ES10	ANALOG ELECTRONICS LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC01	ENVIRONMENTAL SCIENCE	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-02PW01	MATLAB AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-02PW02	ENERGY STORAGE SYSTEMS	PW	0	0	2	1	25	75	100
AS20-02PW03	DESIGN OF ELECTRICAL SYSTEMS	PW	0	0	2	1	25	75	100
AS20-04PW04	SENSOR TECHNOLOGY	PW	0	0	2	1	25	75	100
AS20-05PW02	PROJECT BASED LEARNING USING C++	PW	0	0	2	1	25	75	100
TOTAL						**20.5**			

II BTECH II SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS07	COMPLEX VARIABLES & TRANSFORM TECHNIQUES	BSC	3	1	0	3	30	70	100
AS20-02PC08	AC MACHINES-I	PCC	3	1	0	3	30	70	100
AS20-02PC09	CONTROL SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-04ES06	DIGITAL ELECTRONICS	ESC	3	1	0	3	30	70	100
AS20-05ES09	PYTHON PROGRAMMING	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-02PC10	CONTROL SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
AS20-04ES07	DIGITAL ELECTRONICS LAB	ESC	0	0	3	1.5	30	70	100
AS20-05ES10	PYTHON PROGRAMMING LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC02	GENDERSENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-02PW04	DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS	PW	0	0	2	1	25	75	100
AS20-02PW05	SOLAR PLANT DESIGN & ENGINEERING	PW	0	0	2	1	25	75	100
AS20-02PW06	SIMULINK & ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-12PW02	GRAPHIC DESIGN USING PHOTO SHOP/CORAL DRAW/3D MAX	PW	0	0	2	1	25	75	100
AS20-66PW01	ROBOTICS AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
TOTAL						**20.5**			

III BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PC11	POWER SYSTEM -II	PCC	3	1	0	3	30	70	100
AS20-02PC12	AC MACHINES-II	PCC	3	1	0	3	30	70	100
AS20-04ES11	MICRO PROCESSORS &MICRO CONTROLLERS	ESC	3	1	0	3	30	70	100
AS20-02PE1X	PROFESSIONALELECTIVE –I	PE	3	1	0	3	30	70	100
AS20-02OE1X	OPENELECTIVE-1	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-02PC13	POWER SYSTEMS SIMULATION LAB	PCC	0	0	3	1.5	30	70	100
AS20-02PC14	AC MACHINES LAB	PCC	0	0	3	1.5	30	70	100
AS20-04ES15	MICRO PROCESSORS & MICRO CONTROLLERS LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC04	PROFESSIONAL ETHICS	MC	3	0	0	0	0	100	100
AS20-00MC05	ARTIFICIAL INTELLIGENCE	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-00HS10	APTITUDE SKILLS	HSMC	2	0	0	1	25	75	100
AS20-00HS11	STARTUP MANAGEMENT	HSMC	2	0	0	1	25	75	100
AS20-00HS12	ERP TOOLS	HSMC	2	0	0	1	25	75	100
TOTAL						**20.5**			

Professional Elective-I									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	**T**	**P**				
AS20-02PE11	ELECTRICAL DISTRIBUTION SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE12	NEURAL AND FUZZY SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE13	HIGH VOLTAGE ENGINEERING	PE	3	1	0	3	30	70	100
AS20-02PE14	ELECTRICAL INSTALLATION, DESIGN & ESTIMATION	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-I									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-02OE11	NONCONVENTIONAL POWER GENERATION	OE	3	0	0	3	30	70	100
AS20-02OE12	ELECTRICAL ENGINEERING MATERIALS	OE	3	0	0	3	30	70	100
AS20-02OE13	ELECTRICAL INSTRUMENTATION	OE	3	0	0	3	30	70	100
AS20-02OE14	GENERATION OF ELECTRICAL POWER	OE	3	0	0	3	30	70	100
TOTAL						**3**			

III BTECH II SEM									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	T	P				
AS20-02PC15	POWER ELECTRONICS	PCC	3	1	0	3	30	70	100
AS20-02PC16	SWITCH GEAR & PROTECTION	PCC	3	1	0	3	30	70	100
AS20-02PC17	ELECTRICAL MEASUREMENTS & INSTRUMENTATION	PCC	3	1	0	3	30	70	100
AS20-02PE2X	PROFESSIONALELECTIVE–II	PE	3	1	0	3	30	70	100
AS20-02OE2X	OPENELECTIVE–II	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-02PC18	MEASUREMENTS AND INSTRUMENTATION LAB	PCC	0	0	3	1.5	30	70	100
AS20-02PC19	POWER ELECTRONICS LAB	PCC	0	0	3	1.5	30	70	100
AS20-00HS05	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC03	CONSTITUTION OF INDIA	MC	3	0	0	0	0	100	100
AS20-00MC06	CYBERSECURITY	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-02PW07	PROGRAMMABLE LOGIC CONTROLLERS	PW	0	0	2	1	25	75	100
AS20-02PW08	MICRO GRID TECHNOLOGY	PW	0	0	2	1	25	75	100
AS20-02PW09	HYBRID & ELECTRIC VEHICLE DESIGN TRAINING	PW	0	0	2	1	25	75	100
AS20-12PW01	IOT(PROJECT)– INHOUSE INTERFACING WITH ARDUINOANDRASPBERRY PI	PW	0	0	2	1	25	75	100
AS20-66PW04	DRONE APPLICATIONS	PW	0	0	2	1	25	75	100
TOTAL						**20.5**			

Professional Elective-II									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-02PE21	FLEXIBLE AC TRANSMISSION SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE22	SPECIAL MACHINES	PE	3	1	0	3	30	70	100
AS20-02PE23	ELECTRICAL MACHINE MODELLING AND ANALYSIS	PE	3	1	0	3	30	70	100
AS20-02PE24	ADVANCED ENERGY STORAGE	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-II									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-02OE21	DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS	OE	3	0	0	3	30	70	100
AS20-02OE22	ENERGY STORAGE SYSTEMS	OE	3	0	0	3	30	70	100
AS20-02OE23	SOLAR PHOTOVOLTAIC SYSTEMS	OE	3	0	0	3	30	70	100
AS20-02OE24	SPECIAL ELECTRIC MACHINES	OE	3	0	0	3	30	70	100
TOTAL						**3**			

IV BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PC20	POWER SYSTEM OPERATION & CONTROL	PCC	3	1	0	3	30	70	100
AS20-02PC21	POWER SEMI CONDUCTOR DRIVES	PCC	3	1	0	3	30	70	100
AS20-02PE3X	PROFESSIONAL ELECTIVE-III	PE	3	1	0	3	30	70	100
AS20-02OE3X	OPEN ELECTIVE -III (THROUGH MOOCS)	OE	3	0	0	3	30	70	100
AS20-00HS06	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	HSMC	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-02PC22	POWER SEMI CONDUCTOR DRIVES LAB	PCC	0	0	3	1.5	30	70	100
AS20-02PC23	POWER SYSTEM PROTECTION LAB	PCC	0	0	3	1.5	30	70	100
AS20-02 PW10	INDUSTRY ORIENTED MINI PROJECT REVIEW	PW	0	0	3	2	30	70	100
VALUE ADDED COURSE*									
AS20-00HS13	INTERVIEW SKILLS	HSMC	0	0	2	1	25	75	100
TOTAL						**21**			

Professional Elective-III									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PE31	UTILIZATION OF ELECTRICAL ENERGY	PE	3	1	0	3	30	70	100
AS20-02PE32	NON CONVENTIONAL SOURCES OF ENERGY	PE	3	1	0	3	30	70	100
AS20-02PE33	SMART GRID TECHNOLOGY	PE	3	1	0	3	30	70	100
AS20-02PE34	EMBEDDED SYSTEMS	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-III (MOOCs)									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	Externa marks	Total Marks
			L	**T**	**P**				
AS20-02OE31	AIR INSULATED ELECTRICAL SUBSTATION DESIGN	OE	3	0	0	3	30	70	100
AS20-02OE32	ELECTRICAL ENGINEERING SIMULATION USING ETAP	OE	3	0	0	3	30	70	100
AS20-02OE33	ELECTRICAL POWER DISTRIBUTION WITH AUTOCAD, DIALUX & ETAP	OE	3	0	0	3	30	70	100
AS20-02OE34	CRASH COURSE ON ELECTRONICS AND PCB DESIGN	OE	3	0	0	3	30	70	100
TOTAL						**3**			

IV BTECH II SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PE4X	PROFESSIONAL ELECTIVE-IV	PE	3	1	0	3	30	70	100
AS20-02PE5X	PROFESSIONAL ELECTIVE -V	PE	3	1	0	3	30	70	100
AS20-02OE4X	OPEN ELECTIVE -IV	OE	3	0	0	3	30	70	100
PRACTICAL COURSE									
AS20-02PW11	MAJOR PROJECT	PW	0	0	24	10	30	70	100
TOTAL						**19**			

Professional Elective-IV									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PE41	ADVANCED ELECTRIC DRIVES	PE	3	1	0	3	30	70	100
AS20-02PE42	POWER QUALITY	PE	3	1	0	3	30	70	100
AS20-02PE43	EHVAC TRANSMISSION SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE44	DIGITAL CONTROL SYSTEMS	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Professional Elective-V									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02PE51	POWER SYSTEM DYNAMICS AND CONTROL	PE	3	1	0	3	30	70	100
AS20-02PE52	HVDC TRANSMISSION SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE53	ADVANCED CONTROL SYSTEMS	PE	3	1	0	3	30	70	100
AS20-02PE54	DIGITAL SIGNAL PROCESSING	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-IV									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-02OE41	SENSORS AND TRANSDUCERS	OE	3	0	0	3	30	70	100
AS20-02OE42	ELECTRICAL AND HYBRID VEHICLES	OE	3	0	0	3	30	70	100
AS20-02OE43	SOLID FUEL TECHNOLOGY	OE	3	0	0	3	30	70	100
AS20-02OE44	POWER SYSTEM PROTECTIVE DEVICES	OE	3	0	0	3	30	70	100
TOTAL						**3**			

B.TECH
FIRST YEAR
FIRST SEMESTER
SYLLABUS

LINEAR ALGEBRA AND ADVANCED CALCULUS
I B.Tech.,I SEM

Course Title: LINEAR ALGEBRA AND ADVANCED CALCULUS	Course Code: AS20-00BS06
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs : 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1.Basic definitions of Matrices 2.Knowledge of Calculus 3.Differentiation and Integration rules	

Course Overview: Course include
• Types of matrices and their properties.
• Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
• Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
• Concept of Sequence.
• Concept of nature of the series.
• Geometrical approach to the mean value theorems and their application to the mathematical problems .
• Evaluation of improper integrals using Beta and Gamma functions.
• Partial differentiation, concept of total derivative
• Finding maxima and minima of function of two and three variables.

Course Objective To learn

- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative. Finding maxima and minima of function of two and three variables

Course Outcomes:

CO#	Course Outcomes
C111.1	Convert the set of linear equations in to matrix notation and analyse its solution
C111.2	Apply the concept of orthogonal transformation and reduce quadratic form to canonical form
C111.3	Analyze the nature of series.
C111.4	Describe the applications of the mean value theorems
C111.5	Evaluate the improper integrals using Beta and Gamma functions.
C111.6	Categorize the extreme values of functions of two variables with constraints and without constraints.

COURSE CONTENT (SYLLABUS)

UNIT I:MATRICES

Matrices: Types of Matrices(only definitions);rank of a matrix by Echelon form and Normal form; Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations: solving system of Homogeneous and Non-Homogeneous

equations- consistency, Gauss elimination method; Gauss Jacobi Iteration Method. Gauss Seidel Iteration Method.

UNIT-II: EIGEN VALUES AND EIGEN VECTORS

Eigen values and Eigenvectors and their properties; Cayley-Hamilton Theorem (without proof): finding inverse and power of a matrix by Cayley-Hamilton Theorem; Diagonalization; Quadratic forms and Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: SEQUENCES & SERIES

Sequence: Definition of a Sequence, Convergence of a sequence (definitions and examples only).
Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert's ratio test; Raabe's test; logarithmic test; Integral test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: SINGLE VARIABLE CALCULUS

Mean value theorems(all the theorems without proof): Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: MULTIVARIABLE CALCULUS

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence independence, Maxima and minima of functions of two variables and three variables with constraints; without constraints; method of Lagrange's Multipliers.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43nd Edition, 2014.
2. R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd.,5 thEdition,2016

References Books:

1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://www.khanacademy.org/math/linear-algebra
2.https://onlinecourses.nptel.ac.in/noc20_ma27
3.https://www.mooc-list.com/course/calculus-two-sequences-and-series-coursera

Web Reference/E-Books:

1 www.ee.ic.ac.uk
2 http://en.m.wikipedia.org
3 www.math.odu.edu

ENGINEERING CHEMISTRY
I B.Tech., I SEM

Course Title: Engineering Chemistry	Course Code: AS20-00BS02
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs : 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Students must have studied two years of intermediate chemistry	

Course Overview:

The primary objective of an Engineering Chemistry course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. This course aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Molecular Orbital Concepts, Electrode Potential, Electrodes, types of batteries and their industrial applications, Fuels, UV-VIS, IR and NMR concepts.

Course Objective

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To know the modern technology and interpret different problems involved in industrial utilization of water.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of Electrochemistry and Corrosion which are essential for engineers in Industry.
- Ability to impart the knowledge of fuels to apply the role of chemistry in energy production.

To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

Course Outcomes (s)

CO#	Course Outcomes
C112.1	Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems.
C112.2	To know the modern technology and interpret different problems involved in industrial utilization of water.
C112.3	Interpret the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
C112.4	Summarize the principles and concepts of electrochemistry, corrosion to predict the behavior of a system under different variables.
C112.5	Define and classify the fuels, distinguishing the quality of fuels based on calorific values as well as understand the concepts of petroleum refining.
C112.6	Apply the concepts on basic spectroscopy and application to medical and other fields.

COURSE CONTENT (SYLLABUS)

Unit - I:

Water and its Treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems on Hardness of Water – Estimation of hardness of water by complexometric method. Boiler troubles: Scales and Sludge's and its treatment. Potable water and its specifications - Steps involved in treatment of Potable water – Disinfection of water by ozonization and chlorination – Breakpoint of Chlorination. Boiler feed water and its treatment – Internal Treatment of water: Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange Process. Desalination of Brackish water – Reverse Osmosis.

Unit – II:

Molecular Structure and Theories of Bonding: Introduction - Atomic and Molecular Orbital's. Linear Combination of Atomic Orbital's (LCAO), Molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. Π-molecular orbital's of butadiene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbital's in Tetrahedral, Octahedral and Square planar geometries. Band Structure of solids and effect of doping on conductance.

Unit - III:

Electrochemistry and Corrosion: Electro chemical cells – electrode potential, standard electrode potential, Nernst equation, Types of electrodes – Calomel, Quinhydrone and Glass electrode. Determination of P^H of a solution by using quinhydrone and glass electrode. Electrochemical series
and its applications. Batteries – Primary: Lithium cell, secondary batteries: Lead – Acid storage battery and Lithium ion battery.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, Differential Aeration Corrosion - water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods - Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing , Tinning, Metal Cladding.

Unit - IV:

Fuels and Combustion: Introduction-Classification of Fuels – Calorific value, Characteristics of a good fuel - Solid fuels: coal –Classification of a coal by Rank – Analysis of coal – Proximate and Ultimate analysis and their significance. Liquid fuels – Petroleum and its refining, Cracking –types – Fixed bed Catalytic Cracking - Moving bed catalytic cracking. Synthetic Petrol – Fischer-Tropsch's process-Knocking – Octane and Cetane rating, Flash Point, Fire point, Cloud point & Pour Point; Gaseous fuels – Composition and uses of Natural Gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

Unit-V

Spectroscopic Techniques and applications: Introduction, Principles of Electronic Spectroscopy: Beer-Lamberts law, Types of electronic transitions, applications of UV–Visible spectroscopy.

IR Spectroscopy: Introduction, Principle, Modes of Molecular vibrations, selection rules, Force Constant, Wave number regions of Some common organic functional

groups (C-H, NH_2, OH, -COOH, C=O, C≡ N, C=C, C≡C, C-O-C), Applications of IR Spectroscopy.
^{1}H-NMR Spectroscopy, Principles of NMR spectroscopy, Chemical shift - Shielding and Deshielding effects, Chemical shifts of some organic protons, Interpretation of NMR Spectra (Alkanes, Alcohol, carbonyl compounds, Alkyl halides) Applications of NMR: Introduction to Magnetic Resonance Imaging.

TEXT BOOKS:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. R.V. Gadag& A. Nityananda Shetty., **"**Engineering Chemistry**"**, I K International Publishing House Private Ltd. New Delhi (2015-Edition).

REFERENCES BOOKS:

1. O.G. Palanna, **"**Engineering Chemistry**"**, Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015-Edition).
2. **"**Wiley Engineering Chemistry**"**, Wiley India Pvt. Ltd. New Delhi. SecondEdition 2013.
3. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015-Edition).
4. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/105/104/105104102/
2. https://nptel.ac.in/courses/105/106/105106119/
3. https://nptel.ac.in/courses/103/103/103103163/
4. https://nptel.ac.in/courses/104/106/104106096/
5. https://nptel.ac.in/courses/115/102/115102025/
6. https://nptel.ac.in/courses/103/108/103108162/
7. https://nptel.ac.in/courses/103/105/103105110/
8. https://nptel.ac.in/courses/104/102/104102113/

Web Reference/E-Books:

S.No	Advanced concepts in syllabus	Website Referred
1	Water & Its Treatment	https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/
2	Lithium Ion Batteries	https://www.youtube.com/watch?v=fo3DMXwD9ig
3	Fuel Cells	https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf
4	IR Spectroscopy	www.chem.ucalgary.ca

5	Stereochemistry	research.cm.utexas.edu
6	Synthesis of Aspirin	http://vlab.amrita.edu/?sub=2&brch=191&sim=849&cnt=1
7	Deflouridation of fluoride water	www.csir.res.in
8	Engineering Chemistry IIT-MUMBAI	http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm
9	NMR Spectroscopy	https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy

ELECTRONIC DEVICES AND CIRCUITS
I B.Tech., EEE – I SEM

Course Title: ELECTRONIC DEVICES ANDCIRCUITS	Course Code:AS20-04ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs + 16Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams: 70 Marks
Prerequisites: Physics	

Course Overview:

The creation of electronic circuits requires knowledge of the physics and device technology for the emission and flow control of electrons in vacuum and matter. It uses active devices to control electron flow by amplification and rectification. Electronics has had a major effect on the development of modern society.

Course Objective

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To know the switching characteristics of components
- To know the need of biasing in Transistors
- To understand of various types of transistor's with its principle of operation

Course Outcomes(s)

CO#	Course Outcomes
C113.1	Know the characteristics of various components of semiconductor devices and its applications
C113.2	Understand and remember the applications of semiconductor diodes with examples.
C113.3	Analyze different types of transistor configurations with its parameters
C113.4	Understand and Analyze the relation between current amplification factors of the three configurations
C113.5	Analyze different biasing techniques of three terminal semiconductor Bipolar Semiconductor device.
C113.6	Understand and remember the operation of different types of FET's with its characteristics.

COURSE CONTENT (SYLLABUS)

UNIT I:
JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES:
Diode and its characteristics, Static and Dynamic resistances, Diode current equation,Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Zener diode and its characteristics ,Breakdown Mechanisms in Semi-Conductor (Avalanche and Zener breakdown) Diodes, Varactor Diode, LED, LCD and photo diodecharacteristics.

UNIT II:DIODE APPLICATIONS:
Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor

filter, L- section filter, Pi- section filter and comparison of various filter circuits, Clipping Circuits, Clamper circuits, Application of a zener diode as a voltage regulator. Applications of LED and LCD's. Hall Effect and its applications.

UNIT III:
BIPOLAR JUNCTION TRANSISTOR:
Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Volt-ampere characteristics of CB,CE and CC. Transistor current components, Transistor as a switch, switching times. BJT acts
as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha , Beta and Gamma, Comparison of CE,CB,CC configurations.

UNIT IV:BIASING AND STABILISATION: Transistor Biasing and Stabilization - criteria for fixing operating point, DC & AC load lines, Need for Biasing –Types of biasing's-Fixed Bias, collector to base bias, Self-Bias and voltage divider bias techniques for stabilization, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co}, β) Thermal run away, Thermal stability, Bias Stability, Bias Compensation using Diodes and thermistors.

UNIT V:FIELD EFFECT TRANSISTORS:
Types-The Junction Field Effect Transistor (construction, principle of operation, symbol)- pinch -off Voltage -Volt -Ampere characteristics, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion modes.

Text Books:
1.Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2.Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

References Books:
1.The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2.Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3.Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, McGraw Hill.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1.https://nptel.ac.in/courses/115/102/115102014/
2.https://nptel.ac.in/courses/117/101/117101106/
3.https://www.coursera.org/learn/electronics

Web Reference/E-Books:
https://www.springer.com/gp/book/9789811502668
https://www.pdfdrive.com/basic-electronics-for-scientists-and-engineers-e28939124.html

ENGLISH
I B.Tech., I SEM

Course Title: English	Course Code: AS20-00HS01
Teaching Scheme (L:T:P): 2:0:0	Credits:2
Type of Course: Lecture	Total Contact Periods: 32Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: 1. Basic knowledge of English language 2. Must obtain Grammar, and basic reading skills 3. Able to communicate in English language with basic writing skills 4. Able to use different types of vocabulary in different types of situations	

Course Overview:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.
In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.
Course Objective: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Train the students to use language appropriately for Interviews, Group discussions and Public speaking
- Enhance and empower the students in communication skills by concentrating on LSRW skills.

Course Outcomes(s)

CO#	Course Outcomes
C114.1	Apply English language effectively in spoken and written forms
C114.2	Analyse the given texts and respond appropriately
C114.3	Apply various grammatical structures in personal and academic fronts.
C114.4	Develop appropriate vocabulary for professional communication
C114.5	Improve competency in various forms of academic and professional writing.
C114.6	Perceive the importance of language skill for the enhancement of employability opportunities.

COURSE CONTENT (SYLLABUS)

UNIT I:
'Of Parents and Children' from the Essays of Francis Bacon

Vocabulary: The Concept of Word Formation –The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.
Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT II:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: Homonyms, Homophones and Homographs
Grammar:Misplaced Modifiers
Reading:Sub-skills of Reading- Skimming and Scanning
Writing:Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT III:
'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Comprehension- Intensive Reading and Extensive Reading
Writing**:** Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

UNIT IV:
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations and Acronyms in English
Grammar: Sequence of Tenses
Reading**:** Improving Comprehension Skills – Techniques for Good Comprehension
Writing:Information Transfer- Flow Chart- Pie Chart– Essay Writing-Précis Writing.

UNIT V:
'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage
Grammar:Collocations, Commonly Confused Words-Common Errors in English
Reading: Reading Comprehension-Exercises for Practice
Writing**:**Technical Reports- Introduction - Structure of Reports- Types of Reports - Manuscript Format.

Text Books:

1.Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

2.The Essays of Frances Bacon,Edited,with introduction and notes by Mary Augusta Scott.Charales Scribner's Sons,New york,1908,

References Books:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.

2.Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.

3.Wood, F.T. (2007).Remedial English Grammar. Macmillan.

4.Zinsser, William. (2001). On Writing Well. Harper Resource Book.

5.Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.

6.Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

7. English Grammar Usage for Technical Students. DPS Publications, G Victor Emmanuel Raju, G Shailaja Reddy and M Sanjay Saahul.

1. Practice English Your Own-

https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

2. Longman English Grammar Practice-
file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Edition%20(learnenglishteam.com).pdf

3. English Grammar through stories by Alan Townend-
file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

ELECTRICAL CIRCUITS-I
I B.Tech., EEE -I SEM

Course Title: ELECTRICAL CIRCUITS-I	Course Code:AS20-02PC01
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48 Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basic Mathematics	

Course Overview:
Circuit analysis, or solving a circuit, means figuring out voltages and currents in each element. Here's an overview of circuit analysis, with some context for the various tools and methods we use to analyze circuits

Course Objective

- To understand the basic concepts of circuit analysis
- To understand the basic concepts of magnetic circuit analysis
- To analyze single phase AC circuits
- To understand Locus diagrams and resonance
- To apply network theorems for circuit analysis

Course Outcomes(s)

CO#	Course Outcomes
C115.1	Apply basic network reduction techniques for analysis of electrical circuits
C115.2	Illustrate about magnetic circuits
C115.3	Remember the fundamentals of AC Circuits
C115.4	Analyse AC circuits with different combinations of RLC parameters
C115.5	Discuss resonance and locus diagrams of AC circuits
C115.6	Utilize the concept of network theorems to simplify electrical circuits

COURSE CONTENT (SYLLABUS)

UNIT I::INTRODUCTION TO ELECTRICAL CIRCUITS
Circuit Concept – Types of Elements-R-L-C parameters – Voltage and Current sources – Independent and dependent sources- Source transformation .Kirchhoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT II:MAGNETIC CIRCUITS
Magnetic Circuits – Faraday's laws of electromagnetic induction– concept of self and mutual inductance – dot convention – coefficient of coupling– composite magnetic circuits.

UNIT III: SINGLE PHASE A.C CIRCUITS
Generation of sinusoidal wave form, phasor representation, R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R,

L and C in series, parallel and series parallel combinations with sinusoidal excitation – Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference –concept of power factor, Real and Reactive powers – Complex and Polar form representation.

UNIT IV:LOCUS DIAGRAMS AND RESONANCE

Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance: series and parallel circuits, concept of band width and Q factor.

UNIT V:NETWORK ANALYSIS AND NETWORK THEOREMS

Nodal analysis, Mesh analysis of Networks with Independent and Dependent voltage and current sources. Superposition, Thevenin's, Norton's, Maximum Power Transfer, Tellegen's, Reciprocity, Millman's and Compensation theorems for D.C. and A.C. excitations.

Text Books:

1.Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th EditionMcGraw Hill Company, 2013
2.Circuit Theory, A. Chakrabarti, 6th Edition, DhanpatRai and Co., 2018
3.Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rdEdition, Tata McGraw Hill Company, 2019.

References Books:

1.Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019.
2.Linear Circuit Analysis (Time Domain Phasor and Laplace Transform Approaches),
Raymond A. Decarlo and Pen- min-lin, 2nd Edition, Oxford University Press, 2004
3.Network Theory, N. C. Jagan and C. Lakshminarayana, 1st Edition, B. S.Publications,
2012.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. NPTEL:https://swayam.gov.in/explorer?searchText=Electrical+circuits
2:MOOCS: https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysi-2

Web Reference/E-Books:

1. https://www.allaboutcircuits.com/textbook/direct-current/chpt-1/electric-circuits/
2. https://www.britannica.com/technology/electric-circuit
3. https://www.khanacademy.org/science/electrical-engineering/ee-circuit-analysis-topic
4.https://www.youtube.com/
5. https://www.electrical4u.com/electric-circuit-or-electrical-network/

ENGINEERING CHEMISTRY LAB
I B.Tech., I SEM

Course Title: Engineering Chemistry Lab	Course Code: AS20-00BS03
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of chemistry	

Course Overview:
The course emphasizes active resolution of experimental problems involving volumetric, analytical and instrumental usage; their design and optimization. Analytical, oral presentation, written report, and cooperative problem-solving skills are stressed in the context of chemical sciences practices. Safety awareness is integrated throughout the course.

COURSE OBJECTIVES:
The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin
   layer chromatographic (TLC) technique.

Course Outcomes (s)

CO#	Course Outcomes
C116.1	Analyze the need, design and perform a set of experiments.
C116.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C116.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C116.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conductometric Measurements, Ostwlad's viscometer and stalagmometer.
C116.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C116.6	Learn safety rules in the practice of laboratory investigations.

COURSE CONTENT (SYLLABUS)
LIST OF EXPERIMENTS

1. Determination of total hardness of water by Complexometric method using EDTA
2. Estimation of Iron using Standard $KMnO_4$.
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Dichrometry
7. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate
8. Determination of acid value of coconut oil
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid using Stalagmometer
11. Synthesis of Aspirin and Paracetamol
12. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols

Reference Books:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand &
Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5TH edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1..http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html
2.http://vlabs.iitb.ac.in/vlab/labscs.html
3.https://www.vlab.co.in/broad-area-chemical-engineering

ELECTRONIC DEVICES & CIRCUITS LAB
I B.Tech.,EEE-I SEM

Course Title: ELECTRONIC DEVICES & CIRCUITS LAB	Course Code: AS20-04ES05
Teaching Scheme (L:T:P):0:0:3	Credits:1
Type of Course: PRACTICALS	Total Contact Periods:48 hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:PHYSICS	

Course Overview: In This Practical Sessions Students can able to know, how to conduct Experiments by using breadboards and connections on it with different components, and make use of input and output peripherals, and measuring parameters on that equipment.
Different semiconductor devices and its characteristics they should understand and analyze through that they can identify the applications of those devices, which may help them to develop prototype model of mini and major projects.

Course Objective:

- To know the applications of Semiconductor devices through their characteristics
- To determine characteristics of JFET.
- To understand the amplifying action of a transistor.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Course Outcomes(s)

CO NO:	Student will be able to
C117.1	Understand the modifications in its characteristics of two terminal semiconductor devices
C117.2	Understand the analyze specific application of Zener diode through its characteristics.
C117.3	Understand the application of diode as a rectifier
C117.4	Understand and apply different configurations of transistors (BJT, FETs) pertaining to its nature of characteristics.
C117.5	Analyze and evaluate h-parameters of Bipolar Junction Transistor and its importance.
C117.6	Understand and Evaluate the amplifying action of a transistor

LIST OF EXPERIMENTS

(TWELVE EXPERIMENTS TO BE DONE):

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. V-I Characteristics of LED
3. Photo Diode characteristics
4. Zener diode characteristics
5. ZenerDiode acts as a voltage Regulator
6. Full Wave Rectifier with & without filters
7. Input and output characteristics of BJT in CE Configuration
8. Drain and Transfer characteristics of JFET in CS Configuration
9. Drain and Transfer characteristics of MOSFET in CS Configuration
10. Measurement of h-parameters from its CE and CB configurations
11. Verification of Amplifier action of a Transistor
12. Switching characteristics of a transistor

EXTRA EXPERIMENTS:

1. Half wave rectifier with and without filter
2. Input and output characteristics of BJT in CB Configuration
3. Input and output characteristics of BJT in CC Configuration

TEXT BOOKS:

1. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education.

REFERENCE BOOKS:

1. The Art of Electronics, Horowitz, 3rdEdition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, Mc Graw Hill.
4. Electronic Devices and Circuits-by J.B.Guptha.

Web Reference/E-Books:

W1	**https://www.electronics-tutorials.ws/amplifier/amplifier-classes.html**
W2	https://www.seas.upenn.edu/~ese319/Lecture_Notes/Lec_10_HF_Model_10.pdf
W3	https://whatis.techtarget.com/definition/MOSFET-metal-oxide-semiconductor-field-effect-transistor
W4	https://www.daenotes.com/electronics/digital-electronics/oscillators
W5	https://www.tutorialspoint.com/amplifiers/classification_of_power_amplifiers.htm

VIDEO REFERNCES

V1	**https://www.youtube.com/watch?v=NESchIntkR8**
V2	https://www.youtube.com/watch?v=yUEss0Dl6ww&t=580s
V3	https://www.youtube.com/watch?v=4_nGFY7zgDM
V4	https://www.youtube.com/watch?v=NMZUevvwMlw
V5	https://www.youtube.com/watch?v=gRcE2t_28co

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
I B.Tech., EEE -I SEM

Course Title: English Language Communication Skills Lab	Course Code: AS20-00HS02
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course : Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: 1. The students should have a basic knowledge of English language 2. Must obtain Grammar, and basic Speaking skills 3. Should able to communicate in English language 4. Able to use different types of vocabulary in different of situations	

Course Overview:
In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English Language Communication Skills Lab has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.
In ELCS Lab the focus should be on the skills development in the areas of vocabulary, grammar, reading and speaking. For this, the teachers should use the prescribed Lab manual for detailed study. The students should be encouraged in improving communication skills in the lab. The time should be utilized for activity based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Course Objective: The course will help to
To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
To train students to use language appropriately for public speaking and interviews
To improve the fluency of students in spoken English and neutralize their mother tongue influence

Course Outcome:

CO#	Course Outcomes
C118.1	Learn how to pronounce words using phonetic transcription
C118.2	Improves collaborative skills and maximizes speaking skills
C118.3	Develops Neutralization of accent for intelligibility
C118.4	Develops better understanding of nuances of English language through audio-visual experience
C118.5	Improves language skills according in the different situations, discussions and interviews
C118.6	Develops linguistic, communicative and critical thinking

COURSE CONTENT (SYLLABUS)

Listening Skills Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

Exercise – I :

- CALL Lab: Introduction to Pronunciation – Speech Sounds – Vowels and Consonants.
- ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language.
  Practice: Greetings – Introducing Oneself and Others -Taking Leave – JAM Session- Situational Dialogues.

Exercise – II :

- CALL Lab: Understand: Structure of Syllables – Word Stress .
- Practice: Basic Rules of Word Accent.
- **ICS Lab:** Understand: Features of Good Conversation – Non- verbal Communication.
  Practice: Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions – Telephone Etiquette.

Exercise – III

- **CALL Lab:** Understand: Intonation- Rhythm-The Influence of Mother Tongue (MTI).
  Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
- **ICS Lab:** Oral Presentations- Introduction to Formal Presentations
- Practice: Formal Presentations- Poster Presentations and PPT's.

Exercise – IV

CALL Lab: Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab: Public Speaking – Exposure to Structured Talks- Group Discussion

Practice: Group Discussion.

Exercise – V

CALL Lab: Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.

- ICS Lab: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews.

Practice: Mock Interviews

References

1. ELCS LAB MANUAL
2. Practice English Your Own- https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf
3. Longman English Grammar Practice- file:///C:/Users/user/Downloads/Longman_English_Grammar_Practice_intermediate_Self_Study_Edition%20(learnenglishteam.com).pdf
4. English Grammar through stories by Alan Townend- file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

SOFT SKILLS 1
I B.Tech., EEE-I SEM

Course Title: Soft Skills 1	Course Code: AS20-00HS03
Teaching Scheme (L:T:P): 2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

Course Overview:
The students will enhance their communication skills. The course will enable them to become responsible towards their lives and will be able to faces challenges , the course will also enable to develop work culture, orientation and will enable them with problem solving abilities.

Course Objective:-
1. To develop Communicative Methodology.
2. To lead the life with utmost responsibility.
3. To accept challenges.
4. To develop work orientation in the mindset of the students.
5. To have problem solving ability.

Course Outcomes(s)

CO#	Course Outcomes
C119.1	Facilitates better interaction among students.
C119.2	Enhance and improve documentation.
C119.3	Demonstrate leadership qualities.
C119.4	Demonstrate effective presentation skills.
C119.5	Express benevolence.
C119.6	Enhance their communication skills

COURSE CONTENT (SYLLABUS)

UNIT I: Importance of Soft Skills
Successful Career - Communication - Body Language - Written Communication - Presentation
Team Work - Professionalism - Interpersonal Skills - Time and Stress Management - Leadership Qualities

UNIT II: Self Introduction
Introductory Speech - General Speech - Academic Speech - Evaluation of Speech - Steps of Self Introduction - Basic Questions and Answers -Deliver Self Introduction - Tips of Self Introduction - Body Gestures- Good Eye Contact - Never be Nervous - Do's and Don'ts' of Self Introduction- Examples on Self Introduction

UNIT III: Body Language
Introduction – Communicating Body – Studying of body language – 17 concepts of learning body language.

UNIT IV: Communication Skills

Sounds of English – English as a World Language – Speech formation – Pronunciation – Oral Communication – Written Communication – Face to Face Communication Effective Communication – Presentation – Information Transfer.

UNIT V: Positive Attitude and Positive Thinking

Introduction – Possible Reactions – Dual Attitude – Indifference Attitude – Negative Attitude – Think Positively – Depend on Positive Thinking – Know – What we are – Benefits of Behaviour – Myths of negative thinking – Tips to become a positive thinker – Moving towards success

Text Books:

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTipshttps://www.youtube.com/watch?v=VczVqHJW0gg
2. Effective Communication Skills Training Video in Hindi https://www.youtube.com/watch?v=kxAXOh5RmwU
3. A guide to effective communication https://www.youtube.com/watch?v=JwjAAgGi-90
4. A Failure to Communicate https://www.youtube.com/watch?v=8Ox5LhIJSBE
5. Non Verbal Communication https://www.youtube.com/watch?v=SKhsavlvuao

B.TECH
FIRST YEAR
SECOND SEMESTER
SYLLABUS

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
I B.Tech., EEE - II SEM

Course Title: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	Course Code: AS20-00BS01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. knowledge on Derivatives 2. knowledge on Integrations 3. knowledge on Functions	

Course Overview:

- Students will able to identify Exact and Non-Exact D.E. and find the solutions by using different methods.
- Students will able to identify Homogeneous and Non-Homogeneous D.E. and find the solutions by using different methods.
- Students will learn and evaluate Double and Triple Integrals.
- Students will learn Gradient, Divergent, Curl and Vector Identities.
- Students will learn and evaluate Line, Surface and Volume Integrals and Vector Integral Theorems.

Course Objective:

- Methods of solving the differential equations of first order.
- Methods of solving the differential equations of higher order.
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes(s)

CO#	Course Outcomes
C121.1	Acquires various skills pertaining to differential and vector calculus and apply them in different fields of Engineering
C121.2	Determine whether the given differential equation of first order is exact or not.
C121.3	Apply the concept of higher order ODE to real world problems.
C121.4	Analyze and apply the concept of multiple integrals to find areas, volumes.
C121.5	Define Directional Derivative and Scalar Potential Function
C121.6	Evaluate the line, surface and volume integrals and convert them from one to another.

COURSE CONTENT (SYLLABUS)

UNIT I: FIRST ORDER ODE
Exact equations; Non-Exact equations; Linear equations; Bernoulli's equations; Newton's Law of Cooling; Law of Natural Growth and Decay; Orthogonal Trajectories.

UNIT II: HIGHER ORDER LDE
Higher Order Linear Differential Equations with Constant Coefficients; Non-Homogeneous Differential Equations with RHS of the type: e^{ax}, sinax, cosax, x^k, $e^{ax}v$, xv, Method of Variation of Parameters.

UNIT III: MULTIPLE INTEGRALS
Evaluation of Double Integrals (Cartesian and Polar);Change of Variables(Cartesian to Polar);Change of Order of Integration(Cartesian form);Areas and Volumes by Double Integrals. Triple Integrals(Cartesian form).

UNIT IV: VECTOR DIFFERENTIATION
VectorPointFunction;ScalarPointfunction;Gradient;Divergent;Solenoidal;Curl;Irrotational;Directional Derivative; Scalar Potential Function; Vector Identities.

UNIT V: VECTOR INTEGRATION
Line Integral; Surface Integral; Volume Integral; Green's Theorem in a plane; Gauss's Divergence Theorem;Stoke's Theorem (without proofs) and Applications.

Text Books:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2010.
2. S.R.K. IyengarandR.K.Jain,Advanced Engineering Mathematics, Narosa Publishing House,5th Edition, 2016.
3.

References Books:
1. Dr. M.D. Rai Singhania ,Ordinary and Partial Differential Equations, S.Chand and Company Ltd.,18 th Edition,2008.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.
3. Murray R.Spiegel, Seymour Lipschutz, Dennis Spellman,VectorAnalysis:Schaum's Outlines Series,Tata McGrawHill,2 nd Edition,2009.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://www.coursera.org/learn/ordinary-differential-equations
2.https://onlinecourses.nptel.ac.in/noc20_ma15/preview

Web Reference/E-Books:
1. ENGINEERIMG MATHEMATICS-II BY Dr.M.SURYANARAYANA REDDY
2. MATHEMATICS-I BY P. SHIVARAMAKRISHNA DAS, C. VIJAYA KUMARI
3. ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS BY Dr.M.D.RAISINGHANIA

APPLIED PHYSICS
I B.Tech., EEE-II SEM

Course Title: ENGINEERING PHYSICS	**Course Code: AS20-00BS08**
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs +16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics. 2. The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory. 3. The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.	

Course Overview:

This course deals with quantum principles and explore their applications in studying the behavior of fundamental entities of atom. It deals with semiconductor devices which are employed in designing electronic systems and in communication field. It deals with the fundamental properties of dielectric and magnetic materials and explore their application in all engineering streams.

Course Objective

1. Student explores the dual nature of the particle and applications of Schrodinger Equation.
2. Student identifies the Concept of Energy band formation and analyze classification of solids.
3. Student distinguishes the differences between Intrinsic and Extrinsic Semiconductors
4. Student explores the different applications of semiconductor devices.
5. Student identifies the behaviour of solids under electric and magnetic field and Understand the concept of superconductivity
6. Student interprets the characteristics of Lasers, types of Lasers, Optical fiber principle and their applications.

Course Outcomes(s)

CO#	**Course Outcomes**
C122.1	Interprets the dual nature of matter waves using quantum principles.
C122.2	Differentiates the physical properties of conductors, insulators and semiconductors using energy band.
C122.3	Identifies the different types of semiconductors using Hall Effect
C122.4	Analyzes the different properties of semiconductor devices and their applications.
C122.5	Explores the different types of Dielectric and Magnetic materials and their applications in different fields.
C122.6	Identifies the different characteristics and applications of lasers and fiber optics

COURSE CONTENT (SYLLABUS)

UNIT I: QUNATUM MECHANICS

Introduction to Quantum Mechanics (Origin of QM), Dual nature of particles, De Broglie's hypothesis, Matter waves, Heisenberg's uncertainty principle, Photo-electric effect(qualitative), Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT II: INTRODUCTION TO SOLIDS

Classical Statistics – Maxwell-Boltzmann Distribution(qualitative) Quantum Statistics – Bose-Einstein statistics(qualitative), Fermi – Dirac statistics(qualitative), Density of Energy states, Electrons in a periodic potential – Bloch theorem, Kronig – Penny Model(qualitative), Brillouin Zones (E-K curve), Concept of effective mass of electron, Energy band formation in solids, Classification of solids into Metals, Semiconductors and insulators.

UNIT III: SEMICONDUCTOR PHYSICS AND DEVICES

Semiconductor Physics: Intrinsic and Extrinsic semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Hall Effect.

Semiconductor Devices: PN Junction Diode – Junction Formation, Energy Band Diagram, V-I characteristics of PN junction diode, Direct and Indirect band gap semiconductors, LED & Solar cell.

UNIT IV: DIELCTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectric properties: Introduction, Types of Polarizations (Electronic and Ionic) and Calculation of their polarizabilities, Internal fields in solids: (Lorentz Method), Clausius-Mossotti relation, Piezo-electricity, Ferroelectricity, Pyro-electricity and their applications.

Magnetic Properties: Introduction, Bohr magneton, classification of magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Applications.

Superconductors: Introduction, type – I and type – II Superconductors, Applications of Superconductors

UNIT V: LASERS AND FIBER OPTICS

Lasers: Introduction, Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Relation between Einstein's Coefficients, Population inversion, Metastable state, Pumping, Block Diagram of laser, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers in Defense, Medical field.

Fiber Optics: Introduction to optical fiber, Construction and working of an Optical Fiber, Acceptance angle, Numerical aperture, Types of Optical fibers –Mode & Propagation through Step and Graded index fibers, Attenuation, Applications of optical fibers in Communication System and Sensors.

Text Books:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Halliday and Resnick, Physics - Wiley

References Books:

1. Engineering physics 2nd edition –H.K.Malik and A.K. Singh Richard.
2. Introduction to Solid State Physics - Charles Kittel

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_ph24/preview
2. https://onlinecourses.nptel.ac.in/noc20_ph16/preview
3. https://www.coursera.org/learn/semiconductor-physics
4. https://www.coursera.org/lecture/leds-semiconductor-lasers/active-optical-devices-specialization-introduction-0jner

Web Reference/E-Books:

1. Physics for Engineers by N. K. Verma
2. Essentials of Applied Physics by Royal M. Frye

PROGRAMMING FOR PROBLEM SOLVING
I B.Tech., II SEM

Course Title: PROGRAMMING FOR PROBLEM SOLVING	Course Code: AS20-05ES01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Mathematics knowledge, Analytical and Logical skills	

Course Overview:
It introduces students to the field of computer science as a discipline for solving problems through computation and provides the foundation for more advanced courses on programming and software development.

Course Objective
- To learn the fundamentals ofcomputers.
- To understand the various steps in programdevelopment.
- To learn the syntax and semantics of C programminglanguage.
- To learn the usage of structured programming approach in solvingproblems.

Course Outcomes(s)

CO#	Course Outcomes
C123.1	Designs algorithms and draws flowcharts for solving problems.
C123.2	Converts the algorithms/flowcharts to C programs.
C123.3	Develops the code and tests a given logic in C programming language.
C123.4	Dissects a problem into functions and develops modular reusable code.
C123.5	Demonstrates arrays, pointers, strings and structures in C.
C123.6	Explains Searching and sorting problems.

COURSE CONTENT (SYLLABUS)

UNIT - I
Problem Solving Using Computers :Computer Overview, Introduction to components of a computer system, Algorithms ,Flowchart, Pseudo code with examples, Number systems(Decimal & Binary Conversion).
Overview of C **:**History of C, Basic structure of C- program, Creating and Running C-Program, Input and output statements.

UNIT - II
Fundamentals of C: C-Tokens, Data types, Operators, Expressions, Type conversions, Types of Errors , Input and output statements.
Control Statements in C
Decision making and branching, Decision making and Looping statements.

UNIT – III
Structured Programming :Functions: Syntax, Steps ,Types and Category of

Functions, parameter passing mechanism. Recursion and Storage Classes
Dynamic memory allocation**:**malloc(), calloc(), realloc(), free() with example

UNIT - IV

Arrays & Strings: Declaration , Initialization and Accessing Elements, String handling functions, Array of Strings.

Structures and Unions: Defining structures, initializing structures, unions, Array of structures, self referential structures.

Pointers: Types of Pointers Use of Pointers, Dereferencing operations, Examples

UNIT - V

Numerical methods: Roots, Integration and Differentiation Methods, Examples

Linked List: Definition, Types, Implementation Using Self referential Structures:

Files: (only if time is available, otherwise should be done as part of the lab)

Text Books:

1.Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Ashok N. Kamthane, Programming in C, 2/e, Pearson Education.
4. Programming with C, by K.R. Venugopal, Tata Mcgraw Hill Publishing Co Ltd

References Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4.Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/learn/computational-thinking-problem-solving
2. nptel.ac.in/courses/106105085/4
3. nptel.ac.in/courses/106105085/2

Web Reference/E-Books:

1. https://onlinecourses.nptel.ac.in/noc18_cs33/preview
2. http://www.thenewboston.com/
3. https://www.codesdope.com/

ENGINEERING GRAPHICS AND DESIGN
I B.Tech.,EEE- II SEM

Course Title: ENGINEERING GRAPHICS AND DESIGN	Course Code: AS20-03ES02
Teaching Scheme (L:T:P): 2:0:3	Credits: 3.5
Type of Course: Lecture + Practical	Total Contact Periods: 32Hrs+ 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: None	

Course Overview:
Engineering graphics & Design has a well-defined set of standards by which technical drawings are produced. This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

Course Objective
The objectives of this course are to

- To know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
- To understand the importance of engineering curves.
- To learn to use the orthographic projections for points, lines, planes and solids in different positions.
- To make the students draw the projections of the planes.
- To understand the isometric projections.
- To create simple solid models of various domain applications.

Course Outcomes(s)
At the end of the course, students will be able to

CO#	Course Outcomes
C124.1	Apply the concepts of engineering curves in construction using AutoCAD.
C124.2	Solve the problem of projections of points and lines, in different positions using AutoCAD.
C124.3	Solve the problem of projections of planes and solids in different positions using AutoCAD.
C124.4	Solve the problems of Projections of solids and its positions using AutoCAD.
C124.5	Solve the problems on Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions using AutoCAD.
C124.6	Solve the problems on Orthographic Projections and its conversions using AutoCAD.

COURSE CONTENT (SYLLABUS)

Introduction to AutoCAD Software**:** The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

UNIT I:
Introduction to Engineering Drawing**:** Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.
Engineering Curves**:** Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

UNIT II:
Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes.
Projections of Planes**:** Projections of Planes- Surface Inclined to both the Planes.

UNIT III:
Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone.
Sections and Sectional Views**:** Right regular solids - prism, cylinder, pyramid, cone – use of Auxiliary views.

UNIT IV:
Isometric Projections**:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids.

UNIT V:
Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.
Introduction to Solid Modelling**:** Creation of simple solid models relevant to the domain.

Text Books:

1. Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016.
2. Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, SciTech Publishers, 2010.
3. Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.
5. Engineering graphics and design, Pradeep Jain, A.P Gautam and Ankitha Maheshwari.

References Books:

1. Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton (Auto CAD 2019), 1st Edition, John Wiley & Sons, Indianapolis, Indiana.
2. AutoCAD Software Theory and User Manuals.
3. Engineering Design, George E. Dieter, Linda C. Schmidt/third edition.
4. Engineering Drawing and design, CencellJonson,JayD.Helsel,DennisR.Short.
5. Engineering Drawing, Jolhe/fourth edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/112/103/112103019/
2. https://nptel.ac.in/courses/112/104/112104172/

Web Reference/E-Books:

1. http://nptel.ac.in/courses/112103019
2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_scienc e_students/engineeringdrawing.pdf

Software Required: AUTOCADD

POWER SYSTEMS -1
I B.Tech., EEE -II SEM

Course Title: POWER SYSTEMS -1	Course Code:AS20-02PC02
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Theory	Total Contact Periods:48 Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Electric Circuits -I	

Course Overview:

A power system is an interconnected network with components converting non-electrical energy continuously into the electrical form and transporting the electrical energy from generating sources to the loads/users. A power system serves one important function and that is to supply customers with electricity as economically and as reliably as possible

It presents an overview of the main components of power systems like generating systems, economics of power generation, transmission line parameters.

Course Objective

- To understand the thermal, nuclear, hydro electric generating stations.
- To compare air insulated and gas insulated substations
- To understand about electrical installations
- To compare and understand about types of tariff
- To evaluate the transmission line parameters calculations

Course Outcomes(s)

After Completion of this course the student is able to

CO	Course Outcomes
C125.1	Understand the concepts of power systems
C125.2	Describe layout of hydro power plant, thermal power station, Nuclear power plant and gas power plant
C125.3	Understand concepts based on electrical installation
C125.4	Understand the concepts of economics of power generation
C125.5	Compare and understand about types of tariff
C125.6	Determine the electrical circuit parameters of transmission lines

COURSE CONTENT (SYLLABUS)

UNIT I: THERMAL, NUCLEAR POWER STATIONS

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses. - Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and cooling towers.

Nuclear Power Stations: Nuclear Fission and Chain reaction. - Nuclear fuels. - Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control

rods, Reflectors and Coolants. - Radiation hazards: Shielding and Safety precautions. - Types of Nuclear reactors and brief description of PWR, BWR and FBR.

UNIT II: HYDROELECTRIC POWER STATIONS & SUBSTATIONS

Layout of hydroelectric power plant, Elements of hydro electric power station.
Substations: Classification of substations-Air insulated substations - Indoor & Outdoor substations: Substation layout showing the location of all the substation equipment.

UNIT III: ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

UNIT IV:ECONOMICS OF GENERATION

Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

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UNIT V: TRANSMISSION LINE PARAMETERS

Types of conductors - Calculation of resistance for solid conductors – Calculation of inductance for single phase lines, three phase single circuit and double circuit lines, Transposed lines, concept of GMR and GMD, Skin and Proximity effects. Calculation of capacitance for single phase lines, three phase single circuit and double circuit lines

Text Books:

1.W.D.Stevenson –Elements of Power System Analysis, Fourth Edition, McGraw Hill, 1984.
2. C.L. Wadhwa –Generation, Distribution and Utilization of Electrical Energy, Second
Edition, New Age International, 2009.

References Books:

1. "M.V. Deshpande", "Elements of Power Station design and practice" , Wheeler Publishing,
3rd Edition 1999.
2. "S. N. Singh", "Electrical Power Generation, Transmission and Distribution", PHI, 2003.
3. Charles A. Gross, Power System Analysis - 2nd Edition, John Wiley & Sons, 1986
4. Arthur R. Bergen and Vijay Vittal, Power Systems Analysis - 2nd Edition, Prentice Hall,
2000.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://www.coursera.org/learn/electric-power-systems
2https://nptel.ac.in/courses/108/102/108102047/generation
3.https://onlinecourses.swayam2.ac.in/nou20_cs08/preview

Web Reference/E-Books:

1.https://www.sciencedirect.com/book/9780750646376/electrical-engineers-reference-book
2.https://books.google.co.in/books/about/Electrical_Power_Systems.html?id=4yoYN_EBHxwC

APPLIED PHYSICS LAB
I B.Tech., II SEM

Course Title: APPLIED PHYSICS LAB	Course Code: AS20-00BS09
Teaching Scheme (L:T:P): (0:0:3)	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must know the usage of basic tools for measurement of physical quantities. 2. The students must have knowledge of error analyses, types of errors, principles of optics, mechanics, waves and Oscillations	

Course Overview:
The course deals with experiments in various fields of physics such as Wave Optics, Wave mechanics, Electronics, Electricity and Magnetism.

Course Objective

1. To identify the active and passive elements and gain ability to build electronic circuits for solving complex engineering problems.
2. To classify the semiconductor materials into p-type or n-type semiconductor and estimate the energy gap of semiconductor diode
3. To explore the characteristics of optoelectronic devices
4. determines the work function of given material.
5. estimate magnetic field intensity and explores the generation of magnetic field.
6. To determines the properties of optical fibers using lasers

Course Outcomes(s)

CO#	Course Outcomes
C126.1	Compute time constant of RC circuit and resonant frequency of LCR circuit.
C126.2	Identify the type of semiconductor using Hall Effect and determine the Energy gap of a semiconductor diode.
C126.3	Analyze the V-I characteristics of Solar cell and LED.
C126.4	Evaluate work Function of a photo metal using photo electric effect.
C126.5	Summarize the variation of Magnetic Field along the current carrying coils.
C126.6	Estimate the light gathering ability and bending losses of Optical fibers.

COURSE CONTENT (SYLLABUS)

The Students has to perform any eight of the following experiments

1. LCR Circuit: To study the frequency response of LCR series and parallel resonance circuit.
2. R-C Circuit: To study the time response of RC circuit.
3. Hall Effect: To determine Hall voltage and Hall Coefficient of given semiconductor material.
4. Energy Gap: To determine the energy gap of a given Semiconductor.
5. Solar Cell: To study V-I Characteristics of Solar Cell.
6. LED: To study the V-I characteristics of LED.
7. Photoelectric effect: To determine the work function of given material.
8. Stewart- Gee apparatus – To study the variation of magnetic field along the axis of circular current carrying loop.
9. Optical fibre: To determine the Numerical aperture and Acceptance angle of a given fibre.
10. Optical fibre: To study the bending losses in Optical fibres.

References Books:

1. Practical physics by Dr. Aparna, V.G.S.publications.
2. Physics practical lab manual –SPEC

Online Resources

1. https://www.futurelearn.com/courses/teaching-practical-science-physics
2.https://www.vlab.co.in/broad-area-physical-sciences

PROGRAMMING FOR PROBLEM SOLVING LAB
I B.Tech.,EEE- II SEM

Course Title:PROGRAMMING FOR PROBLEM SOLVING LAB	Course Code:AS20-05ES02
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:- Mathematics knowledge, Analytical and Logical skills	

Course Overview:

This course provides the fundamental concepts of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

Course Objective

- To learn the fundamentals ofcomputers.
- To understand the various steps in programdevelopment.
- To learn the syntax and semantics of C programminglanguage.
- To learn the usage of structured programming approach in solvingproblems.

Course Outcomes(s)

CO#	Course Outcomes
C127.1	Develops algorithms for simple problems.
C127.2	Translate given algorithms to a working and correct program.
C127.3	Identifies and correct syntax errors as reported by the compilers.
C127.4	Identifies and correct logical errors encountered duringexecution.
C127.5	Demonstrates data operations using arrays, strings, structures and pointers of different types.
C127.6	Creates, reads and writes to and from simple text and binary files.

COURSE CONTENT

Practice Sessions:

Week1:

Tutorial 1: Problem solving using computers(Creating, Compiling & Running Steps , Basic Structure of C Program)-:

Lab1: Familiarization with programming environment

Week2:

Tutorial 2: Variable types and Rules, Formatted I/O statements

Lab 2: Reading and Displaying Different Values Using scanf() &Printf()

Week3:

Tutorial 3: Types of Operators

Lab 3: Simple Computational problems using operators

Week4:

Tutorial 4: Branching and logical expressions:

Lab 4: Problems involving if-then-else structures

Week5:

Tutorial 5: Loops, while, do-while and for loops:

Lab 5: Iterative problems e.g., sum of series, sum of n- natural numbers

Week6:

Tutorial 6: 1D Arrays: searching, sorting:

Lab 6: 1D Array manipulation : insertion, selection and bubble sort

Week7:

Tutorial 7: 2D arrays and Strings

Lab 7: Matrix problems, String operations, string sorting , palindrome string

Week8:

Tutorial 8: Functions, call by value:

Lab 8: Simple functions: factorial ,sum of individual digits, Fibonacci series etc.,

Week9:

Tutorial 9: Recursion, structure of recursive calls

Lab 9: Recursive functions: factorial, Fibonacci, GCD and towers of Hanoi

Week10:

Tutorial 10: Pointers, structures and dynamic memory allocation

Lab 10: Problem solving using Pointers and structures

Week11:

Tutorial 11: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 11: Programming for solving Numerical methods problems

Week12

Tutorial 12: Single Linked List using self referential structures

Lab 12: Implementation of Single liked list using self referential structures

Week13:

Tutorial 13: File data type , File pointer, modes of operations, file handling functions

Lab 13: Programs using file handling functions: File copy, Merging of Files

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C,McGraw-Hill.
2. B.A.ForouzanandR.F.GilbergCProgrammingandDataStructures,Cengage Learning, (3rdEdition).
3. BrianW.KernighanandDennisM.Ritchie,TheCProgramming Language,Prentice Hall ofIndia.

References Books:

1. R.G. Dromey, Howtosolve it by Computer, Pearson (16thImpression).
2. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducation.
3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill,4th Edition.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. http://nptel.ac.in/courses/106105085/
2. http://nptel.ac.in/courses/106106127/

Web Reference/E-Books:

1. www.leetcode.com
2. www.thenewboston.com
3. www.codesdope.com

ENGINEERING PRACTICES
I B.Tech. EEE-II SEM

Course Title: ENGINEERING PRACTICES	Course Code: AS20-03ES04
Teaching Scheme (L:T:P): 0:0:4	Credits: 2
Type of Course: Practical	Total Contact Periods: 64 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
Mechanical Engineering Practices is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment.

Course Objective
The objectives of this course are to

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes(s)

CO#	Course Outcomes
C128.1	Apply the concepts of engineering workshop practice on machine tools and their operations.
C128.2	Expertise on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
C128.3	Recognize the tools and apply different trades of Engineering practices on drilling, material removing, measuring, chiseling etc.
C128.4	Apply basic knowledge on electrical engineering for house wiring practice.
C128.5	Manufacture the given material to desired product in a particular pattern by tin smithy.
C128.6	Mould the component of different size and shape by black smithy in on Furnace

COURSE CONTENT (SYLLABUS)

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint).
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit).
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel).
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern).
V. Welding Practice – (Arc Welding & Gas Welding).
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light).
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook).

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working.

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

References Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/112/107/112107145/
2. https://nptel.ac.in/courses/112/107/112107144/

Web Reference/E-Books:

1. https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-_ye4C
2. https://www.youtube.com/watch?reload=9&v=4gpjof5ESKQ

SOFT SKILLS -II
I B.Tech. EEE- II SEM

Course Title: Soft Skills –II	Course Code: AS20-00HS04
Teaching Scheme (L:T:P):2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Soft skills-I	

Course Objective:-

1. To develop Optimistic Nature.
2. To enhance the skills related to Group Discussion.
3. To make the students to have commitment.
4. To have dedication as well determination.
5. To develop confidence.

Course Outcomes:

CO#	Course Outcomes
C129.1	Analyze excellent behavioral attitude.
C129.2	Apply amicable solutions to problematic issues in life.
C129.3	Understand the importance of functional and practical work.
C129.4	Create goal oriented personality.
C129.5	Understand soft skills and life skills.
C129.6	Remember to be committed and determined.

COURSE CONTENT (SYLLABUS)

UNIT I: Linguistic Ability
Writing Skills - Reading Skills - Listening Skills - Speaking Skills - Just a Minute Program – JAM – Improving Vocabulary.

UNIT II: Effective Communication
Introduction – Communicative Methodology – Way to Communicate perfectly – Communicative series – Descriptive Communication – Process of Communication – Barriers of Communication – Essentials of Communication – Improving existing Communication – Strategies to improve Communication – Corporate Communication – Assess the Communication – How to be a successful Communicator.

UNIT III: Ethical Values
Meaning of Ethics- Importance of Education – Moral Values – Eradication of problems – Influence of the society – Developing self-motivational skills – Source of Ethics – Develop Ethics – Ethics related to Life.

UNIT IV: Confidence
Self Confidence – Self Esteem – Importance of Confidence – Right decision Making – Turn towards Productivity – Things can be had with Confidence – Self Identity – Building good career – Self Reliance – Quotes of Confidence.

UNIT V: Introduction – Initiation – Verbal Oriented – Purpose of Group Discussion –Importance of Group Discussion – Involvement in Group Discussion - Learning Attitude – Skill Development Platform – Primary Level Topics and Discussion – Able Participation – Practice Group Discussion.

Text Books:

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

Web References:

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTipshttps://www.youtube.com/watch?v=VczVqHJW0gg
2. Effective Communication Skills Training Video in Hindi https://www.youtube.com/watch?v=kxAXOh5RmwU
3. A guide to effective communication https://www.youtube.com/watch?v=JwjAAgGi-90
4. A Failure to Communicate https://www.youtube.com/watch?v=8Ox5LhIJSBE
5. Non Verbal Communication https://www.youtube.com/watch?v=SKhsavlvuao

B.TECH
SECOND YEAR
FIRST SEMESTER
SYLLABUS

UNIVERSAL HUMAN VALUES-II
II B.TECHEEE-I SEM

Course Title: UNIVERSAL HUMAN VALUES-II	Course Code: AS20 – 00HS07
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Prerequisites:

1. The student must have basic knowledge of Need, Basic Guidelines, Content and Process for Value Education
2. Understanding Harmony in the Human Being - Harmony in Myself
3. The student must have fundamental knowledge Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
4. The student can able to Understanding Harmony in the Nature and Existence - Whole existence asCoexistence

Course Overview:

This course is designed for transferring the right understanding and definite human conduct in the students. The conduct of every human differs from human to human. Through this course an attempt is being made to introduce the definite human conduct in students. The conduct of a human being can be definite only if knowledge of right understanding and right human conduct is taught to them.

Course Objective

The objective of the course is four fold:

1.Development of a holistic perspective based on self-exploration aboutthemselves (human being),
family, society and nature/existence.

2. Understanding (or developing clarity) of the harmony in the human being, family, society and
nature/existence

3. Strengthening of self-reflection.

4. Development of commitment and courage to act.

Course Outcome(s)

CO#	Course Outcomes
C211.1	Basic guideline of human values universally.
C211.2	Understanding the harmony in the human being
C211.3	Learn the rights and responsibilities as an employee, team member and a global citizen
C211.4	To know about society – Harmony @ human relation
C211.5	The student can study the professional ethics and values.
C211.6	Understand the importance of Values and Ethics in their personal lives and Professional careers

COURSE CONTENT (SYLLABUS)

UNIT – I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values-I- Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and ExperientialValidation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels. (Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking)

UNIT – II

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient 'I' and the material 'Body' . Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensureSanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT- III

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and selfregulation in

nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT – V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly, and eco-friendly production systems, c. Ability to identify and develop appropriate, technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations, Sum up, Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference Books

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

E-RESOURCES:

1. https://www.yourmorals.org/schwartz.2006.basic%20human%20values.pdf
2. https://web.archive.org/web/20080311200942/https://kroc.nd.edu/ocpapers/op_16_1.pdf
3. https://kroc.nd.edu/ocpapers/op_16_1.pdf
4. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&q
5. https://www.researchgate.net/publication/270388493_Variations_in_Value_Orientation

WEB REFERENCES:

1. https://furhhdl.org/our-programmes/education-and-ethics/universal-human-values-ethics/
2. https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&qWEB RESOURSES
3. https://www.un.org/press/en/2003/sgsm9076.doc.htm

https://www.kobo.com/ebook/the-psychology-of-conservatism-routledge-revivals

ELECTRICAL CIRCUITS-II
II B.Tech.,EEE -I SEM

Course Title: ELECTRICAL CIRCUITS-II	Course Code:AS20-02PC03
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48Hrs+16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: ELECTRICAL CIRCUITS-I	

Course Overview:

Students can gain good knowledge in solving three phase circuits for the star and delta connected balanced and unbalanced loads, transient behavior of electrical networks, concept of two port networks, circuit topology and design of various filter circuits.

Strong knowledge in this course and along with Pre-Requisite course, students who attempt GATE, other competitive exams has 11.75weightage of marks of this Electric Circuits Theory.

Course Objective:

- To understand three phase circuits
- To analyze transients in electrical systems
- To evaluate network parameters of given electrical network
- To understand the graph theory for circuit analysis
- To understand the behaviour of filters

Course Outcomes(s)

CO#	Course Outcomes
C212.1	Describe the importance of three phase circuit for balanced and unbalanced conditions
C212.2	Analyze the transient behavior of electrical networks in time domain and frequency domain
C212.3	Illustrate the concept of complex frequency, transform impedance, significance of poles and zeros of a given transfer function and network synthesis
C212.4	Develops relationship among various two port network and converts one parameter to the other
C212.5	Create the circuits using network topology
C212.6	Design the filter circuit for application of electrical system

COURSE CONTENT (SYLLABUS)

UNIT I: THREE PHASE CIRCUITS

Three phase circuits: Phase sequence – Star and Delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of Active and Reactive Power- Different methods.

UNIT II: TRANSIENT ANALYSIS

Transient response of R-L, R-C, R-L-C circuits (Series and parallel combinations) for D.C. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transforms. Response of R-L, R-C, R-L-C circuits

for step, ramp, pulse and impulse excitation using Laplace Transform Methods. Transfer function representation. Poles and Zeros. Frequency response- magnitude and phase plots.

UNIT III:TWO PORT NETWORKS

Two Port Networks- relationship of two port variables, impedance parameters, admittance parameters, transmission parameters(ABCD) and hybrid parameters, conversion of Parameters from one form to other, Conditions for Reciprocity and Symmetry, interconnections of two port networks. Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters.

UNIT IV:NETWORK TOPOLOGY

Definitions of Graph, Tree, Basic cut-set and Basic Tie-set matrices for planar networks -Duality and Dual networks.

UNIT V:FILTERS

Classification of filters – Low pass, High pass, Band pass and Band Elimination, Constant-k and M-derived filters-Low pass and High pass Filters and Band pass and Band elimination filters (qualitative treatment only)

Text Books:

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition, McGraw Hill Company, 2013.
2. Network Analysis, A. Sudhakar, ShyammohanPalli, McGraw Hill Company.
3. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rdEdition, Tata McGraw Hill Company, 2019.
4. Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI learning, 2019.
5. Circuit Theory, A. Chakrabarti, 6th Edition, DhanpatRai and Co., 2018.

References Books:

1. Electrical Circuits, David A. Bell, 7th Edition, Oxford University Press, 2009.
2. Network Theory and Filter Design, Vasudev K. Aatre, 3rd Edition, Eastern Wiley Publishers, 1993.
3. Electric Circuits, Mahmood Nahvi, Joseph A. Edmister, Schaum's Outline, 7thEdition, 2017.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://onlinecourses.nptel.ac.in/noc20_ee46/preview
2.https://www.udemy.com/course/electrical-circuit-for-electrical-electronics-engineering/
3.https://www.coursera.org/learn/linear-circuits-dcanalysis

Web Reference/E-Books:

1. https://www.pdfdrive.com/electrical-circuit-theory-and-technology-third-edition-electrical-circuit-theory-and-technology-e162459767.html
2. https://www.pdfdrive.com/schaums-outline-of-theory-and-problems-of-electric-circuits-e33461668.html
3. https://www.pdfdrive.com/electrical-circuit-theory-and-technology-wordpresscom-get-a-e3958340.html

DC MACHINES
II B.Tech., EEE -I SEM

Course Title: DC MACHINES	Course Code: AS20-02PC04
Teaching Scheme (L:T:P): 3 1 0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Electrical circuits-I	

Course Overview:
Identify DC machine main parts & understand their operation and gain the knowledge of machine for specified needs. Understanding each component purpose of DC machine. Designing different windings which increases the efficiency of machine and conducting various tests on DC machine. The speed control of D C machine in wide range possible by various techniques to be studied.

Course Objective
- To study and understand different types of DC generators, Motors, their construction, operation.
- To understand different starting methods and speed control methods of DC motors
- To analyze performance aspects of various testing methods.

Course Outcomes(s)

CO#	Course Outcomes
C213.1	Identify different parts of a DC machine & understand their operation
C213.2	Understand different excitation and starting methods of DC machines
C213.3	Control the voltage and speed of a DC machines
C213.4	Carry out different testing methods to predetermine the efficiency of DC machines
C213.5	Understand characteristics of DC machines
C213.6	Understand applications of DC machines

COURSE CONTENT (SYLLABUS)

UNIT – I D.C. GENERATORS-I
D.C. Generators: Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings, EM.F Equation. Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation–reactance voltage linear and delayed commutation, methods of improving commutation.

UNIT–II D.C. GENERATORS-II
Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F in self excited generators– reasons for failure, remedial measures. Magnetization characteristic of separately excited DC Generator, critical field

resistance and critical speed - Load characteristics of shunt, series and compound generators.ApplicationsofDCGenerators.

UNIT–III D.C. MOTORS

D.C Motors: Principle of operation – Back E.M.F. –mechanical power developed-Torque equation – armature reaction in DC motors-characteristics and applications of shunt, series and compound motors.

UNIT – IV SPEED CONTROL AND STARTERS FOR DC MOTOR

Speed control of D.C.Motors - Armature voltage and field flux control methods. Series parallel control.

DCMotor starters- Necessity of starter, -3-point and 4-point starters .Starter step resistance calculations.

UNIT – V TESTING OF DC MACHINES

Losses in DC machine – calculation of efficiency, condition for maximum efficiency. Methods of Testing – direct, indirect, and regenerative testing – Brake test – Swinburne's test – Hopkinson's test – Field's test -separation of stray losses in a D.C. motor test, Retardation test.

TEXT BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education,2013.

2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS

REFERENCES BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.

2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.youtube.com/watch?v=D4RFFnzRdkk&list=PLSRCPd4kA2-S2Cu1tYUe5WGmc959y50Xf
2. https://swayam.gov.in/nd1_noc19_ee69/

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1) https://www.youtube.com/watch?v=D4RFFnzRdkk&list=PLSRCPd4kA2-S2Cu1tYUe5WGmc959y50Xf
2) https://swayam.gov.in/nd1_noc19_ee69/

Web Reference/E-Books:

1) https://books.google.co.in/books/about/D_C_Machines_and_Transformers.html?id=wS_v_EBcBtQC
2) https://books.google.co.in/books?id=FLgMygrZDgEC&printsec=frontcover#v=onepage&q&f=false
3) https://www.pdfdrive.com/a-textbook-of-electrical-technology-volume-ii-ac-and-dc-machines-bl-thferaja-e33405170.html

ELECTROMAGNETIC THEORY
II B.Tech., EEE -I SEM

Course Title: ELECTROMAGNETIC THEORY	Course Code: AS20-02PC05
Teaching Scheme (L:T:P): 3 1 0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basic electrical engineering, Vector calculus, Co-ordinate system	

Course Overview:
Electromagnetic fields is branch of electrical engineering which deals with inter play inter mechanism with electrical and magnetic fields.
This subject explains about how electrical and magnetic fields varies with respect to different co-ordinate systems.

Course Objective

- Apply vector Calculus and different coordinates systems for Electro and Magnetic systems.
- Understand the knowledge of Electro field theory for Point, Line ,Surface Charge.
- Understand the concept of conductors, dielectrics, inductance ,capacitance.
- Understand the concept of Magnetic Fields and Calculation of MFI for Line, Surface

Course Outcomes(s)

CO#	Course Outcomes
C214.1	To understand the concepts of electric field and magnetic field for different coordinate systems using vector calcus analysis and their applications, this will be utilized in the development of the theory for power transmission lines and electrical machines
C214.2	To obtain electric and magnetic fields for simple configurations and static conditions.
C214.3	To understand current, current density, capacitance, poisons and Laplace's equations
C214.4	To analyze time varying electric and magnetic fields
C214.5	To understand Maxwell's equations in different forms and different media
C214.6	To understand the propagation of EM waves in conducting mediums, dielectrics

COURSE CONTENT (SYLLABUS)

UNIT-I: REVIEW OF VECTOR CALCULUS
Vector algebra-addition-subtraction- components of vectors- scalar and vector multiplications--three orthogonal coordinate systems (rectangular, cylindrical and spherical). Vector calculus: differentiation-integration- vector operator del-gradient-divergence and curl. Conversion of a vector from one co-ordinate system to another.

UNIT-II: STATIC ELECTRIC FIELD

Coulomb's law- Electric field intensity-Electrical field due to point charges. Line Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential- Potential difference-Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.

UNIT-III: CONDUCTORS, DIELECTRICS AND CAPACITANCE

Current and current density, Ohms Law in Point form, Continuity equation, Boundary conditions of conductors and dielectric materials. Capacitance, Capacitance of a two-wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation.

UNIT-IV: STATIC MAGNETIC FIELDS AND MAGNETIC FORCES

Static Magnetic Fields : Biot-Savart's Law- Ampere Law-Magnetic flux and magnetic flux density- Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors. Magnetic Forces-Materials and Inductance Force on a moving charge-Force on a differential current element- Force between differential current elements- Nature of magnetic materials- Magnetization and permeability Magnetic boundary conditions- Magnetic circuits- inductances and mutual inductances.

UNIT-V: TIME VARYING FIELDS-MAXWELL'S EQUATIONS AND ELECTROMAGNETIC WAVES

Time Varying Fields - Maxwell's Equations : Faraday's law for Electromagnetic induction- Displacement current- Point form of Maxwell's equation- Integral form of Maxwell's equations- Motional Electromotive forces, Boundary Conditions.

Electromagnetic Waves: Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Poynting theorem.

TEXT/REFERENCE BOOKS:

1. M. N. O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014.
2. W.Hayt, "Engineering Electromagnetics", McGraw Hill Education, 2012 .
3. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
4. G. W. Carter, "The electromagnetic field in its engineering aspects", Longmans, 1954.
5. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. NPTEL VIDEOS

i .https://onlinecourses.nptel.ac.in/noc20_ph08/preview
ii. https://www.classcentral.com/course/swayam-electromagnetic-theory-5223
iii. https://onlinecourses.nptel.ac.in/noc19_ph08/preview
iv. https://www.coursera.org/learn/electrodynamics-electric-magnetic-fields

Web Reference/E-Books:

1. https://books.google.co.in/books?id=V7Tdeqa8b6UC&printsec=frontcover#v=onepage&q&f=false
2. google.com/search?q=textbooks+on+electromagnetic+field+theory&oq=textbooks+on+electromagnetic+field+theory&aqs=chrome..69i57j0l2.21442j0j15&sourceid=chrome&ie=UTF-8
3. https://archive.org/details/electrodynamicsf0000darr
4. https://www.google.co.in/books/edition/Electromagnetic_Fields/1tPotI3DJuEC?hl=en&gbpv=1&dq=electromagnetic+fields&printsec=frontcover

ANALOG ELECTRONICS
II B.Tech.,EEE -I SEM

Course Title:ANALOG ELECTRONICS	Course Code:AS20-04ES09
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Electronic devices and circuits	

Course Overview:

This course on Analog Electronic Circuits has been designed primarily as an engineering service course for undergraduate students in Electricals and Electronics engineering discipline. This course is designed to offer a comprehensive introduction to a wide, relevant array of topics in analog electronics. Beginning with a review of linear circuit theory and basic electronic devices, the course moves on to present a detailed, practical understanding of many analog integrated circuits. The most commonly used analog IC to build practical circuits is the operational amplifier or op-amp. Its characteristics, basic configurations and applications in the linear and nonlinear circuits are explained.

Course Objective

1. To introduce circuit realizations with components such as diodes, BJTs and transistorsstudied earlier.
2. To give understanding of various types of amplifier circuits such as small signal,cascaded and largesignal
3. To introduce circuit realization using components FET transistors.
4. To familiarize the Concept of feedback in amplifiers so as to differentiate betweennegative and positive feedback.
5. To give understanding of various types of Op-amps and circuit realisations with Op-amps.

Course Outcomes

CO#	Course Outcomes
C215.1	Design and analyze small signal amplifier circuits applying the biasing techniques
C215.2	Design single stage hybrid model amplifiers.
C215.3	Analyze different types of FET amplifiers with different configurations.
C215.4	Understand and Analyze the functioning of Power amplifiers class A , class B and Class C
C215.5	Distinguish the need for positive and negative feedback in amplifiers as well as in oscillators.
C215.6	Understand and remember different types of functioning of OP-AMP, design OP-AMP based circuits with linear integrated circuits.

COURSE CONTENT (SYLLABUS)

UNIT I:ANALYSIS AND DESIGN OF SMALL SIGNAL LOW FREQUENCY BJT AMPLIFIERS: Review of transistor biasing, Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC,and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair

UNIT II:

TRANSISTOR AT HIGH FREQUENCY: THE HYBRID- PI – Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier response, Gain-bandwidth product.

UNIT III:

FET AMPLIFIERS: Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers, – MOSFET Characteristics in Enhancement and Depletion mode – MOS Small signal model, common-source, common-gate and common-drain amplifiers, Power Amplifiers: Class A, Class B and Class C amplifiers.

UNIT IV:

POSITIVE & NEGATIVE FEEDBACK IN AMPLIFIERS: Classification of 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 – Simple problems.

Condition for oscillations. RC and LC type Oscillators – Frequency and amplitude stability of oscillators – Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators – RC-phase shift and Wien-bridge oscillators.

UNIT V:

OPERATIONAL AMPLIFIERS: Ideal op-amp, Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product, Inverting and non-inverting amplifier, Differentiator, integrator, Square-wave and triangular-wave generators.

Text Books:

1. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
2. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A Vallvaraj, 5th Edition, MC GRAW HILL EDUCATION.
3. Electronics circuits and applications,Md H Rashid, Cengage 2014

References Books:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.
3. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, person

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://onlinecourses.nptel.ac.in/noc20_ee45
2.https://www.coursera.org/learn/electronics

Web Reference/E-Books:

1. **https://books.google.co.in/books/about/ANALOG_ELECTRONICS.html?id=1NcSBP2OA-QC**
2. **https://freebookcentre.net/electronics-ebooks-download/Analog-Electronics-Study-Material.html**

ELECTRICAL CIRCUITS LAB
II B.Tech., EEE-I SEM

Course Title: ELECTRICAL CIRCUITS LAB	Course Code:AS20-02PC06
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Laboratory	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:-- ELECTRICAL CIRCUITS I & ELECTRICAL CIRCUITS II	

Course Overview:
Students have real time hands on experience to handle DC, Single Phase and Three Phase AC Supply. Under this Platform student can compare and analyze theoretical and practical values of various electrical networks and they can also verify various theorems which have major applications, Student also can understand the concept of active and reactive power, harmonics etc.

Course Objective
•To design electrical systems
•To analyze a given network by applying various Network Theorems
•To measure three phase Active and Reactive power.
•To understand the locus diagrams

Course Outcomes(s)

CO#	Course Outcomes
C216.1	Understands safety Precautions and identify color coding of a resistor
C216.2	Evaluate response in a given network by using theorems
C216.3	Analyze complex DC and AC linear circuits
C216.4	Analyze Two-port Network Parameters
C216.5	Measure power in three phase system
C216.6	Determine the form Factor for given Non-Sinusoidal waveforms

LIST OF EXPERIMENTS

(PART-A and Any 10 experiments in Part-B must be performed)

PART – A

1. Demonstration of safety precautions, measuring instruments, electrical and electronic components.
2. Identification of ratings of resistors using color codes and electrical circuit bread board practice.

PART – B

1. Verification of Thevenin's and Norton's theorems.
2. Verification of Superposition and Reciprocity theorems.
3. Verification of Maximum power transfer and Compensation theorem.
4. Series and parallel resonance.
5. Time response of first order RC / RL network for periodic non – sinusoidal inputs – Time constant and Steady state error determination.

6. Locus diagrams of RL and RC series circuits.
7. Determination of self, mutual inductances and coefficient of coupling of a coupled circuit.
8. Determination of Z and Y parameters.
9. Determination of ABCD and hybrid parameters.
10. Measurement of Active Power for Star and Delta connected balanced loads
11. Measurement of Reactive Power for Star and Delta connected balanced loads
12. Determination of form factor for non-sinusoidal waveform

Text Books:

1. "William Hayt and Jack E. Kemmerly", "Engineering circuit analysis", McGraw Hill Company, 6thedition, 2016.
2. "D. Roy Chowdary", "Networks and systems", New age international publishers, 2009
3. "N. C. Jagan& C. Lakshminarayana", "Network Theory", B.S Publications, 2014.
4. "Van Valkenburg", "Network Analysis", PHI, 3rd Edition, 2014
5. "Franklin F Kuo," "Network Analysis & Synthesis", Wiley India PVT. Ltd., second Edition, 2006

References Books:

1. "K.C. A. Smith & R. E. Alley", "Electrical Circuits", Cambridge University Press, 1992
2. "K. Rajeswaran", "Electric Circuit theory", Pearson Education, 2004.
3. A. Bruce Carlson", "Circuits", Thomson Publishers, 1999

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_ee46/preview
2. https://www.udemy.com/course/electrical-circuit-for-electrical-electronics-engineering/
3. https://www.coursera.org/learn/linear-circuits-dcanalysis

Web Reference/E-Books:

1. https://www.ciebookstore.com/electric-circuits-course-with-lab
2. https://www.coursera.org/lecture/linear-circuits-dcanalysis/3-1-lab-demo-electrical-components-fJ1K2
3. https://www.udemy.com/course/basic-electrical-circuit-experiments/

DC MACHINES LAB

II Year B.Tech. EEE I-Sem

Course Title: DC MACHINES LAB	Course Code:AS20-02PC07
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Laboratory	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:--DC Machines	

Course Objectives:

- To expose the students to the operation of DC Generator
- To expose the students to the operation of DC Motor.
- To examine the self-excitation in DC generators.

Course Outcomes: After completion of this lab the student is able to

- Start and control Different DC Machines.
- Assess the performance of different DC machines using different testing methods
- Identify different conditions required to be satisfied for self - excitation of DC Generators.
- Separate iron losses of DC machines into different components

The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shunt generator
2. Swinburne's test and speed control of DC shunt motor
3. Hopkinson's test on two identical DC shunt machines.
4. Load test on DC shunt generator
5. Brake test on DC compound motor
6. Field's test on two DC series machines
7. Load test on DC compound generator
8. Load test on DC series generator

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

9. Brake test on DC shunt motor
10. Retardation test on DC Shunt motor
11. Separation of losses in DC Shunt motor.

TEXT BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education,2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.

REFERENCES:

1. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
2. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
3. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

ANALOG ELECTRONICS LAB
II B.Tech., EEE -I SEM

Course Title:ANALOG ELECTRONICS LAB	Course Code:AS20-04ES10
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course: Laboratory	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Electronic devices and circuits	

Course Overview:

Analog Electronics Lab is a lab designed specifically to enhance the practical side of a contemporary course in analog electronic circuits for undergraduate students of the electrical and electronics engineering program. Each of the experiment begins with a discussion of a particular sort of circuit followed by the chance to try it out and see how it actually behaves. Students gain intuitive understanding through immersion in good circuit design.

Course Objective

- To introduce components such as diodes, BJTs and FETs their switching characteristics, applications
- Learn the concepts of high frequency analysis of transistors.
- To give understanding of various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
- To introduce the basic building blocks of linear integrated circuits.
- To introduce the concepts of waveform generation and introduce some special function ICs.

Course Outcomes

CO#	Course Outcomes
C218.1	Know the characteristics, utilization of various components and understand the biasing techniques
C218.2	Design and analyse various rectifiers, small signal amplifier circuits.
C218.3	Apply the usage of transistors based on evaluation of h-parameters of respective configurations of transistor.
C218.4	Design Integrator and differentiator using op amp .
C218.5	Design inverting and non-inverting amplifiers
C218.6	A thorough understanding, functioning of OP-AMP, design OP-AMP based circuits with linearintegrated circuits.

COURSE CONTENT (SYLLABUS)
LIST OF EXPERIMENTS
(Perform any 12 experiments)

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. Full Wave Rectifier with & without filters
3. Common Emitter Amplifier Characteristics
4. Common Base Amplifier Characteristics
5. Common Source amplifier Characteristics
6. Measurement of h-parameters of transistor in CB, CE, CC configurations
7. Inverting and Non-inverting Amplifiers using Op Amps.
8. Adder and Subtracter using Op Amp.
9. Integrator Circuit using IC 741.
10. Differentiator circuit using Op Amp.
11. Current Shunt Feedback amplifier
12. RC Phase shift Oscillator
13. Hartley and Colpitts Oscillators
14. Class A Power amplifier**:**

References: **1)**J.V. Wait, L.P. Huelsman and GA Korn,
2)Introduction to Operational Amplifier theory and applications, 2nd edition, McGraw Hill, New York, 1992.
3)J. Millman and A. Grabel, Microelectronics, 2nd edition, McGraw Hill, 1988.

WEB REFERENCES:

1. **https://www.electronics-tutorials.ws/oscillator/hartley.html#:~:text=Then%20to%20summarise%2C%20the%20Hartley,way%20of%20an%20inductive%20divider.&text=The%20Colpitts%20oscillator%20uses%20two,within%20its%20resonant%20tank%20circuit. (**Hartley and Colpitts Oscillators)
2. **https://www.electronics-tutorials.ws/opamp/opamp_7.html (Differentiator)**
3. **https://www.electronics-tutorials.ws/opamp/opamp_6.html (Integrator)**
4. **https://www.youtube.com/watch?v=NizrzRKQqII (CE amplifier)**
5. **https://www.youtube.com/watch?v=eOH9xVnvJac (CB amplifier)**
6. **https://www.youtube.com/watch?v=fgzjtnXaFTc (CS amplifier)**
7. **https://www.youtube.com/watch?v=dNi_T0P5TLk (FWR)**
8. **https://www.youtube.com/watch?v=MxaaWlr6osY (HWR)**
9. **http://www.brainkart.com/article/h-Parameters-for-all-three-configurations_13244/ (h-parameter)**
10. **https://www.youtube.com/watch?v=KltT_gVUh_A (h-parameters-calculation)**
11. **https://www.youtube.com/watch?v=aa5BRhNz3Nc (Inverting and Non-inverting Amp)**

ENVIRONMENTAL SCIENCES
II B.Tech., EEE -I SEM

Course Title: Environmental Sciences	Course Code: AS20-00MC01
Teaching Scheme (L:T:P): 3:0:0	Credits:0
Type of Course: Lecture	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Objective: To learn

- The importance of ecological balance for sustainable development.
- The impacts of developmental activities and mitigation measures.
- The environmental policies and regulations.
- New developmental projects for sustainable development of nations.

Course Outcomes (s)

CO#	Course Outcomes
C219.1	Understand the importance of ecological balance and principles
C219.2	Evaluates the impact of developmental activities on ecological balance
C219.3	Understand various environmental acts and policies
C219.4	Gain knowledge about effect of Environment on Human health
C219.5	Understands the importance of environmental regulations helping in sustainable development
C219.6	Develop technologies for the sustainable development based on ecological principles

COURSE CONTENT (SYLLABUS)

UNIT-I

Ecosystem: Definition, scope and importance of ecosystem, classification, structure and function of an ecosystem, food chains, food web, Ecological Pyramids, Flow of energy, biochemical cycles, bio accumulation, bio magnification, Carrying capacity, ecosystem value services.

UNIT-II

Natural resources: Water resources: use and over utilization of surface and ground water, floods and droughts, measures taken to mitigate the intensity of floods and droughts. Dams: benefits and problems. Mineral resources: Use and exploitation, Environmental effects of extracting mineral resources, Land resources: Forest resources, uses of forests, causes of Deforestation. Energy resources: Growing energy needs, Renewable and non-renewable energy sources. Use of alternative energy sources and case studies. Projects of renewable energy resources in different states of India.

UNIT-III

Biodiversity and Biotic resources: Introduction, definition, genetic, species and ecosystem diversity. Value of biodiversity, Consumptive use, productive use, social, ethical, aesthetic and optional values. India as a megadiversity nation. Hot spots of biodiversity. Threats to biodiversity, conservation of biodiversity: in-situ and ex-situ conservation and national biodiversity act.

UNIT-IV

Environmental pollution and control technologies: Environmental pollution: classification of pollution, Air pollution: primary and secondary pollutants, Automobile and Industrial pollution, ambient air quality standards. Water pollution: sources and types of pollution, drinking water quality standards. Soil pollution: sources and types, impacts of modern agriculture, Degradation of soil. Noise pollution: sources and health hazards, standards. Solid waste: characterization and management. e-waste and its management. **Pollution control technologies**: Wastewater treatment methods: primary, secondary and

tertiary. Overview of air pollution control technologies. **Global environmental problems and global efforts**: Climate change and impacts on human environment. Ozone depletion and ozone depleting substances (ODS). International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol.

UNIT-V

Environmental policy, legislation and EIA: Environmental protection act, legal aspects, Air act-1981, Water act, Forest act, Wild life act, Municipal solid waste management and handling rules, biomedical waste management and handling rule, Hazardous waste management and handling rule. EIA: EIA structure, methods of base line data acquisition, overview on impacts of air, water, biological and socio-economical aspects, strategies for risk assessment, concepts of environmental management plan (EMP). Towards sustainable future: concept of sustainable development, population and its explosion, crazy consumerism, Rain water harvesting, Environmental education, Urban sprawl, Human health, Environmental ethics, Concept of green building, Life cycle assessment(LCA).

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Textbook of Environmental Science and Technology- Dr. M. Anji Reddy, BS Publications.
3. Environmental Studies by Anubha Kaushik, New Age International Publishers.

REFERENCE BOOKS:

1. Environmental Studies by R. Rajagopalan, Oxford University press.
2. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.
3. Environmental Science: Towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd, NewDelhi.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/120/108/120108002/
2. https://onlinecourses.nptel.ac.in/noc20_ge16/preview
3. https://nptel.ac.in/courses/121/106/121106014/
4. https://nptel.ac.in/courses/120/108/120108004/

Web Reference/E-Books:

.No	Advanced concepts	Website Referred
	Ecosystem	https://youmatter.world/en/definition/ecosystem-definition-example/
	Natural Resources	https://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/natural_resources/
	Biodiversity	https://www.nationalgeographic.org/encyclopedia/biodiversity/ https://www.natureserve.org/conservation-tools/biodiversity-indicators-dashboard
	Pollution	https://www.nationalgeographic.org/encyclopedia/pollution/ https://www.livescience.com/22728-pollution-facts.html https://www.worldwildlife.org/threats/pollution https://www.nrdc.org/stories/air-pollution-everything-you-need-know https://www.who.int/health-topics/air-pollution#tab=tab_1 https://www.history.com/news/7-deadly-environmental-disasters https://www.insider.com/worst-modern-manmade-disasters-world-environment-day-2019-5
	Environmental policy	https://www.britannica.com/topic/environmental-policy https://www.unece.org/fr/env/welcome.html
	EIA	http://alphace.ac.in/downloads/notes/cv/10cv847.pdf

MATLAB AND ITS APPLICATIONS
II B.Tech., EEE -I SEM
Value Added Course

Course Title: MATLAB AND ITS APPLICATIONS	Course Code: AS20-02PW01
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1. Matlab- Fundamentals and Graphics Description: Understanding MATLAB programming language. Basic management of scalars, vectors and matrices. Basic 2-D and 3-D graphics. Basic mathematical functions, including linear algebra, complex numbers and polynomials.
2. M-files Programming Description: Learn structured MATLAB programming, including command files and function files. Learn how to write efficient MATLAB programs.
3. Toolboxes Description: Familiarize with the main MATLAB toolboxes.
4. Graphics User Interface Description: Learn how to build a GUI application in MATLAB.
5. Final Work Description: Develop an entire MATLAB application

REFERENCES:

1.www.Mathworks.com
2.MATLAB Getting Started Guide
http://www.mathworks.com/help/pdf_doc/matlab/getstart.pdf
3.Useful references: MATLAB Central (script, toolbox, blog, newsgroup)
http://www.mathworks.com/matlabcentral/ MATLAB Newsletters
http://www.mathworks.com/company/newsletters/

ENERGY STORAGE SYSTEMS
II B.Tech., EEE -I SEM
Value Added Course

Course Title: ENERGY STORAGE SYSTEMS	Course Code: AS20-02PW02
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1) Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

2) Needs for Electrical Energy Storage: Emerging needs for EES, More renewable energy, less fossil fuel, Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

3) Features of Energy Storage Systems: Classification of ESS Systems, Mechanical Storage Systems, Pumped Hydro Storage (PHS).Compressed air energy storage CAES),Flywheel energy storage (FES),Electrochemical storage systems, Secondary batteries, Flowbatteries, Chemical energy storage ,Hydrogen(H2),Synthetic Natural gas(SNG).

4) FUEL CELLS: Concept, key components, physical and chemical phenomena in fuel cells, advantages and disadvantages, different types of fuel cells and applications, characteristics, Nernst equation, relation of the fuel consumption versus current output.

REFERENCES:

1. 'Our Common Future', Report of the World Commission on Environment & Development.Oxford University Press, NY, 1987.
2. John W. Twidell& Anthony D.Weir, 'Renewable Energy Resources' 3. Geofrey Boyle, ' Renewable Energy: Power for a Sustainable Future', OUP in assn with Open University, 1996.

DESIGN OF ELECTRICAL SYSTEMS
II B.Tech., EEE -I SEM
Value Added Course

Course Title: DESIGN OF ELECTRICAL SYSTEMS	Course Code: AS20-02PW03
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1) Design of Electrical Transmission Systems
2) Design of Electrical Distribution systems
3) Power Generation by using Hybrid Systems.
4) Design of Micro Grid
5) Design of Transformer.

TEXT BOOKS:

1. W.D.Stevenson –Elements of Power System Analysis, Fourth Edition, McGraw Hill, 1984.
2. C.L. Wadhwa –Generation, Distribution and Utilization of Electrical Energy, Second Edition, New Age International, 2009.

REFERENCE BOOKS:

1. “M.V. Deshpande”, “Elements of Power Station design and practice” , Wheeler Publishing, 3rd Edition 1999.
2. “S. N. Singh”, “Electrical Power Generation, Transmission and Distribution”, PHI, 2003.

SENSOR TECHNOLOGY
II B.Tech., EEE -I SEM
Value Added Course

Course Title: SENSOR TECHNOLOGY	Course Code: AS20-04PW04
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Electronic Devices and Circuits	

COURSE OVERVIEW

This course will deliver the knowledge in introducing various types of sensors, their performance and error analysis. The course also provides concepts on intensity polarization and interfeometric sensors.

COURSE OBJECTIVES

- To provide in depth knowledge in physical principles applied in sensing, measurement and a comprehensive understanding on how measurement systems are designed, calibrated, characterized and analyzed.
- To introduce the students to sources and detectors of various Optical sensing mechanisms and provide in-depth understanding of the principle of measurement, and theory of instruments and sensors for measuring velocity and acceleration.
- To give a fundamental knowledge on the basic laws and phenomena on which operation of sensor transformation of energy is based.
- To impart a reasonable level of competence in the design, construction, and execution of mechanical measurements strain, force, torque and pressure.

COURSE OUTCOMES

CO#	Course Outcomes
C2210.1	Use concepts in common methods for converting a physical parameter into an electrical quantity
C2210.2	Choose an appropriate sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc
C2210.3	Design and develop sensors using optical methods with desired properties
C2210.4	Evaluate performance characteristics of different types of sensors
C2210.5	Locate different type of sensors used in real life applications and paraphrase their importance
C2210.6	Create analytical design and development solutions for sensors.

COURSE CONTENT (SYLLABUS)

UNIT 1
SENSOR FUNDAMENTALS AND CHARACTERISTICS
Sensor Classification, Performance and Types, Error Analysis characteristics

UNIT 2
OPTICAL SOURCES AND DETECTORS
Electronic and Optical properties of semiconductor as sensors, LED, Semiconductor lasers, Fiber optic sensors, Thermal detectors, Photo multipliers, photoconductive detectors, Photo diodes, Avalanche photodiodes, CCDs.

UNIT 3
INTENSITY POLARIZATION AND INTERFEROMETRIC SENSORS
Intensity sensor, Microbending concept, Interferometers, Mach Zehnder, Michelson, FabryPerot and Sagnac, Phase sensor: Phase detection, Polarization maintaining fibers.

UNIT 4
STRAIN, FORCE, TORQUE AND PRESSURE SENSORS
Strain gages, strain gage beam force sensor, piezoelectric force sensor, load cell, torque sensor, Piezo-resistive and capacitive pressure sensor, optoelectronic pressure sensors, vacuum sensors.

UNIT 5
POSITION, DIRECTION, DISPLACEMENT, PROXIMITY AND LEVEL SENSORS
Potentiometric and capacitive sensors, Inductive and magnetic sensor, LVDT, RVDT, eddy current, transverse inductive, Hall effect, magneto resistive, magneto strictive sensors. Fiber optic liquid level sensing, Fabry Perot sensor, ultrasonic sensor, capacitive liquid level sensor. IR sensor, PIR sensor, RF sensors, Microwave sensors.

TEXT BOOKS
1. 1 Jacob Fraden, “Hand Book of Modern Sensors: physics, Designs and Applications”, 2015, 3rd edition, Springer, New York.
2. Jon. S. Wilson, “Sensor Technology Hand Book”, 2011, 1st edition, Elsevier, Netherland.

REFERENCE BOOKS
1. Gerd Keiser,”OpticalFiber Communications”, 2012, 4th edition, McGraw-Hill Science, Delhi.
2. John G Webster, “Measurement, Instrumentation and sensor Handbook”, 2014, 2nd edition, CRC Press, Florida.
3. Eric Udd and W.B. Spillman, “Fiber optic sensors: An introduction for engineers and scientists”, 2013, 2nd edition, Wiley, New Jersey.
4. Bahaa E. A. Saleh and Malvin Carl Teich, “Fundamentals of photonics”, 2012, 1st edition, John Wiley, New York.

ONLINE REFERENCES
1. https://nptel.ac.in/courses/108/106/108106165/
2. https://nptel.ac.in/courses/108/108/108108147/

E-BOOKS
1. http://library.lol/main/5E10E1D4242F3A1834331055B520DC95
2. http://library.lol/main/9DFB559E0EB5781392E7C5B4E5919B0F

http://library.lol/main/31BE5601549E2B4B0C1D45AAE4D35C32

PROJECT BASED LEARNING USING C++
II B.Tech., EEE -I SEM
Value Added Course

Course Title: PROJECT BASED LEARNING USING C++	Course Code: AS20-05PW02
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

Course Overview:
This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development, and coding and testing using a modern software development environment. Students learn how to write programs in an object-oriented high level programming language. Students will be equipped with fundamental programming, Arrays, Functions, Exception, class, objects, etc.

Course Objective: The objective of this Course is:
- Understand and use the basic programming constructs of C++
- Manipulate various C++ data types, such as arrays, strings, and pointers
- Isolate and fix common errors in C++ programs
- Use memory appropriately, including proper allocation/deallocation procedures
- Apply object-oriented approaches to software problems in C++

Course Outcomes(s)

CO#	Course Outcomes
C2110.1	Understand the Basics of object and class in C++.
C2110.2	Understand the Basic concept of Object Orientation, object identity and Encapsulation.
C2110.3	Analyze the given problem statements to create basic program designs.
C2110.4	Implement different functions for input and output, various data types, basic operators, files and functions.
C2110.5	Implement programming techniques to solve problems in the C++ programming language
C2110.6	Apply the concepts and principles of the programming language to the real-world problems and solve the problems through project-based learning.

COURSE CONTENT (SYLLABUS)

Week 1: Login and Registration System
Week 2: Car Rental System.
Week 3: Bookshop inventory system.
Week 4: Student Report Management System.
Week 5: Sudoku Game.
Week 6: Using Graphics to Draw and Move Shapes
Week 7: Customer Billing System
Week 8: Phonebook Application
Week 9: Snake Game.
Week 10: Payroll Management System

TEXT BOOK:

1. Reeta Sahoo, C++ Projects- Khanna Book Publication

REFERENCE BOOKS:

2. Stanley Lippman, Josée Lajoie, Barbara Moo, C++ Primer-Fifth edition
3. Bruce Eckel, Thinking in C++: Introduction to Standard C++-Second Edition

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
2. https://onlinecourses.nptel.ac.in/noc19_cs38/preview
3. https://onlinecourses.nptel.ac.in/noc21_cs02/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/cpp-tutorial
2. https://www.tutorialspoint.com/cplusplus/index.htm
3. https://www.cplusplus.com/doc/tutorial/
4. https://www.learncpp.com/

B.TECH
SECOND YEAR
SECOND SEMESTER
SYLLABUS

COMPLEXVARIABLES & TRANSFORM TECHNIQUES
II B.Tech.,II - SEM

Course Title: COMPLEX VARIABLES & TRANSFORM TECHNIQUES	Course Code:AS20-00BS07
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course:Lecture + Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1.Student should have knowledge of Derivatives 2.Student should have knowledge of Integrations 3.Student should have knowledge of Functions	

Course Overview:

- Students get the basics of complex functions with reference to their analyticity, integration using C-R equations.
- Students acquire knowledge of Taylor's and Laurent's series expansion of complex functions and Residues.
- Student will learnLaplace transforms techniques for solving ODE's.
- Students will learn Fourier series of periodic functions, Even and Odd functions, Half Range sine and Cosine series
- Students will learn Fourier Sine and Cosine integrals, Fourier Sine and Cosine transforms

Course Objective:

- Differentiation of complex functions by using Analyticity
- Integration of complex functions and Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem
- Expansion of complex functions using Taylor's and Laurent's series
- Laplace transforms and Concept of Laplace transforms, Inverse Laplace transforms
- Solving ordinary differential equations using Laplace transforms techniques.
- Express a periodic function by Fourier Series and a non-periodic function by Fourier Transform

Course Outcomes(s)

CO#	Course Outcomes
C221.1	Analyze the complex function with reference to their analyticity
C221.2	Integrate complex functions using Cauchy's integral and residue theorems
C221.3	Find Taylor's and Laurent's series expansions of complex Function
C221.4	Use the Laplace transforms techniques for solving ODE's
C221.5	Express any periodic function in term of sines andcosines
C221.6	Express a non-periodic function as integral representation

COURSE CONTENT (SYLLABUS)

UNIT – I: ANALYTIC FUNCTIONS

Introduction of Complex functions: Analyticity; Cauchy-Riemann equations (without proof);Milne- Thomson methods; Analytic functions; Harmonic functions: Finding harmonic conjugate;ElementaryAnalytic functions (exponential, trigonometric, logarithm) and their properties.

UNIT - II: COMPLEX INTEGRATION

Line integrals; Cauchy's theorem; Cauchy's Integral formula; Liouville's theorem; Maximum-Modulustheorem (All theorems without proof); zeros of analytic functions; singularities. Taylor's series;Laurent's series; Residues; Cauchy Residue theorem (without proof).

UNIT – III: LAPLACE TRANSFORMS

Laplace Transform of standard functions; first shifting theorem; Laplacetransforms of functions when they are multiplied and divided by 't'. Laplace transforms of derivativesand integrals of function; Evaluation of integrals by Laplace transforms; Laplace transforms of Specialfunctions; Laplace transform of periodic functions.Inverse Laplace transform by different methods, convolution theorem (without Proof), solving ODEsby Laplace Transform method

UNIT-IV: **FOURIER SERIES**

Introduction: Periodic functions; Fourier series of periodic function; Dirichlet'sconditions; Even and odd functions; Change of interval; Half range sine and cosine series.

UNIT-V: **FOURIER TRANSFORMS**

Fourier integral theorem (without proof);Fouriersineintegrals and cosine integrals; Fourier sine and cosine transforms: Properties; Inverse transforms; Finite Fourier transforms.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. J.K. Goyal KP Gupta, Integral Transforms, Published by PragathiPrakashan Publishers
3. S.R.K. Iyengar and R.K.Jain, Advanced Engineering Mathematics,Narosa Publishing House
5th Edition,2016.

REFERENCE BOOKS:

1. B V Ramana, Higher Engineering Mathematics Core engineering series, Tata McGraw-Hill Education, 2006
2. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons,10th Edition,2011

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.Complex Analysis
2. Laplace Transform
3. Integral Transforms and their Applications

Web Reference/E-Books:

1. Complex Variables and Applications by Brown.
2. Laplace and Fourier Transforms by J.K. Goyal, K.P. Gupta.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh , S. Ranganatham

AC MACHINES-I
II B.Tech., II SEM

Course Title:AC MACHINES-I	Course Code: AS20-02PC08
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:DC Machines	

Course Overview:
This course examines the basic theory, characteristics, construction operation and application of rotating electrical machines. It includes the study of direct current motors, direct current generators, polyphase induction motors and single phase motors.

Course Objective
•To deal with the detailed analysis of transformers and poly-phase induction motors.
•To understand operation, construction and types of transformers and their applications
• To understand different testing methods of transformer
•To understand operation, construction and types of induction motors and their applicationsin house hold appliances and industrial systems.
• To understand different speed control methods and starting methods of Inductionmotor
• To understand testing methods of Induction motor

Course Outcomes(s)

CO#	Course Outcomes
C222.1	Understand the concept of transformer behaviour with different loads
C222.2	Test for transformers
C222.3	Illustrate the concepts of rotating magnetic fields.
C222.4	Discuss polyphone induction Machines
C222.5	Analyze performance characteristics of transformer and induction machines
C222.6	Elaborate about Single Phase Induction Motor

COURSE CONTENT (SYLLABUS)

UNIT I:I SINGLE PHASE TRANSFORMERS
Single Phase Transformers: Types - constructional details-minimization of hysteresis and eddy current losses- EMF equation - Principle of Operationon no load and on load**,** phasor diagrams, Equivalent circuit – voltage regulation, losses, efficiency and All day efficiency.

UNIT II:TRANSFORMERS AND POLY-PHASE TRANSFORMERS
Parallel operation with equal and unequal voltage ratios. OC and SC tests -

Sumpner's test - separation of losses test. Auto transformer-principle of operation - comparison with two winding transformer.

Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δand openΔ. Scott connection.

UNIT III:POLY-PHASE INDUCTION MACHINES

Constructional details of cage and wound rotor machines - principle of operation - rotor EMF and rotor frequency – rotor reactance, rotor current and Power factor at standstill and during running condition. Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic.

UNIT IV:CHARACTERISTICS OF INDUCTION MACHINES

Characteristics of Induction Machines: - equivalent circuit - phasor diagram - crawling and cogging. Losses and efficiency. No-load Test and Blocked rotor tests – Predetermination of performance. Methods of starting, starting current and torque calculations.

Speed Control Methods: Change of voltage, change of frequency, pole changing, injection of EMF into rotor circuit. Induction generator-principle of operation.

UNIT V: SINGLE PHASE INDUCTION MOTOR

Single phase induction motor – Constructional features-Double revolving field theory – split-phase motors – capacitor start and run motors, shaded pole motor. Universal motor.

Text Books:

1.A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013

2.M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002

References Books:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
3. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
4. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons,
2007.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA)/Web Reference/E-Books:

1. https://www.elprocus.com/what-is-a-single-phase-transformer-construction-and-its-working/
2. https://www.electrical4u.com/single-phase-transformer/
3.http://www.industrial-electronics.com/emct_2e_3m.html
4. https://www.electrical4u.com/starting-methods-for-polyphase-induction-machine/

CONTROL SYSTEMS
II B.Tech., II SEM

Course Title: CONTROL SYSTEMS	Course Code: AS20-02PC09
Teaching Scheme (L:T:P):3 1 0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48Hrs+16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Linear Algebra and Calculus, Ordinary Differential Equations and Multivariable Calculus Laplace Transforms , Numerical Methods and Complex	

Course Overview: Transfer functions; Stability; Dynamic and steady-state performance; Root locus diagrams; Bode plots; Cascade compensation using root locus and frequency response techniques. Introduction to state-space modelling and analysis. Analysis and design of digital control systems.

Course Objective

•To understand the different ways of system representations such as Transfer functionrepresentation and state space representations and to assess the systemdynamicresponse

•To assess the system performance using time domain analysis and methods for improving it

•To assess the system performance using frequency domain analysis and techniques for improving the performance

•To design various controllers and compensators to improve system performance

Course Outcomes(s)

CO#	Course Outcomes
C223.1	Develop Mathematical model of physical systems
C223.2	Formulate transfer function for given control system problems by using Block diagram reduction techniques and signal flow graphs.
C223.3	Determine the time domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
C223.4	Apply the frequency response analysis specifications and use them for various stability analyses (Bode plot, polar plot and Nyquist plots techniques).
C223.5	Design Lead, Lag & Lead-Lag compensators and P, PI, PID controllers to meet the desired specifications, which is required in the process control Industry.
C223.6	Test for system Controllability and Observability using state space representation and applications of state space representation to various systems.

COURSE CONTENT (SYLLABUS)

UNIT I: INTRODUCTION TO CONTROL PROBLEM

Introduction to Control Problem: Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra.

UNIT II: TIME RESPONSE ANALYSIS OF STANDARD TEST SIGNALS

Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci.

UNIT III: FREQUENCY-RESPONSE ANALYSIS

Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

UNIT IV: INTRODUCTION TO CONTROLLER DESIGN

Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and Lag compensation in designs. Analog and Digital implementation of controllers.

UNIT V: STATE VARIABLE ANALYSIS AND CONCEPTS OF STATE VARIABLES

State space model. Diagonalization of State Matrix. Solution of state equations. Eigen values and Stability Analysis. Concept of controllability and observability. Pole-placement by state feedback.

Text Books:

1. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
2. B. C. Kuo, "Automatic Control System", Prentice Hall, 1995.

References Books:

1. K. Ogata, "Modern Control Engineering", Prentice Hall, 1991.
2. I. J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International, 2009.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://youtu.be/Cl23xQrvFhk
2.https://youtu.be/fsxSst10_cE
3.https://www.coursera.org/courses?query=control%20systems

Web Reference/E-Books:

1. **https://www.youtube.com/user/ControlLectures**
2. **https://books.google.co.in/books/about/Control_Systems_Engineering.html?id=jGgWqQZiqIgC**
3. **https://ledin.com/control-systems-basics/**

DIGITAL ELECTRONICS
II B.Tech., -II SEM

Course Title: DIGITAL ELECTRONICS	Course Code:AS20-04ES06
Teaching Scheme (L:T:P): 3:1: 0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs+16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: EDC	

Course Overview:
To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

Course Objective
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyse sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

Course Outcomes(s)

CO#	Course Outcomes
C224.1	Explain working of different logic families and logic gates.
C224.2	Solve Boolean expressions to minimize various combinational functions.
C224.3	Design and implement various Combinational logic circuits.
C224.4	Analyze and design various sequential circuits.
C224.5	Explain the process of Analog to Digital conversion and Digital to Analog conversion.
C224.6	Develop the given logical problem using PLD's

COURSE CONTENT (SYLLABUS)

UNIT I: Fundamentals of Digital Systems and Logic Families: Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital lCs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

UNIT II: Combinational Digital Circuits: Standard representation for logic functions, K-map representation, and simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial ladder, ALU, elementary ALU design, popular MSI chips, digital

comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

UNIT III: Sequential Circuits and Systems: A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J, K, T and D types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

UNIT IV:A/D and D/A Converters: Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter lCs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

UNIT V: Semiconductor Memories and Programmable Logic Devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

Text Books:

1.R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.

2.M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

References Books:

1.A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. SWAYAM
2. NPTEL

Web Reference/E-Books:

https://doi.org/10.1515/9783110263787.73

PYTHON PROGRAMMING
II B.Tech., II SEM

Course Title: PYTHON PROGRAMMING	Course Code: AS20-05ES09
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods:48 Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming	

Course Overview:

The purpose of the course is to provide the basic programming methodology and writing programs in python. This course will enable one to learn programming skills necessary to implement all the basic mathematical, scientific calculations and various operations. Python is a general-purpose interpreted, interactive, object-oriented, and high level programming language.

Course Objective

- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build Web Services and introduction to Network and Database Programming in Python.

Course Outcomes(s)

CO#	Course Outcomes
C225.1	Identify Python syntax and semantics and be fluent in the use of Python flow control and functions.
C225.2	Demonstrate proficiency in handling Strings and File Systems.
C225.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions
C225.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C225.5	Explain exemplary applications related to Network Programming, Web Services and Databases in Python.
C225.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

COURSE CONTENT (SYLLABUS)

UNIT – I

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types.

UNIT – II

FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management,

*Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the Sys Module, Related Modules.

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules.

UNIT - III

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python. **Multithreaded Programming:** Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.

UNIT - IV

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers.

UNIT – V

Database Programming: Introduction, Python Database Application Programmer's Interface (DB- API), Object Relational Managers (ORMs), Related Modules.

Text Books:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Exploring Python, Timothy Budd, Mc Graw Hill Publication, ISBN:9780073523378, August 2010.

References Books:

1. Dive into Python, Mike.
2. Learning Python, 4th Edition by MarkLutz.
3. Programming Python, 4th Edition by MarkLutz.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/python
2. https://www.edx.org/python

Web Reference/E-Books:

1. http://www.learnpython.org/
2. https://docs.python.org/2/tutorial/index.html
3. http://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python_3/Intro
4. https://developers.google.com/edu/python/introduction
5. https://www.datacamp.com/courses/intro-to-python-for-data-science

CONTROL SYSTEMS LAB
II B.Tech., EEE -II SEM

Course Title: CONTROL SYSTEMS LAB	Course Code:AS20-02PC10
Teaching Scheme (L:T:P):0 0 3	Credits:1.5
Type of Course: Practicals	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Linear Algebra and Calculus, Ordinary Differential Equations and Multivariable Calculus Laplace Transforms , Numerical Methods and Complex variables	

Course Overview:
Transfer functions; Stability; Dynamic and steady-state performance; Root locus diagrams; Bode plots; Cascade compensation using root locus and frequency response techniques. Introduction to state-space modelling and analysis. Analysis and design of digital control systems.

Course Objective
- To understand the different ways of system representations such as Transfer functionrepresentation and state space representations and to assess the system dynamic response
- To assess the system performance using time domain analysis and methods for improving it
- To assess the system performance using frequency domain analysis and techniques forimproving the performance
- To design various controllers and compensators to improve system performance

Course Outcomes(s)

CO#	Course Outcomes
C226.1	To understand the different ways of system such as transfer function representation state space representation and to assess the dynamic response
C226.2	To study the characteristic of ac servomotor and dc servomotor and to analyze the effect of feedback on them.
C226.3	Design various logic gate using Programmable logic control unit in conjunction with WLP software
C226.4	To improve the system performance by selecting suitable controller and/or a compensator for a specific application.
C226.5	To perform frequency domain analysis and determine the stability of various systems using MATLAB
C226.6	Design of Lag and Lead compensators and to study the effect of P, PI, PD, PID controller on a second order system

COURSE CONTENT (SYLLABUS)

The following experiments are required to be conducted compulsory experiments:

1. Time response of Second order system
2. Characteristics of Synchros
3. Programmable logic controller – Study and verification of truth tables of logic gates, simple Boolean expressions, and application of speed control of motor.
4. Effect of feedback on DC servo motor
5. Transfer function of DC motor
6. Transfer function of DC generator
7. Temperature controller using PID
8. Characteristics of AC servo motor

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

1. Effect of P, PD, PI, PID Controller on a second order systems
2. Lag and lead compensation – Magnitude and phase plot
3. Simulation of P, PI, PID Controller.
4. Linear system analysis (Time domain analysis, Error analysis) using suitable software
5. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using suitable software
6. State space model for classical transfer function using suitable software - Verification.

Text Books:

1. M. Gopal, “Control Systems: Principles and Design”, McGraw Hill Education, 1997.
2. B. C. Kuo, “Automatic Control System”, Prentice Hall, 1995.

References Books:

1. K. Ogata, “Modern Control Engineering”, Prentice Hall, 1991.
2. I. J. Nagrath and M. Gopal, “Control Systems Engineering”, New Age International, 2009.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://youtu.be/Cl23xQrvFhk
2.https://youtu.be/fsxSst10_cE

Web Reference/E-Books:

1.https://www.youtube.com/user/ControlLectures

DIGITAL ELECTRONICS LAB
II B.Tech., EEE -II SEM

Course Title: Digital Electronics Lab	Course Code: AS20-04ES07
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Digital Electronics, Analog Electronics and EDC	

Course Overview:
To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

Course Objective

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

Course Outcomes(s)

CO#	Course Outcomes
C227.1	**Identify** the various digital ICs and understand their operation.
C227.2	**Understand** the basic logic gates and to verify their operation
C227.3	**Construct** basic combinational circuits and verify their functionalities
C227.4	**Apply** the design procedures to design basic sequential circuits
C227.5	**Verify** truth tables and excitation tables of various flip flops
C227.6	**Understand** working of Logic families

COURSE CONTENT (SYLLABUS)

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 Gray Converter
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 machines

Text Books:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.

2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

References Books:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. SWAYAM

2. NPTEL

Web Reference/E-Books:

https://doi.org/10.1515/9783110263787.73

PYTHON PROGRAMMING LAB
II B.Tech., II SEM

Course Title: PYTHON PROGRAMMING LAB	Course Code: AS20-05ES10
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming	

Course Overview:
Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements.

Course Objective

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcomes(s)

CO#	Course Outcomes
C228.1	Study the basic concepts scripting and the contributions of scripting language.
C228.2	Demonstrate proficiency in handling Strings and File Systems.
C228.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C228.4	Explore python especially the object oriented concepts, and the built in objects of Python.
C228.5	Create practical and contemporary applications such as TCP/IP network programming.
C228.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

COURSE CONTENT (SYLLABUS)
(18 of the following Experiments are to be performed)

1. Write a program to demonstrate different number data types in Python.

2. Write a program to perform different Arithmetic Operations on numbers in Python.

3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.

4. Write a python script to print the current date in the following format “Sun May 29 02:26:23 IST 2017”.

5. Write a program to create, append, and remove lists in python.

6. Write a program to demonstrate working with tuples in python.

7. Write a program to demonstrate working with dictionaries in python.

8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9].

10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* *
*
```

11. Write a Python script that prints prime numbers less than20.

12. Write a python program to find factorial of a number using Recursion.

13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).

14. WriteapythonprogramtodefineamoduletofindFibonacciNumbersand importthemodule to another program.

15. Write a python program to define a module and import a specific function in that module to another program.

16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

17. Writeaprogramthatinputsatextfile.Theprogramshouldprintalloftheu niquewordsinthe file in alphabetical order.

18. Write a Python class to convert an integer to a roman numeral.

19. Write a Python class to implement pow(x,n).
20. Write a Python class to reverse a string word byword.

Text Books:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

References Books:

1. Dive into Python, Mike.
2. Learning Python, 4th Edition by Mark Lutz.
3. Programming Python, 4th Edition by Mark Lutz.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/python
2. https://www.edx.org/python

Web Reference/E-Books:

1. http://www.w3schools.com
2. http://docs.python.org
3. http://www.tutorialspoint.com
4. http://www.learnpython.org

GENDER SENSITIZATION
II B.Tech. EEE-II SEM

Course Title: Gender Sensitization	Course Code:AS20-00MC02
Teaching Scheme (L:T:P):3:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods:48Hrs
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks

Course Objective:

1.To develop students' sensibility with regard to issues of gender in contemporary India.
2.To provide a critical perspective on the socialization of men and women.
3.To expose the students to debates on the politics and economics of work.
4.To help students reflect critically on gender violence.

Course Outcomes(s)

CO#	Course Outcomes
C229.1	Develop a better understanding of important issues related to what gender is in contemporary India.
C229.2	Be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
C229.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
C229.4	Understand what constitutes sexual harassment and domestic violence and be made aware of new forums of Justice.
C229.5	Draw solutions as to how men and women, students and professionals can be better equipped to work and live together as equals.
C229.6	Develop a sense of appriciationof women in all walks of life

COURSE CONTENT (SYLLABUS)

UNIT I:
Understanding Gender:
Introduction
What is Gender and why does it matter
Gender Relations and Status in the Household
Masculinities
Gender Analysis and mainstreaming
Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1)
Socialization: Making Women, Making Men (*Towards a World of Equals*: Unit – 2 Introduction.
Preparing for Womanhood.Growing up Male.First lessons in Caste.Different Masculinities.

UNIT II
Gender And Biology:
Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)
Declining Sex Ratio.Demographic Consequences.
Teacher's Role in Promoting/Advancing Gender Sensitization
Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)
Two or Many?Struggles with Discrimination.

UNIT III:
Gender and Labour:
Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)
"My Mother doesn't Work." "Share the Load."
Women's Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)
Fact and Fiction.Unrecognized and Unaccounted work. Additional Reading: Wages andConditions of Work.
Sexual Harassment—Women at all levels of employment and all levels of workplace are affected.

UNIT IV:
Issues Of Violence
Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading:"*Chupulu".*
Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)
Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading:New Forums for Justice.
Promoting gender equality to prevent violence against women
Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)
Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT V:
Gender: Co – Existence
Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.
Additional Reading: Rosa Parks-The Brave Heart.

Text Books:

1. Towards a World of equals. A bilingual text book on Gender written by A. Suneetha. Telugu Academy, Hyderabad in 2015.
2. Seeing like a feminist: Menon Nivedita. Zubaan Penguin books. New Delhi in 2012.
3. Gender Sensitization by C. Rajya Lakshmi, D. S. Vittal, by Himalaya Publishing House.

e- books:

1. https://fybblog.com/ignou-book-bgdg-172-hindi-english
2. http://saha.ac.in/web/images/administration/pdf/Gender%20Sensitization%20New-10-4-2017_545c7.pdf
3. https://www.researchgate.net/publication/329541569_EMPOWERING_WOMEN_THROUGH_GENDER_SENSITIZATION

Web References:

1. https://nptel.ac.in/courses/110/105/110105080/
2. https://onlinecourses.nptel.ac.in/noc19_hs57/preview
3. https://nptel.ac.in/content/storage2/courses/109103023/download/Lecture%2027.pdf

DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS
II B.Tech., EEE -II SEM
Value Added Course

Course Title: DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS	Course Code: AS20-02PW04
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1.Design and drawing of Electrical circuit diagrams:

Design and drawing of light and fan circuits and alarm circuits for simple, specific and emergency requirements. Alarm circuits with relays. Illumination engineering, design of light schemes for hotels, parks and street lighting etc.

2. Motor Control circuits:

Starting of ac motors, stopping of motors, basic control circuits for motors.

3. Estimating and Costing of Electrical Installations:

Introduction, load calculation, conductor size calculations, selection of energy meter, main switch, distribution board and number of circuits and sub-circuits. Costing of electrical installation for small, medium residences, large installations like public buildings and commercial establishments.

4.Design, estimation and costing:

Design, estimation and costing of HT and LT lines overhead as well as underground with complete list of material including labour charges and wastage etc.

5.Estimating and costing:

Estimating and costing of 11KV, 33KV and 66KV substation along with transformers.

REFERENCES

1. Electrical Design Estimating and Costing by: K. B. Raina, New Age International
2. Electrical Estimating and Costing by: Surjit Singh, Ravi Deep Singh, DhanpatRai& Company

SOLAR PLANT DESIGN & ENGINEERING
II B.Tech., EEE -II SEM
Value Added Course

Course Title: SOLAR PLANT DESIGN & ENGINEERING	Course Code: AS20-02PW05
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1.Types of Solar Power Plant
2.Selection of site and shadow analysis
3. Selection of PV module technology
4. Selection of PV module (cells and BOM) and sizing
5. Inverters Selection and Sizing (Grid Connection and Off Grid)

REFERENCEs

1. 'Our Common Future', Report of the World Commission on Environment &Development.Oxford
University Press, NY, 1987.
2. John W. Twidell& Anthony D.Weir, 'Renewable Energy Resources' 3. Geofrey Boyle, ' Renewable Energy: Power for a Sustainable Future', OUP in assn with Open University, 1996.

SIMULINK & ITS APPLICATIONS
II B.Tech., EEE -II SEM
Value Added Course

Course Title: SIMULINK & ITS APPLICATIONS	Course Code: AS20-02PW06
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

1) Verification of KCL and KVL
2) Verification of Mesh Analysis
3) Verification of Nodal Analysis
4) Verification of Superposition Theorem
5) Verification of Thevenin's and Norton's Theorem

Reference:
Hand book of SIMULINK

GRAPHIC DESIGN USING PHOTO SHOP/CORAL DRAW/3D MAX
II B.Tech., EEE -II SEM
Value Added Course

Course Title: GRAPHIC DESIGN USING PHOTO SHOP/CORAL DRAW/3D MAX	Course Code: AS20-12PW02
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks

Course Overview:
Implement the fundamentals of color: visual, rhythm, and pattern in design · Use scale, weight,
direction, texture, and space in a composition.

Course Objective:
- To develop, design and implement two- and three-dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

Course Outcome(s):

CO#	Course Outcomes
C2110.1	Basic skills using Photoshop software and the peripherals.
C2110.2	Ability to use a range of tools and filters in Photoshop
C2110.3	Ability to print with a variety of techniques and papers.
C2110.4	Creatively solve visual problems.
C2110.5	Evaluate, adjust, refine, and rework solutions.
C2110.6	Use instructor and peer criticism to improve skills and rework solutions.

COURSE CONTENT

UNIT - I:
2D PRIMITIVES
Elements of pictures created in computer graphics – Graphics input primitives and devices**.** Drawingprimitives in open GL and Basic open GL programming - open GL basic Graphics primitives – Outputprimitives – Line, Circle and Ellipse drawing algorithms – Attributes of output primitives.

UNIT - II:
2D GEOMETRIC TRANSFORMATIONS
2D Viewing – Window-Viewport Transformation - Two dimensional Geometric transformations–Line, Polygon, Curve and Text clipping algorithms.

UNIT - III:
3D CONCEPTS
Projections - Three-dimensional object representation – Parallel and Perspective Polygons,69Splines,Quadric Surfaces - Visualization of data sets - 3D affine transformations 3DRotations usingQuaternionsViewing – Visible surface identification – Color Models, 3DTransformations in open GL

UNIT - IV:

MULTIMEDIA BASICS
Introduction and definitions – applications – elements – Animations – Compression – Types ofCompressions: Lossless – Loss – Video compression – Image Compression – Audio compression–Data and file format standards – Multimedia data structures: KD Trees –R trees.

UNIT - V:
MULTIMEDIA AUTHORING AND APPLICATIONS
Creating interactive multimedia – Multimedia Authoring Systems – Multimedia Authoring SoftwareApplications – Video On demand – Virtual Reality – Augmented Reality – Content based retrieval indigital libraries.

Text Books:
1Donald D. Hearn, M. Pauline Baker and Warren Carithers, "Computer Graphics with Open GL",Fourth Edition, Pearson Education, 2010.
2Ze-Nian Li and Mark S.Drew, "Fundamentals of Multimedia", First Edition, Pearson Education,2007.

Reference Books:
1F.S.Hill, "Computer Graphics using OPENGL", Second edition, Pearson Education, 2003.
2Prabhat K Andleigh, Kiran Thakrar, "Multimedia systems design", First Edition, PHI, 2007.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):
1https://nptel.ac.in/courses/112/102/112102101/
2https://nptel.ac.in/courses/107/101/107101001/

ROBOTICS AND ITS APPLICATIONS
II B.Tech., EEE -II SEM
Value Added Course

Course Title: Robotics And Its Applications	Course Code: AS20-66PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Mathematics, Micro processor	

Course Overview:
The course would cover the fundamental concepts and mathematics required to understand, analyze, design and control robotic manipulators for industrial applications or research. As robotics is a very wide field, after taking this course, students could then take more advanced courses/topics in focused areas like, motion planning, AI, unmanned vehicles, etc. Students could use this course to lay the foundation of other courses they teach involving robotics like, manufacturing automation, AI, Computer vision applications, etc.

Course Objective: The objective of this Course is:

- To introduce basic concepts, parts of robots and types of robots
- To make the students familiar with various drive systems of robots, sensors and their applications in programming of robots
- To discuss the applications of robots, and implementations of robots

Course Outcomes(s)

CO#	Course Outcomes
C2110.1	Understand the basic concepts of working of robot
C2110.2	Analyze the function of sensor in robot and design the robotic arm with various tools
C2110.3	Analyze and design to Program the robot for a typical application and path planning using robotic vision
C2110.4	Understand the various robot programming languages
C2110.5	Conduct and design the experiments for various robot operations
C2110.6	Apply and use the advanced techniques for robot processing

COURSE CONTENT (SYLLABUS)

UNIT I
Introduction: Introduction, brief history, types, classification and usage, science and technology of robots, Artificial Intelligence in Robotics, some useful websites, textbooks and research journals

UNIT II
Elements of Robots-Joints, Links, Actuators, and Sensors : Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kind of actuators, stepper-DC-servo-and brushless

motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders-tachometers-strain gauge based force torque sensor-proximity and distance measuring sensors-and vision

UNIT III

End Effectors: Classification of end effectors-tools as end effectors-drive system for grippers-mechanical adhesive- vacuum magnetic-grippers-hooks and scoops-gripper force analysis-and gripper design- active and passive grippers

Planning and Navigation: Introduction, path planning-overview-road map path planning-cell decomposition path planning- potential field path planning-obstacle avoidance-case studies

UNIT IV

Vision system: Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations

Robot Programming: Introduction to robot languages-VAL-RAPID-language-basic commands-motion instructions- pick and place operation using industrial robot manual mode-automatic mode-subroutine command based programming-move master command language-introduction-syntax-simple problems

UNIT V

Field and service robots / Industrial Robots: Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc

TEXT BOOKS:

1. RicharedD.Klafter.ThomasAchmielewski and Mickael Negin, Robotic Engineering an Integrated approach prentice hall India- newdelhi-2001
2. Saeed B.Nikku, Introduction to Robotics, analysis, control and applications Wiley-India 2nd edition-2011

REFERENCE BOOKS:

1. Industrial robotic technology-programming and application by M.P.Groover et al, McGrawhill 2008
2. Robotics technology and flexible automation by S.R. Deb, TMH 2009

Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_de11/preview
2. https://onlinecourses.nptel.ac.in/noc19_me74/preview

Web Reference/E-Books:

1. https://www.javatpoint.com/robotics-tutorial
2. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.htm
3. https://www.toptal.com/robotics/programming-a-robot-an-introductory-tutorial