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
AS20-02ES01	BASIC ELECTRICAL ENGINEERING	ESC	3	1	0	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	0	0	2	30	70	100
AS20-03ES01	ENGINEERING MECHANICS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-02ES02	BASIC ELECTRICAL ENGINEERING LAB	ESC	0	0	2	1	30	70	100
AS20-00HS02	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
AS20-00BS03	ENGINEERING CHEMISTRY LAB	BSC	0	0	2	1	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
AS20-00BS04	ENGINEERING 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
AS20-01ES01	ENERGY SCIENCE AND ENGINEERING	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS05	ENGINEERING 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	HSMC	3	1	0	3	30	70	100
AS20-01PC01	SURVEYING AND GEOMATICS	PCC	3	1	0	3	30	70	100
AS20-01PC02	FLUID MECHANICS	PCC	3	1	0	3	30	70	100
AS20-01ES02	BUILDING MATERIALS, CONSTRUCTION AND PLANNING	ESC	3	1	0	3	30	70	100
AS20-01PC03	STRENGTH OF MATERIALS - I	PCC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-01PC04	SURVEYING LAB - I	PCC	0	0	3	1.5	30	70	100
AS20-01ES03	COMPUTER AIDED CIVIL ENGINEERING DRAWING - I	ESC	0	0	3	1.5	30	70	100
AS20-01PC05	STRENGTH OF MATERIALS LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC01	ENVIRONMENTAL SCIENCES	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-01PW01	TOTAL STATION	PW	0	0	2	1	25	75	100
AS20-01PW02	BUILDING DRAWING	PW	0	0	2	1	25	75	100
AS20-01PW03	VAASTU IN CONSTRUCTION	PW	0	0	2	1	25	75	100
AS20-05PW09	PYTHON PROGRAMMING	PW	0	0	2	1	25	75	100
AS20-12PW02	GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)	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**				
AS20-03ES11	BASIC MECHANICAL ENGINEERING FOR CIVIL ENGINEERS	ESC	3	1	0	3	30	70	100
AS20-00BS10	PROBABILITY AND RANDOM PROCESSES	BSC	3	1	0	3	30	70	100
AS20-01PC06	ENGINEERING GEOLOGY	PCC	3	1	0	3	30	70	100
AS20-01PC07	STRENGTH OF MATERIALS - II	PCC	3	1	0	3	30	70	100
AS20-01PC08	HYDRAULICS AND HYDRAULIC MACHINERY	PCC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-01PC09	SURVEYING LAB - II	PCC	0	0	3	1.5	30	70	100
AS20-01PC10	ENGINEERING GEOLOGY LAB	PCC	0	0	3	1.5	30	70	100
AS20-01PC11	HYDRAULICS AND HYDRAULIC MACHINERY LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC02	GENDER SENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-01PW04	MICROSOFT PROJECT	PW	0	0	2	1	25	75	100
AS20-01PW05	PRIMAVERA	PW	0	0	2	1	25	75	100
AS20-01PW06	ADVANCED SURVEYING	PW	0	0	2	1	25	75	100
AS20-02PW05	SOLAR PLANT DESIGN AND ENGINEERING	PW	0	0	2	1	25	75	100
AS20-04PW04	SENSOR TECHNOLOGY	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				
AS20-01PC12	ENVIRONMENTAL ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-01PC13	DESIGN OF REINFORCED CONCRETESTRUCTURES	PCC	3	1	0	3	30	70	100
AS20-01PC14	STRUCTURAL ANALYSIS	PCC	3	1	0	3	30	70	100
AS20-01PE1X	PROFESSIONAL ELECTIVE – I	PE	3	1	0	3	30	70	100
AS20-01OE1X	OPEN ELECTIVE -1	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-01PC15	CONCRETE TECHNOLOGY LAB	PCC	0	0	3	1.5	30	70	100
AS20-01ES04	GEOGRAPHICAL INFORMATION SYSTEMS LAB	ESC	0	0	3	1.5	30	70	100
AS20-01PC16	ENVIRONMENTAL ENGINEERING LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC04	PROFESSIONAL ETHICS	MC	3	0	0	0	0	100	100
AS20-00MC06	CYBER SECURITY	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-00HS10	APTITUDE SKILLS	HSMC	0	0	2	1	25	75	100
AS20-00HS11	STARTUP MANAGEMENT	HSMC	0	0	2	1	25	75	100
AS20-00HS12	ERP TOOLS	HSMC	0	0	2	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**				
AS20-01PE11	CONCRETE TECHNOLOGY	PE	3	1	0	3	30	70	100
AS20-01PE12	AIR POLLUTION AND CONTROL	PE	3	1	0	3	30	70	100
AS20-01PE13	GROUND WATER DEVELOPMENT AND MANAGEMENT	PE	3	1	0	3	30	70	100
AS20-01PE14	WATERSHED MANAGEMENT	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**				
AS20-01OE11	BASICS OF CIVIL ENGINEERING	OE	3	0	0	3	30	70	100
AS20-01OE12	BUILDING PLANNING AND CONSTRUCTION	OE	3	0	0	3	30	70	100
AS20-01OE13	WATER POLLUTION AND ITS MANAGEMENT	OE	3	0	0	3	30	70	100
AS20-01OE14	AIR POLLUTION AND CONTROL ENGINEERING	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				
AS20-01PC17	DESIGN OF STEEL STRUCTURES	PCC	3	1	0	3	30	70	100
AS20-01PC18	SOIL MECHANICS	PCC	3	1	0	3	30	70	100
AS20-01PC19	WATER RESOURCES ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-01PE2X	PROFESSIONAL ELECTIVE –II	PE	3	1	0	3	30	70	100
AS20-01OE2X	OPEN ELECTIVE –II	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-01PC20	SOIL MECHANICS LAB	PCC	0	0	3	1.5	30	70	100
AS20-01ES05	COMPUTER AIDED DRAFTING – II LAB	ESC	0	0	3	1.5	30	70	100
AS20-00HS05	ADVANCED ENGLISH COMMUNICATION SKILLSLAB	HSMC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC03	CONSTITUTION OF INDIA	MC	3	0	0	0	0	100	100
AS20-00MC05	ARTIFICIAL INTELLIGENCE	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-01PW07	A COURSE ON REVIT ARCHITECTURE	PW	0	0	2	1	25	75	100
AS20-01PW08	ETAB	PW	0	0	2	1	25	75	100
AS20-01PW09	ESTIMATION AND CURRENT PRACTICE IN CIVILENGINEERING	PW	0	0	2	1	25	75	100
AS20-01PW10	ANSYS	PW	0	0	2	1	25	75	100
AS20-66PW05	DRONE APPLICATION	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**				
AS20-01PE21	ADVANCED STRUCTURAL ANALYSIS	PE	3	1	0	3	30	70	100
AS20-01PE22	CONSTRUCTION TECHNOLOGY AND MANAGEMENT	PE	3	1	0	3	30	70	100
AS20-01PE23	FOUNDATION ENGINEERING	PE	3	1	0	3	30	70	100
AS20-01PE24	REHABILITATION AND RETROFITTING OF STRUCTURES	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**				
AS20-01OE21	DISASTER MANAGEMENT AND MITIGATION	OE	3	0	0	3	30	70	100
AS20-01OE22	INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENTAL ENGINEERING	OE	3	0	0	3	30	70	100
AS20-01OE23	GEOINFORMATICS	OE	3	0	0	3	30	70	100
AS20-01OE24	INDUSTRIAL POLLUTION PREVENTION AND CONTROL	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**				
AS20-01PC21	ESTIMATION QUANTITY SURVEYING AND VALUATION	PCC	3	1	0	3	30	70	100
AS20-01PC22	TRANSPORTATION ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-00HS06	BUSINESS ECONOMICS AND FINANCIALANALYSIS	HSMC	3	1	0	3	30	70	100
AS20-01PE3X	PROFESSIONAL ELECTIVE-III	PE	3	1	0	3	30	70	100
AS20-01OE3X	OPEN ELECTIVE-III (MOOCS)	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-01PC23	TRANSPORT ENGINEERING LAB	PCC	0	0	3	1.5	30	70	100
AS20-01ES06	ENVIRONMENTAL AND HYDRAULICSTRUCTURES DRAWING LAB	ESC	0	0	3	1.5	30	70	100
AS20-01PW11	INDUSTRY ORIENTED MINI PROJECT	PW	0	0	4	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**				
AS20-01PE31	INTELLIGENT TRANSPORTATION SYSTEMS	PE	3	1	0	3	30	70	100
AS20-01PE32	PRESTRESSED CONCRETE	PE	3	1	0	3	30	70	100
AS20-01PE33	INDUSTRIAL WASTE WATER TREATMENT	PE	3	1	0	3	30	70	100
AS20-01PE34	RAILWAY AND AIRPORT ENGINEERING	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**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-01OE31	GPS SURVEYING	OE	3	0	0	3	30	70	100
AS20-01OE32	REMOTE SENSING AND GIS	OE	3	0	0	3	30	70	100
AS20-01OE33	INTEGRATED WASTE MANAGEMENT FOR A SMART CITIES	OE	3	0	0	3	30	70	100
AS20-01OE34	MUNICIPAL SOLID WASTE MANAGEMENT	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**				
AS20-01PE4X	PROFESSIONAL ELECTIVE-IV	PE	3	1	0	3	30	70	100
AS20-01PE5X	PROFESSIONAL ELECTIVE -V	PE	3	1	0	3	30	70	100
AS20-01OE4X	OPEN ELECTIVE -IV	OE	3	0	0	3	30	70	100
PRACTICAL COURSE									
AS20-01PW12	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**				
AS20-01PE41	TRAFFIC ENGINEERING	PE	3	1	0	3	30	70	100
AS20-01PE42	BRIDGE ENGINEERING	PE	3	1	0	3	30	70	100
AS20-01PE43	STOCHASTIC HYDROLOGY	PE	3	1	0	3	30	70	100
AS20-01PE44	IRRIGATION AND HYDRAULIC STRUCTURES	PE	3	1	0	3	30	70	100
AS20-01PE41	TRAFFIC ENGINEERING	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				
AS20-01PE51	INDUSTRIAL WASTE MANAGEMENT	PE	3	1	0	3	30	70	100
AS20-01PE52	PAVEMENT DESIGN	PE	3	1	0	3	30	70	100
AS20-01PE53	ELEMENTS OF EARTHQUAKE ENGINEERING	PE	3	1	0	3	30	70	100
AS20-01PE54	GROUND IMPROVEMENT TECHNIQUES	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**				
AS20-01OE41	INTELLECTUAL PROPERTY RIGHTS	OE	3	0	0	3	30	70	100
AS20-01OE42	GLOBAL WARMING AND CLIMATE CHANGE	OE	3	0	0	3	30	70	100
AS20-01OE43	URBAN AND REGIONAL PLANNING	OE	3	0	0	3	30	70	100
AS20-01OE44	ENVIRONMENTAL IMPACT ASSESSMENT	OE	3	0	0	3	30	70	100
TOTAL						**3**			

*Open Elective – Students should take Open Electives from The List of Open Electives Offered by Other Departments/Branches Only.

B. TECH
FIRST YEAR
FIRST SEMESTER
SYLLABUS

LINEAR ALGEBRA AND ADVANCED CALCULUS
I B.TECH., I SEMESTER

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 + 16Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exam: 70 Marks
Prerequisites: Knowledge of Matrices, Calculus, Differentiation and Integration rules	

COURSE OVERVIEW

Types of matrices and their properties along with the concept of rank of the matrix and applying this to know the consistency of the system of linear equations and concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Later the concept of Sequences & 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 has been included.

COURSE OBJECTIVES

- 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 analyze 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
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.

REFERENCE 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

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

E-BOOKS

1. http://ckw.phys.ncku.edu.tw/public/pub/Notes/Mathematics/LinearAlgebra/Web/matrixalgebra.pdf

ENGINEERING CHEMISTRY
I B.TECH., I SEMESTER

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 + 16Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: 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 OBJECTIVES

- 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

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. 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).

REFERENCE 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. Second Edition 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

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/
9. http://vlab.amrita.edu/?sub=2&brch=191&sim=849&cnt=1

E-BOOKS

1. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/
2. https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf

BASIC ELECTRICAL ENGINEERING

I B.TECH., I SEMESTER

Course Title: Basic Electrical Engineering	**Course Code:** AS20-02ES01
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 Exam:** 70 Marks
Prerequisites: Basic knowledge of electronics	

COURSE OVERVIEW

Electrical engineering principles are taught in this course. Topics include circuit theory, alternating current theory, DC Machines, induction, motors, Synchronous Machine, cabling, batteries and Switches..

COURSE OBJECTIVES

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

COURSE OUTCOMES

CO#	Course Outcomes
C113.1	Understand the basic concepts of Electrical Circuits.
C113.2	Study various concepts in AC circuits
C113.3	Discuss the concepts of transformer and Induction motor.
C113.4	Discuss the concepts of DC Machines and synchronous machines.
C113.5	Describe the operation of different types of cables, wires and batteries.
C113.6	Understand the performance of different protecting equipment's like MCB, FUSE.

COURSE CONTENT (SYLLABUS)

UNIT I
D.C. CIRCUITS
Electrical circuit elements R, L and C, voltage and current sources, Kirchoff's laws, Network reduction techniques, Series –parallel, Y-Δ transformation, analysis of simple circuits with dc excitation. Superposition theorem, Thevenin's theorem and Norton's Theorem.

UNIT II
A.C. CIRCUITS
Representation of sinusoidal waveform, phasor representation, peak and RMS values, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations, series resonance in series R-L-C circuit. Three-phase balanced circuits. Voltage and current relations in star and delta connections.

UNIT III
TRANSFORMERS AND INDUCTION MOTORS
Transformers: Principle of operation of transformer, Equivalent circuit, losses and efficiency, voltage regulation. Auto-transformer. Three phase transformer connections.
Induction motors: Working principle and operation of three phase induction motor, Losses and efficiency-Brake test. Single-phase induction motor-working principle, operation and applications.

UNIT IV
DC MACHINES AND SYNCHRONOUS MACHINES
DC machines: Constructional details and working of DC Generator, Methods of excitation, Applications of DC generators. DC Motor - principle of operation, speed control of separately excited DC motor. Applications of DC motors.
Synchronous machines**:** Construction and working of synchronous generator and its applications.

UNIT V
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.

TEXT BOOKS
1. "Basic Electrical Engineering", D.C. Kulshreshtha, McGraw Hill, 2019.
2. "Basic Electrical Engineering", A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
3. "Basic Electrical Engineering" - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
4. "Principle of Electrical Engineering", V.K Mehta, R. Mehta, S. Chand Limited, 2011.
5. **"**Basic Electrical Engineering", V. Mittle & Arvind Mittal, TMH, Second Edition.

REFERENCE BOOKS

1. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

ONLINE RESOURCES

1. NPTEL Videos on Course "Basic Electrical Technology" Co-ordinated by IISc Bangalore
   Link: https://nptel.ac.in/courses/108/108/108108076/
2. NPTEL Videos on Course "Basic Electrical Technology" Co-ordinated by IIT Kharagpur
   Link: https://nptel.ac.in/courses/108/105/108105053/

E-BOOKS

1. Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
2. Basic Electrical Engineering By Chakrabarti · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
3. Basic Electrical Engineering By R. K. Rajput · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
4. Basic Electrical Engineering By SK Sahdev · 2015
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover

ENGLISH
I B.TECH., I SEMESTER

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 Exam:** 70 Marks
Prerequisites: Basic knowledge of English language, Grammar, basic reading skills, 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 OBJECTIVES

- 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

CO#	Course Outcomes
C114.1	Apply English language effectively in spoken and written forms
C114.2	Analyze 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,

REFERENCE 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.

ONLINE RESOURCES

1. Practice English Your Own- https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

E-BOOKS

1. https://ia801604.us.archive.org/33/items/in.ernet.dli.2015.189338/2015.189338.The-Kesava-Temple-At-Belur--Vol-1.pdf
2. https://viden.io/knowledge/how-a-chinese-billionaire-built-her-fortune

ENGINEERING MECHANICS
I B.TECH., I SEMESTER

Course Title: Engineering Mechanics	**Course Code:** AS20-03ES01
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 Exam:** 70 Marks
Prerequisites:	

COURSE OVERVIEW
Engineering mechanics is the application of mechanics to solve problems involving common engineering elements. The goal of this Engineering Mechanics course is to expose students to problems in mechanics as applied to plausibly real-world scenarios. The course addresses the modeling and analysis of static equilibrium problems with an emphasis on real world engineering applications and problem solving.

COURSE OBJECTIVES
- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium.
- Explain the resolution of a spatial system of forces using equations of equilibrium.
- Perform analysis of bodies lying on rough surfaces.
- Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections.
- Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations.

COURSE OUTCOMES
CO#	Course Outcomes
C115.1	Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
C115.2	Determine resultant of forces acting on a body subjected to a spatial of forces.
C115.3	Solve problem of bodies subjected to friction.
C115.4	Find the location of centroid and calculate moment of inertia of a given section.
C115.5	Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
C115.6	Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION TO ENGINEERING MECHANICS - FORCE SYSTEMS
Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space - Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy.

UNIT II
FRICTION
Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack; Centroid and Centre of Gravity - Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications. Theorem of Pappus.

UNIT III
AREA MOMENT OF INERTIA
Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem. Mass Moment of Inertia : Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia - Mass moment of inertia of composite bodies. Virtual Work: Theory of virtual work-Application.

UNIT IV
REVIEW OF PARTICLE DYNAMICS
Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular);
Impact (Direct and oblique).

UNIT V
KINETICS
Kinetics of a particle-D'Alemberts principle-Motion in a curved path - work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation work done-Principle of work-energy-Impulse-momentum. Mechanical Vibrations: Definitions, Concepts-Simple Harmonic motion- free vibrations-Simple and compound pendulums.

TEXT BOOKS
1. Singer's Engineering Mechanics Statics and Dynamics/ K.Vijaya Kumar Reddy, J. Suresh Kumar/ BSP.
2. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall.
3. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.
4. Tayal A.K., "Engineering Mechanics - Statics & Dynamics", Umesh Publications, 2011.
5. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.

REFERENCE BOOKS

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain/ Academic Publishing Company.
3. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.

ONLINE RESOURCES

1. https://nptel.ac.in/courses/112/106/112106180/
2. https://nptel.ac.in/courses/112/106/112106286/
3. https://nptel.ac.in/courses/112/105/112105164/
4. https://nptel.ac.in/courses/112/103/112103109/

E-BOOKS

1. http://nptel.ac.in/courses/Webcourse contents/IITKANPUR/engg_mechanics/ui/Course_home_3.htm
2. https://nptel.ac.in/courses/122/104/122104015/
3. https://freevideolectures.com/course/2264/engineering-mechanics
4. https://nptel.ac.in/courses/112/103/112103108/
5. https://nptel.ac.in/courses/115/104/115104094/

BASIC ELECTRICAL ENGINEERING LAB
I B.TECH., I SEMESTER

Course Title: Basic Electrical Engineering Lab	**Course Code:** AS20-02ES02
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Practical	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Basic Electrical Engineering	

COURSE OVERVIEW
Electrical engineering principles are taught practically in this Lab course. Topics include circuit theory, alternating current theory, Transformers, DC Machines, induction, motors and Synchronous Machine.

COURSE OBJECTIVES
- To analyze a given network by applying various electrical laws and network theorems
- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

COURSE OUTCOMES
CO#	Course Outcomes
C116.1	Apply basic laws of electrical circuits.
C116.2	Design simple Electrical Networks
C116.3	Analyze the response of different types of electrical circuits to different Excitations.
C116.4	Understand the measurement, calculation and relation between the basic electrical Parameters
C116.5	Determine the characteristics of DC Machines
C116.6	Determine characteristics of Transformer and AC Machines

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

Any ten of the following experiments:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit
11. Performance Characteristics of a Separately/Self Excited DC Shunt Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

TEXT BOOKS

1. "Basic Electrical Engineering", D.C. Kulshreshtha, McGraw Hill, 2019.
2. "Basic Electrical Engineering", A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
3. "Basic Electrical Engineering" - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata Mc Graw Hill.
4. "Principle of Electrical Engineering", V.K Mehta, R. Mehta, S. Chand Limited, 2011.
5. "Basic Electrical Engineering", V. Mittle & Arvind Mittal, TMH, Second Edition.

REFERENCE BOOKS

1. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

ONLINE RESOURCES

1. NPTEL Videos on Course "Basic Electrical Technology" Co-ordinated by IISc Bangalore
   Link: https://nptel.ac.in/courses/108/108/108108076/
2. NPTEL Videos on Course "Basic Electrical Technology" Co-ordinated by IIT Kharagpur
   Link: https://nptel.ac.in/courses/108/105/108105053/

E-BOOKS

1. Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
2. Basic Electrical Engineering By Chakrabarti · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
3. Basic Electrical Engineering By R. K. Rajput · 2009
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
4. Basic Electrical Engineering By SK Sahdev · 2015
   https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
I B.TECH., I SEMESTER

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 Exam:** 70 Marks
Prerequisites: Basic knowledge of English language, Grammar, Speaking skills, able to communicate in English language, 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 OBJECTIVES

- 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 OUTCOMES

CO#	Course Outcomes
C117.1	Learn how to pronounce words using phonetic transcription
C117.2	Improves collaborative skills and maximizes speaking skills
C117.3	Develops Neutralization of accent for intelligibility
C117.4	Develops better understanding of nuances of English language throughaudio-visual experience
C117.5	Improves language skills according in the different situations, discussionsand interviews
C117.6	Develops linguistic, communicative and critical thinking

COURSE CONTENT (SYLLABUS)

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

1. Computer Assisted Language Learning (CALL) Lab
2. 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.

TEXT BOOKS

1. A Textbook of English phonetics for Indian students by T. Balasubramanian
2. ELCS LAB Manual- A workbook for CALL and ICS Lab Activities, by Orient BlackSwan
3. Group Discussion and Interview Skills by Priyadarshi Patnaik
4. Intonation in Context Student's Book: Intonation Practice for Upper-Intermediate and Advanced Learners of English by Barbara Bradford and David Brazil (Editor)

REFERENCE BOOKS

1. ELCS LAB MANUAL
2. Group Discussion and Interview Skills by Priyadarshi Patnaik
3. Communication Skills Vol I, Students Course book by Tabitha Wangare Wambui, Alice W Kibui, Elizabeth Gathuthi

ONLINE RESOURCES

1. Practice English Your Own- https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

E-BOOKS

1. https://scholar.harvard.edu/files/adam/files/phonetics.ppt.pdf
2. https://gdpi.hitbullseye.com/MBA/free-ebooks.php
3. https://www.mbarendezvous.com/pdf/GroupDiscussionEbook.pdf
4. https://www.ldsassoc.com/wp-content/uploads/2019/04/intonation_e-book.pdf
5. 6.https://www.teachingenglish.org.uk/sites/teacheng/files/TeachingSpeaking_4_stressintonation_v01.pdf

ENGINEERING CHEMISTRY LAB
I B.TECH., I SEMESTER

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:** 32Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 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
- Estimation of hardness in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

COURSE OUTCOMES
CO#	Course Outcomes
C118.1	Analyze the need, design and perform a set of experiments.
C118.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C118.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C118.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conductometric Measurements, Ostwlad's viscometer and stalagmometer.
C118.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C118.6	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

TEXT BOOKS

1. Vogel's text book of practical organic chemistry 5TH edition
2. Experiments and calculations in Engineering chemistry – S.S. Dara.

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)

ONLINE RESOURCES

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

E-BOOKS

1. http://library.lol/main/07F20624DAF9C50096E4A6E2DF954A63
2. http://library.lol/main/45ACAA8932E3139F7821D4720BA8A225

SOFT SKILLS - I
I B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: Soft Skills - I	**Course Code:** AS20-00HS03
Teaching Scheme (L:T:P): 3:0:0	**Credits:** 0
Type of Course: Lecture	**Total Contact Periods:** 48 Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Basic English grammar understanding	

COURSE OVERVIEW
Course will enable students to become responsible towards their lives and will be able to faces challenges, and will also enable to develop work culture, orientation and will enable them with problem solving abilities.

COURSE OBJECTIVES
- To develop Communicative Methodology.
- To lead the life with utmost responsibility.
- To accept challenges.
- To develop work orientation in the mindset of the students.
- To have problem solving ability.

COURSE OUTCOMES

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.

REFERENCE BOOKS
1. Soft Skills and its application in work place by Dr. Vasantha Kumari S
2. Soft Skills Development by Dr. Abdul Mohammad Ali Zinna, Dr. M Syed Ali Padusha, Mr. S Peerbasha
3. Soft Skills (Academic Guide/ Teaching Materials) by Shoo Fly Publishing

ONLINE RESOURCES
1. https://enterprisersproject.com/article/2019/2/how-build-soft-skills-10-must-read-books
2. https://booksoncode.com/articles/top-soft-skills
3. https://www.goodreads.com/shelf/show/soft-skills

E-BOOKS
1. https://www.researchgate.net/publication/301351158_Advanced_Skills_for_Communication_in_English_Book_I
2. https://jmc.edu/images/files/ALL-IIUG-SOFT-SKILL-BOOK-21-08-2020.pdf

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
I B.TECH., II SEMESTER

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 + 16Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Knowledge on Derivatives, Integrations, Functions	

COURSE OVERVIEW
Course include Exact and Non-Exact D.E. along with the solutions of Higher order ODE by different methods, Later the double and triple integral and Basic concepts of vector calculus are also included.

COURSE OBJECTIVES
- 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
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
Vector Point Function; Scalar Point function ;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. Iyengarand R.K.Jain,Advanced Engineering Mathematics, Narosa Publishing House,5th Edition, 2016.

REFERENCE 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, Vector Analysis: Schaum's Outlines Series, Tata McGrawHill,2nd Edition,2009.

ONLINE RESOURCES
1. https://www.coursera.org/learn/ordinary-differential-equations
2. https://onlinecourses.nptel.ac.in/noc20_ma15/preview

E-BOOKS
1. Engineering Mathematics - II by Dr.M. Surya Narayana Reddy https://amsslive.files.wordpress.com/2018/07/engineering-mathematics-ii-2009-cuppy.pdf

ENGINEERING PHYSICS
I B.TECH., II SEMESTER

Course Title: Engineering Physics	**Course Code:** AS20-00BS04
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 Exam:** 70 Marks
Prerequisites: Knowledge of mathematical concepts like vector algebra, integration and differentiation units and dimension of physical quantities, principles of mechanics and laws of optics, waves and oscillations, fundamental principles of electromagnetic theory.	

COURSE OVERVIEW

This course deals with the study of harmonic Oscillators which explore in understanding complex mechanical systems. It deals with wave optics which helps to understand the behavior of wave propagation in different medium. It deals with the fundamental properties of dielectric, magnetic and nanomaterials and explore their application in all engineering streams.

COURSE OBJECTIVES

- Explore different types of harmonic oscillations.
- Identify different properties of physical optics like interference and diffraction.
- Distinguishes the distribution of particles in solids using different statistical concepts.
- Understand the concept of effective mass of electron and Differentiate between the types of semiconductor.
- Classify different dielectric and magnetic properties of solids using basic principles of physics
- Interprets the characteristics of lasers and applications of lasers, and characteristics of nanomaterials and their applications

COURSE OUTCOMES

CO#	Course Outcomes
C122.1	Analyze the impedances in Mechanical and Electrical Oscillators
C122.2	Interpret the phase difference of coherent light sources using interference and diffraction
C122.3	Summarize the distribution of particles in solids using Maxwell-Boltzmann, Bose-Einstein statistics and Fermi-Dirac statistics
C122.4	Identify the different type of semiconductors using Hall Effect and their applications
C122.5	Explore different types of Dielectric and Magnetic materials and their applications in different fields.
C122.6	Analyze the different properties of laser, along with the Significance of nanomaterials and their application in Science and Technology.

COURSE CONTENT (SYLLABUS)

UNIT I
HARMONIC OSCILLATIONS
Introduction to Mechanical and electrical simple harmonic oscillators, Complex number notation and phasor representation of simple harmonic motion, Damped harmonic oscillator: wave equation, Analysis of under, over damped, critically damped, Energy in a damped harmonic oscillator, Quality factor, forced vibration: equation of motion(Qualitatively) and solution.

UNIT II
WAVE OPTICS
Interference: Superposition of waves, Interference by transmitted and reflected light, Formation of Newton's ring, experimental method for calculation of wavelength, determination of refractive index of a liquid by newton's ring Diffraction: Types of Diffraction, Fraunhofer diffraction at a single slit - Intensity distribution in diffraction pattern, Fraunhofer diffraction due to double slit - expression for resultant intensity, Diffraction grating - resolving power of a plane transmission grating(qualitative)

UNIT III
INRODUCTION TO SOLIDS
Limitation of Classical statistics, Density of Energy tates(qualitative), Fermi distribution function Electrons in a periodic potential - Bloch theorem, Kronig - Penny Model(qualitative), Brillouin Zones (E-K curve). Concept effective mass of electron, Energy band formation in solids, classification of solids into Metals, Semiconductors and insulators, types of semiconductors(qualitative), Hall effect.

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, Properties of anti-ferro and Ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Superconductors- Type - I and Type - II Superconductors, Applications of Superconductors

UNIT V
LASERS AND NANO MATERIALS
Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, Carbon dioxide (CO_2) laser, He-Ne laser, Applications of lasers in science and technology. Nanomaterials: Introduction, Significance of nanoscience: Surface to volume ratio, Quantum Confinement, Synthesis of Nanomaterials: Ball Milling Method, Sol-Gel Method, Applications of Nanomaterials in medical and defense

TEXT BOOKS

1. Engineering Physics - B K pandey, S. Chturvedi
2. A Text Book of Engineering Physics- Dr.P.G. Kshirsagar, Dr.M.N. Avadhanulu
3. Engineering Physics - P.K.Palaniswamy
4. Engineering Physics, Malik and Singh, Tata Mc Graw Hill

REFERENCE BOOKS

1. Vibrations of waves & Physics, 3rd edition, I. G. Main.
2. Introduction to Solid State Physics - Charles Kittel

ONLINE RESOURCES

1. https://onlinecourses.nptel.ac.in/noc20_ph24/preview
2. https://nptel.ac.in/courses/122/107/122107035/#
3. https://www.coursera.org/learn/nanotechnology

E-BOOKS

1. Physics for Engineers by N. K. Verma
2. Wave Optics by R.K Verma

PROGRAMMING FOR PROBLEM SOLVING
I B.TECH., II SEMESTER

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 Exam:** 70 Marks
Prerequisites: Knowledge of Mathematics, Analytical and Logical skills	

COURSE OVERVIEW
Course 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 OBJECTIVES
- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

COURSE OUTCOMES

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, STRING & POINTERS

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 & FILES

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

REFERENCE 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.l

ONLINE RESOURCES

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

E-BOOKS

1. https://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdfhttps://www.codesdope.com/

ENGINEERING GRAPHICS AND DESIGN
I B.Tech., II SEMESTER

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 + 48Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Basic geometry skills	

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 OBJECTIVES
- Know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
- Understand the importance of engineering curves.
- Learn to use the orthographic projections for points, lines, planes and solids in different positions.
- Make the students draw the projections of the planes.
- Understand the isometric projections.
- Create simple solid models of various domain applications.

COURSE OUTCOMES

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, and 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
CONVERSIONS
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.

REFERENCE 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, Cencell Jonson,Jay D.Helsel,Dennis R.Short.
5. Engineering Drawing, Jolhe/fourth edition.

ONLINE RESOURCES

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

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

TOOL REQUIREMENT

Auto CADD

ENERGY SCIENCE AND ENGINEERING
I B.TECH., II SEMESTER

Course Title: Energy Science and Engineering	**Course Code:** AS20-01ES01
Teaching Scheme (L:T:P): 3:1:0	**Credits:** 3
Type of Course: Lecture + Tutorial	**Total Contact Periods:** 48 Hrs + 16Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Nil	

COURSE OVERVIEW

This course involves various sciences which are related to and important for Energy Engineering. For e.g. Thermodynamics, Fluid Mechanics, Structural Mechanics, Heat Transfer, Mass Transfer, Material Science and Basics of Electrical Engineering such as Electrical Machines and Power Electronics. It also involves application of the concepts learnt in courses related to Energy Science to specific areas such as renewable power generation, energy storage, energy transmission and load scheduling etc. It involves the interplay of concepts from one or more energy sciences as energy systems are itself interdisciplinary in nature.

COURSE OBJECTIVES

- Introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.
- The class will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources such as solar, biomass (conversions), wind power, waves and tidal, geothermal, ocean thermal, hydro and nuclear.
- The knowledge acquired lays a good foundation for design of various civil engineering systems/ projects dealing with these energy generation paradigms in an efficient manner.

COURSE OUTCOMES

CO#	Course Outcomes
C125.1	List and generally explain the main sources of energy and their primary applications nationally and internationally.
C125.2	Understand the energy sources and scientific concepts/principles behind them
C125.3	Understand effect of using these sources on the environment and climate
C125.4	Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
C125.5	List and describe the primary renewable energy resources and technologies.
C125.6	Quantify energy demands and make comparisons among energy uses, resources, and technologies.

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION TO ENERGY SCIENCE
Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment

UNIT II
ENERGY SOURCES
Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries)

UNIT III
ENERGY & ENVIRONMENT
Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy

UNIT IV
CIVIL ENGINEERING PROJECTS CONNECTED WITH THE ENERGY SOURCES
Coal mining technologies, Oil exploration offshore platforms, underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.; Nuclear reactor containment buildings and associated buildings, design and construction constraints and testing procedures for reactor containment buildings; Spent Nuclear fuel storage and disposal systems

UNIT V
ENGINEERING FOR ENERGY CONSERVATION
Concept of Green Building and Green Architecture; Green building concepts (Green building encompasses everything from the choice of building materials to where a building is located, how it is designed and operated); LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy audit of facilities and optimization of energy consumption.

TEXT BOOKS

1. Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
2. Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press

REFERENCE BOOKS

1. Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaiam Jean-Philippe; Zaccour, Georges (Eds.), (2005),
2. Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waaub, XVIII,
3. Ristinen, Robert A. Kraushaar, Jack J. AK.Raushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley
4. UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
5. E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, Addison-Wesley Publishing Company

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/102/105102175/
2. https://nptel.ac.in/courses/109/101/109101171/
3. https://nptel.ac.in/courses/109/106/109106161/

E-BOOKS

1. https://www.freebookcentre.net/chemical-books-download/Energy-Engineering-Lecture-Notes.html1
2. http://www.msubbu.in/ln/energy/
3. https://sites.google.com/view/avyxhfluqt/energy-engineering-lecture-notes

ENGINEERING PHYSICS LAB
I B.TECH., II SEMESTER

Course Title: Engineering Physics Lab	**Course Code:** AS20-00BS05
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 Exam:** 70 Marks
Prerequisites: Basic tools for measurement of physical quantities, 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 OBJECTIVES
- To understand the different types of harmonic oscillators.
- To understand the electromagnetic modes of energy transmission.
- To understand the geometrical and physics properties of light using mercury vapor lamp
- To explores the interference and diffraction of light.
- To classify the P-type and n-type semiconductors.
- To estimate the quality factor of electrical resonance.

COURSE OUTCOMES

CO#	Course Outcomes
C126.1	Evaluate the rigidity modulus and spring constant using torsional pendulum and coupled oscillator
C126.2	Explore the different electromagnetic modes of energy transmission using Melde's and Stewart and Gees experiments
C126.3	Identify the difference between interference, diffraction and dispersion of light
C126.4	Explore the interference of light using newtons rings and diffraction of light using diffraction gratings.
C126.5	Classify the p-type and n-type semiconductors using Hall effect.
C126.6	Estimate the quality factor of the resonance using different LCR values

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS
Any eight of the following experiments:

1. Torsional pendulum -Rigidity modulus of given wire.
2. Coupled Oscillator - Determine the spring constant.
3. Melde's experiment -Transverse and Longitudinal modes.
4. Stewart and Gee's method-Magnetic field along the axis of
5. current carrying coil.
6. Spectrometer-Dispersive power of the material of a prism.
7. Diffraction grating - Determination of wavelengths spectral
8. lines of Mercury spectrum by minimum deviation method.
9. Diffraction grating -Wavelength of laser light.
10. Newton's Rings -Radius of curvature of Plano convex lens.
11. Hall effect- Determination of Hall Voltage and Hall Coefficient.
12. LCR Circuit -Determination of quality factor and resonant
13. Frequency of LCR circuit.

REFERENCE 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., II SEMESTER

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:** 48 Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Mathematics Knowledge, Analytical and Logical skills	

COURSE OVERVIEW

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 OBJECTIVES

- Learn the fundamentals of computers.
- Understand the various steps in program development.
- Learn the syntax and semantics of C programming language.
- Learn the usage of structured programming approach in solving problems.

COURSE OUTCOMES

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 during execution.
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 (SYLLABUS)

Practice Sessions:

Week 1:

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

Lab1: Familiarization with programming environment

Week 2:

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

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

Week 3:

Tutorial 3: Types of Operators

Lab 3: Simple Computational problems using operators

Week 4:

Tutorial 4: Branching and logical expressions:

Lab 4: Problems involving if-then-else structures

Week 5:

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

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

Week 6:
Tutorial 6: 1D Arrays - searching, sorting:
Lab 6: 1D Array manipulation - insertion, selection and bubble sort

Week 7:
Tutorial 7: 2D arrays and Strings
Lab 7: Matrix problems, String operations, string sorting, palindrome string

Week 8:
Tutorial 8: Functions, call by value
Lab 8: Simple functions: factorial ,sum of individual digits, Fibonacci series etc.,

Week 9:
Tutorial 9: Recursion, structure of recursive calls
Lab 9: Recursive functions: factorial, Fibonacci, GCD and towers of Hanoi

Week 10:
Tutorial 10: Pointers, structures and dynamic memory allocation
Lab 10: Problem solving using Pointers and structures

Week 11:
Tutorial 11: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 11: Programming for solving Numerical methods problems

Week 12:
Tutorial 12: Single Linked List using self referential structures
Lab 12: Implementation of Single liked list using self referential structures

Week 13:
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. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

REFERENCE BOOKS

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

ONLINE RESOURCES

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

E-BOOKS

1. https://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdfhttps://www.codesdope.com/

ENGINEERING PRACTICES
I B.TECH., II SEMESTER

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:** 64Hrs
Continuous Internal Evaluation: 30 Marks	**Semester End Exam:** 70 Marks
Prerequisites: Engineering Graphics and Design	

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 OBJECTIVES
- 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
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)

At least two exercises from each trade:

1. TRADES FOR EXERCISES

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

REFERENCE BOOKS

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

ONLINE RESOURCES

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

E-BOOKS

1. https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-_ye4C

SOFT SKILLS - II
I B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Soft Skills – II	**Course Code:** AS20-00HS04
Teaching Scheme (L:T:P): 2:0:0	**Credits:** 0
Type of Course: Lecture	**Total Contact Periods:** 48 Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam: 75** Marks
Prerequisites: Soft skills - I	

COURSE OVERVIEW

The main overview of this course is train the students in certain areas in Soft Skills which are needed at work place and also in their real life too. And 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 OBJECTIVES

- To develop Optimistic Nature.
- To enhance the skills related to Group Discussion.
- To make the students to have commitment.
- To have dedication as well determination.
- 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.

REFERENCE BOOKS
1. Soft Skills and its application in work place by Dr. Vasantha Kumari S
2. Soft Skills Development by Dr. Abdul Mohammad Ali Zinna, Dr. M Syed Ali Padusha, Mr. S Peerbasha
3. Soft Skills (Academic Guide/ Teaching Materials) by Shoo Fly Publishing

ONLINE RESOURCES
1. https://booksoncode.com/articles/top-soft-skills
2. https://www.researchgate.net/publication/301351158_Advanced_Skills_for_Communication_in_English_Book_I
3. https://www.goodreads.com/shelf/show/soft-skills

E-BOOKS
1. https://bookboon.com/en/languages-ebooks

UNIVERSAL HUMAN VALUES - II
II B.TECH., I SEMESTER

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 Exam:** 70 Marks
Prerequisites: Basic knowledge of Need, Basic Guidelines, Content and Process for Value Education Understanding Harmony in the Human Being - Harmony in Myself	

COURSE OVERVIEW

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 OBJECTIVES

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- Development of commitment and courage to act.

COURSE OUTCOMES

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 Experiential Validation- 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 ensure Sanyam 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 forensuring 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 self regulation 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: Ek Parichaya, 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

ONLINE 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

E-BOOKS

1. https://soaneemrana.org/onewebmedia/Professional%20Ethics%20and%20Human%20Values%20by%20R.S%20NAAGARAZAN.pdf

SURVEYING AND GEOMATICS
II B.TECH., I SEMESTER

Course Title: Surveying and Geomatics	**Course Code:** AS20-01PC01
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 Exam:** 70 Marks
Prerequisites: Nil	

COURSE OVERVIEW
Surveying is defined as "taking a general view of, by observation and measurement determining the boundaries, size, position, quantity, condition, value etc. of land, estates, building, farms mines etc. and finally presenting the survey data in a suitable form". This covers the work of the valuation surveyor, the quantity surveyor, the building surveyor, the mining surveyor and so forth, as well as the land surveyor.

COURSE OBJECTIVES
- Know the principle and methods of surveying.
- Measure horizontal and vertical- distances and angles
- Recording of observation accurately
- Perform calculations based on the observation
- Identification of source of errors and rectification methods
- Apply surveying principles to determine areas and volumes and setting out curves
- Use modern surveying equipment's for accurate results

COURSE OUTCOMES
CO#	Course Outcomes
C212.1	Apply the knowledge to calculate angles, distances and levels
C212.2	Identify data collection methods and prepare field notes
C212.3	Understand the working principles of survey instruments, measurement errors and corrective measures
C212.4	Estimate measurements, errors and apply corrections
C212.5	Interpret survey data and compute areas
C212.6	Interpret survey data and compute volumes, levels by different type of modern equipment

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION AND BASIC CONCEPTS
Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying. Measurement of Distances and Directions: Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections. Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination and dip.

UNIT II
LEVELLING, CONTOURING & VOLUMES
Levelling: Types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels, Effect of Curvature of Earth and Refraction.
Contouring: Characteristics and uses of Contours, methods of contour surveying. Areas - Determination of areas consisting of irregular boundary and regular boundary.
Volumes: Determination of volume of earth work in cutting and embankments for level section, volume of borrow pits, capacity of reservoirs.

UNIT III
THEODOLITE SURVEYING
Types of Theodolite, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.
Traversing: Methods of traversing traverse computations and adjustments, Omitted measurements.

UNIT IV
CURVES
Types of curves and their necessity, elements of simple, compound, reverse, transition and vertical curves.
Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry, Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Field Procedure for total station survey, Errors in Total Station Survey, Global Positioning System- Principle and Applications. . LIDAR surveying-concepts and applications.

UNIT V
PHOTOGRAMMETRY SURVEYING
Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.

TEXT BOOKS

1. Chandra A M, "Plane Surveying and Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi.
2. Duggal S K, "Surveying (Vole – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.

REFERENCE BOOKS

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill.
2. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi.
3. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/107/105107122/
2. https://nptel.ac.in/courses/105/104/105104101/
3. https://nptel.ac.in/courses/105/103/105103176/

E-BOOKS

1. https://www.freebookcentre.net/civil-books-download/Surveying-Notes-by-NPTEL.html
2. https://www.freebookcentre.net/civil-books-download/Introduction-to-Surveying.html
3. https://www.freebookcentre.net/civil-books-download/Lecture-Note-On-Advanced-Surveying.html

FLUID MECHANICS
II B.TECH., I SEMESTER

Course Title: Fluid Mechanics	**Course Code:** AS20-01PC02
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 Exam:** 70 Marks
Prerequisites: Engineering Mechanics	

COURSE OVERVIEW
This course will provide the student with a basic understanding of fluid properties, fluid statics and dynamics, and fluid flow. The flow of incompressible fluids in pressure systems constitutes the major portion of this course. Fluid measurement is covered both in the lecture and the laboratory portion of the course.

COURSE OBJECTIVES
- Introduce the concepts of fluid mechanics useful in Civil Engineering applications
- Provide a first level exposure to the students to fluid statics, kinematics and dynamics.
- Learn about the application of mass, energy and momentum conservation laws for fluid flows
- Train and analyze engineering problems involving fluids with a mechanistic perspective is essential for the civil engineering students
- To obtain the velocity and pressure variations in various types of simple flows
- To prepare a student to build a good fundamental background useful in the application intensive courses covering hydraulics, hydraulic machinery and hydrology

COURSE OUTCOMES
CO#	Course Outcomes
C213.1	Understand the broad principles of fluid statics, kinematics and dynamics.
C213.2	Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow.
C213.3	Understand classifications of fluid flow.
C213.4	Be able to apply the continuity, momentum and energy principles.
C213.5	Analyze and design simple pipe systems
C213.6	Compute drag and lift coefficents

COURSE CONTENT (SYLLABUS)

UNIT I

PROPERTIES OF FLUID DISTINCTION BETWEEN A FLUID AND A SOLID

Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility. Fluid Statics Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micro manometers. pressure gauges. Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

UNIT II

FLUID KINEMATICS CLASSIFICATION OF FLUID FLOW

steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two- and three-dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two- and three-dimensional continuity equations in Cartesian coordinates. Fluid Dynamics Surface and Body forces -Euler's and Bernoulli's equation; Energy correction factor; Momentum equation. Vortex flow – Free and Forced. Bernoulli's equation to real fluid flows.

UNIT III

FLOW MEASUREMENT IN PIPES PRACTICAL APPLICATIONS OF BERNOULLI'S EQUATION

Venturimeter, orifice meter and pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend. Flow over Notches & Weirs Flow through rectangular; triangular and trapezoidal notches and weirs; End contractions; Velocity of approach. Broad crested weir.

UNIT IV

FLOW THROUGH PIPES

Reynolds experiment, Reynolds number, Loss of head through pipes, Darcy-Wiesbatch equation, minor losses, total energy line, hydraulic grade line, Pipes in series, equivalent pipes, pipes in parallel, siphon, branching of pipes, three reservoir problem, power transmission through pipes. Analysis of pipe networks: Hardy Cross method, water hammer in pipes and control measures.

UNIT V

LAMINAR & TURBULENT FLOW LAMINAR FLOW

Through circular pipes, annulus and parallel plates. Boundary Layer Concepts: Boundary Layer Analysis-Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and Turbulent boundary layers on a flat plate; Laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control. Definition of Drag and Lift and types drag, magnus effect.

TEXT BOOKS

1. Fluid Mechanics by Modi and Seth, Standard Book House.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015.
3. Fluid Mechanics by R.C. Hibbeler, Pearson India Education Services Pvt. Ltd

REFERENCE BOOKS

1. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
2. Introduction to Fluid Mechanics and Fluid Machines by SK Som, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited
3. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
4. Fluid mechanics & Hydraulic Machines, Domkundwar & Domkundwar Dhanpat Rai &Co
5. Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publication Pvt Ltd.

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/103/105103192/
2. https://nptel.ac.in/courses/112/105/112105171/
3. https://nptel.ac.in/courses/105/101/105101082/

E-BOOKS

1. https://lecturenotes.in/download/note/29373-note-for-fluid-mechanics-fm-by-bikash-mn
2. https://www.researchgate.net/publication/265258030_Lecture_notes_Introductory_fluid_mechanics
3. https://arxiv.org/ftp/arxiv/papers/1407/1407.3162.pdf

BUILDING MATERIALS, CONSTRUCTION AND PLANNING
II B.TECH., I SEMESTER

Course Title: Building Materials, Construction and Planning	**Course Code:** AS20-01ES02
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 Exam:** 70 Marks
Prerequisites: Nil	

COURSE OVERVIEW

A construction materials course introduces students to materials used in different construction projects from building materials to ground and foundation make-up. Specific materials studied include soil, metals, concrete and wood.

COURSE OBJECTIVES

- List the construction material.
- Explain different construction techniques.
- Understand the building bye-laws.
- Highlight the smart building materials.

COURSE OUTCOMES

CO#	Course Outcomes
C214.1	Define the basic terminology that is used in the industry.
C214.2	Categorize different building materials, properties and their uses.
C214.3	Understand the Prevention of damage measures and good workmanship.
C214.4	Explain different building services.
C214.5	Identify about building standard codes related to practical view.
C214.6	Identify the importance of infrastructure for buildings

COURSE CONTENT (SYLLABUS)

UNIT I
STONES AND BRICKS, TILES
Building stones – classifications and quarrying – properties – structural requirements – dressing. Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics. Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics.

UNIT II
CEMENT & ADMIXTURES
Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests. Admixtures – mineral & chemical admixtures – uses.

UNIT III
BUILDING COMPONENTS
Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course; Joinery – doors – windows – materials – types. Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of fire-resistant materials and constructions

UNIT IV
MORTARS, MASONRY AND FINISHING'S MORTARS
Lime and Cement Mortars Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick. Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP. Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT V
BUILDING PLANNING
Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS
1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
3. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCE BOOKS
1. Building Materials by Duggal, New Age International.
2. Building Materials by P. C. Varghese, PHI.
3. Building Construction by PC Varghese PHI
4. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
5. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications

ONLINE RESOURCES

1. https://nptel.ac.in/courses/124/105/124105013/
2. https://nptel.ac.in/courses/105/102/105102088/
3. https://nptel.ac.in/courses/105/106/105106053/

E-BOOKS

1. https://www.smartzworld.com/notes/building-materials-construction-planning-notes-pdf-bmcp/
2. http://www.rgpvonline.com/guide/notes-building-planning-architecture-unit-2.pdf
3. https://www.studynama.com/community/threads/building-planning-architecture-quick-revision-pdf-handwritten-notes-book-for- -engg-second-year.4341/

STRENGTH OF MATERIALS - I
II B.TECH., I SEMESTER

Course Title: Strength of Materials – I	**Course Code:** AS20-01PC03
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 Exam:** 70 Marks
Prerequisites: Engineering Mechanics	

COURSE OVERVIEW
Strength of materials, also called mechanics of materials, deals with the behaviour of solid objects subject to stresses and strains. The complete theory began with the consideration of the behaviour of one and two dimensional members of structures, whose states of stress can be approximated as two dimensional, and was then generalized to three dimensions to develop a more complete theory of the elastic and plastic behaviour of materials.

COURSE OBJECTIVES
- To understand the nature of stresses developed in simple geometries such as bars, cantilevers and beams for various types of simple loads.
- To calculate the elastic deformation occurring in simple members for different types of loading. To show the plane stress transformation with a particular coordinate system for different orientation of the plane.
- To know different failure theories adopted in designing of structural members.

COURSE OUTCOMES
CO#	Course Outcomes
C215.1	Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components.
C215.2	Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components.
C215.3	Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
C215.4	Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress.
C215.5	Examine on different ideas to design a system, component, or process.
C215.6	Determine the principal stress and strains in structural members.

COURSE CONTENT (SYLLABUS)

UNIT I
SIMPLE STRESSES AND STRAINS
Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram - Elasticity and plasticity – Types of stresses and strains- Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Pure shear and Complementary shear - Elastic moduli, Elastic constants and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain energy – Resilience – Gradual, sudden, and impact loadings – simple applications.

UNIT II
SHEAR FORCE AND BENDING MOMENT
Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported including overhanging beams subjected to point loads, uniformly distributed load, uniformly varying load, couple and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT III
FLEXURAL STRESSES
Theory of simple bending – Assumptions – Derivation of bending equation- Section Modulus Determination of flexural/bending stresses of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections. Shear stresses: Derivation of formula for shear stress distribution – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle and channel sections.

UNIT IV
DEFLECTION OF BEAMS
Slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load and couple -Mohr's theorems – Moment area method – Application to simple cases. Conjugate beam method: Introduction – Concept of conjugate beam method - Difference between a real beam and a conjugate beam - Deflections of determinate beams with constant and different moments of inertia.

UNIT V
PRINCIPAL STRESSES
Introduction – Stresses on an oblique plane of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear –Principal stresses – Mohr's circle of stresses – ellipse of stress - Analytical and graphical solutions. Theories of failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

TEXT BOOKS

1. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.
2. Mechanics of Materials by Dr. B.C Punmia, Dr. Ashok Kumar Jain and Dr. Arun Kumar Jain
3. Strength of Materials by R. Subramanian, Oxford University Press

REFERENCE BOOKS

1. Mechanics of material by R.C. Hibbeler, Prentice Hall publications
2. Engineering Mechanics of Solids by Egor P. Popov, Prentice Hall publications
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, Cambridge Publishers
4. Strength of Materials by R.K. Bansal, Lakshmi Publications House Pvt. Ltd.
5. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, 3rd Edition, Universities Press

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/105/105105108/
2. https://nptel.ac.in/courses/112/107/112107147/
3. https://nptel.ac.in/courses/105/106/105106116/

E-BOOKS

1. https://learnmech.com/strength-of-material-som-notes-free-pdf/
2. https://easyengineering.net/ce6402-strength-of-materials-som_14/
3. https://www.academia.edu/40843847/Strength_of_Materials_by_R_S_Khurmi
4. https://www.pdfdrive.com/strength-of-material-by-r-k-bansal-e22366752.html

SURVEYING LAB - I
II B.TECH., I SEMESTER

Course Title: Surveying Lab – I	**Course Code:** AS20-01PC04
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 Exam:** 70 Marks
Prerequisites: Surveying and Geomatics	

COURSE OVERVIEW
Surveying is the science and art of making all essential measurements to determine the relative position of points or physical and cultural details above, on, or beneath the surface of the Earth, and to depict them in a usable form, or to establish the position of points or details.

COURSE OBJECTIVES
- To impart the practical knowledge in the field- measuring distances, directions, angles,
- To determining R.L.'s areas and volumes
- To set out Curves
- To stake out points
- To traverse the area
- To draw Plans and Maps

COURSE OUTCOMES

CO#	Course Outcomes
C216.1	Apply the principle of surveying for civil Engineering Applications.
C216.2	Calculation of areas for requires field.
C216.3	Apply the knowledge of Theodolite in different operations in civil engineering projects
C216.4	Drawing plans and contour maps using different measuring equipment at field level.
C216.5	Formulate the setting out of curve by linear and angular methods.
C216.6	Write a technical laboratory report.

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

1. Surveying of an area by chain, and compass survey (closed traverse) & plotting.
2. Determine of distance between two inaccessible points with compass
3. Radiation method, intersection methods by plane table survey.
4. Levelling – Longitudinal and cross-section and plotting
5. Measurement of Horizontal and vertical angle by theodolite
6. Trigonometric leveling using theodolite
7. Height and distances using principles of tachometric surveying
8. Determination of height, remote elevation, distance between inaccessible points using total station
9. Determination of Area using total station and drawing map
10. Traversing using total station for drawing contour map
11. Stake out using total station
12. Setting out Curve using total station

Additional experiments:

1. Surveying of an area by using GPS.
2. Two Points and Three-point methods by using plain table.

Open-ended experiments:

1. Three Points methods by using plain table.

TEXT BOOKS

1. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004.
2. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.
3. Chandra A M, "Plane Surveying", New Age International Pvt. Ltd., New Delhi, 2002.

REFERENCE BOOKS

1. Surveying by Bhavikatti; Vikas publishing house ltd
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Surveying and leveling by R. Agor Khanna Publishers 2015

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/107/105107158/
2. https://nptel.ac.in/courses/105/107/105107121/
3. https://nptel.ac.in/courses/105/104/105104100/

E-BOOKS

1. https://nptel.ac.in/courses/105/107/105107121/
2. https://www.freebookcentre.net/civil-books-download/Lecture-Note-On-Advanced-Surveying.html

COMPUTER AIDED CIVIL ENGINEERING DRAWING - I
II B.TECH., I SEMESTER

Course Title: Computer Aided Civil Engineering Drawing – I	**Course Code:** AS20-01ES03
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 Exam:** 70 Marks
Prerequisites: Building Materials, Construction and Planning	

COURSE OVERVIEW

The benefits of CAD systems over manual drafting are the capabilities one often takes for granted from computer systems today; automated generation of bills of materials, auto layout in integrated circuits, interference checking, and many others. Eventually, CAD provided the designer with the ability to perform engineering calculations. During this transition, calculations were still performed either by hand or by those individuals who could run computer programs.

COURSE OBJECTIVES

- Use the AUTOCAD commands for drawing 2D & 3D building drawings required for different civil engineering applications.
- Plan and draw Civil Engineering Buildings as per aspect and orientation.
- Presenting drawings as per user requirements and preparation of technical report

COURSE OUTCOMES

CO#	Course Outcomes
C217.1	Explain the usage of AutoCAD commands for drawing 2D & 3D.
C217.2	Build a drawing in 2D applications
C217.3	Outline a drawing in 2D applications
C217.4	Build a drawing in 2D applications
C217.5	Outline a drawing in 2D applications
C217.6	Outline different building drawing for civil engineering applications

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

1. Introduction to computer aided drafting and different coordinate system
2. Drawing of Regular shapes using Editor mode
3. Introduction GUI and drawing of regular shapes using GUI
4. Exercise on Draw tools
5. Exercise on Modify tools
6. Exercise on other tools (Layers, dimensions, texting etc.)
7. Drawing of building components like walls, lintels, Doors, and Windows. using CAD software
8. Drawing a plan of Building and dimensioning
9. Drawing a plan of a residential building using layers
10. Developing a 3-D plan from a given 2-D plan
11. Developing sections and elevations for given a) Single storied buildings b) multi storied buildings
12. Auto CAD applications in surveying, mechanics etc.

Additional experiments:

1. Analysis & design of commercial buildings subjected to all loads.
2. Analysis & design of commercial steel buildings.

Open-ended experiments:

1. Draw a plan for auditorium.

TEXT BOOKS

1. Computer Aided Design Laboratory by M. N. Sesha Prakash & Dr. G. S. Servesh –Laxmi Publications.

REFERENCE BOOKS

1. Engineering Graphics by P. J. Sha – S. Chand & Co

ONLINE RESOURCES

1. https://www.coursera.org/learn/autodesk-autocad-design-drafting
2. https://www.coursera.org/learn/autodesk-civil-3d-infrastructure-design
3. https://nptel.ac.in/courses/112/104/112104031/

E-BOOKS

1. https://www.coursera.org/learn/autodesk-autocad-design-drafting
2. https://www.coursera.org/learn/autodesk-civil-3d-infrastructure-design
3. https://nptel.ac.in/courses/112/104/112104031/

STRENGTH OF MATERIALS LAB
II B.TECH., I SEMESTER

Course Title: Strength of Materials Lab	**Course Code:** AS20-01PC05
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 Exam:** 70 Marks
Prerequisites: Strength of Materials	

COURSE OVERVIEW
Demonstrating the basic principles in the area of strength and mechanics of materials and structural analysis to the undergraduate students through a series of experiments is the objective of the strength of materials lab.

COURSE OBJECTIVES
- Make measurements of different strains, stress and elastic properties of materials used in Civil Engineering.
- Provide physical observations to complement concepts learnt
- Introduce experimental procedures and common measurement instruments, equipment, devices. Exposure to a variety of established material testing procedures and techniques
- Different methods of evaluation and inferences drawn from observations

COURSE OUTCOMES
CO#	Course Outcomes
C218.1	Experiment on tension test with materials like steel etc.,
C218.2	Test on compression tests of spring and wood.
C218.3	Grade the compression tests on concrete.
C218.4	Test on flexural and torsion test to determine elastic constants.
C218.5	Determine hardness of metals.
C218.6	Compute and Analyze engineering values (e.g. stress or strain) from laboratory measurements. Write a technical laboratory report

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

Additional experiments:

1. Deflection test on simply supported beam
2. Compression test on Red brick

Open-ended experiments:

1. Understanding of Failure Planes.

TEXT BOOKS

1. Rajput.R.K. "Strength of Materials", S.Chand and Co, New Delhi, 2015.
2. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, SMTS –I Strength of materials, Laxmi publications. New Delhi, 2015

REFERENCE BOOKS

1. Rattan. S. S, "Strength of Materials", Tata McGraw Hill Education Private Limited, New Delhi, 2012
2. Bansal. R.K. "Strength of Materials", Laxmi Publications Pvt. Ltd., New Delhi, 2010

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/105/105105108/
2. https://nptel.ac.in/courses/112/101/112101095/

E-BOOKS

1. https://notes.specworld.in/strength-of-materials-lab-manual-pdf-sm-lab-manual-pdf/
2. https://notes.specworld.in/strength-of-materials-1-pdf-notes-sm-1-pdf-notes/

ENVIRONMENTAL SCIENCES
II B.TECH., I SEMESTER

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:** 48Hrs
Continuous Internal Evaluation: 0 Marks	**Semester End Exam:** 100 Marks
Prerequisites: Understanding of biology, geography and natural environment.	

COURSE OVERVIEW

Environmental science is the study of patterns and processes in the natural world and their modification by human activity. To understand current environmental problems, we need to consider physical, biological and chemical processes that are often the basis of those problems. This course will give students the skills necessary to address the environmental issues we are facing today by examining scientific principles and the application of those principles to natural systems. This course will survey some of the many environmental science topics at an introductory level, ultimately considering the sustainability of human activities on the planet.

Broad objective of the course:

The Environmental Science course is designed in such a way as to study the concept of sustainability in an integrated way, including environmental, economic, and social aspects, exploring both desirable future conditions and the transitions needed to reach them. The basic tenet of the Environmental Science course is that progress toward a sustainable future depends on the creative application of interdisciplinary thinking, spanning disciplines across the traditional college divisions, while striving for both depth and breadth. We seek to inspire creativity and combine passion with critical thinking skills in students who one day will be the citizens working to convert the world to more sustainable systems.

COURSE OBJECTIVES

- 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

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. Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. 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, New Delhi.

ONLINE RESOURCES

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/

E-BOOKS

1. http://library.lol/main/3E15D31B3FF2EC78AAE9DB3D7ADDE9C3
2. http://library.lol/main/9FD0D396AA12B0E6E97D1B132127AC6D

TOTAL STATION
II B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: Total Station	**Course Code:** AS20-01PW01
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Surveying, Geomatic and Surveying Lab	

COURSE OVERVIEW

A Total Station is an electronic/optical instrument used for angle measurement, distance measurements, and coordinate measurements. Total Stations can be remotely controlled and are mounted on Surveying Tripods. A Total Station uses a Surveying Prisms as a measurement target, and the ability to remotely control or automatically track these targets eliminates the need for an assistant staff.

COURSE OBJECTIVES

- To impart the practical knowledge in the field- measuring distances, directions, angles.
- To determining R.L.'s areas and volumes
- To set out Curves and stakeout points
- To traverse the area and draw Plans and Maps

COURSE OUTCOMES

CO#	Course Outcomes
C2110.1	Develop skills in using Total Station & advanced surveying instruments and analyze data.
C2110.2	Develop skills to set out Curves in the field using both Total Station
C2110.3	Apply the principle of surveying for civil Engineering Applications
C2110.4	Integrate the field data in software and prepare a technical survey report
C2110.5	Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level
C2110.6	Interpret the field data in software and prepare a technical survey report

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Basics of surveying -History of surveying and Fundamentals of surveying – Knowledge on coordinates-Area calculation-Graf method coordinate extraction. Introduction about the Total Station instrument-Operations-Applications-Advantages-Disadvantages.

UNIT II
SETTING UP OF THE INSTRUMENT AND FIELD WORK SURVEYING
Fixing the station point-Setting the instrument-Checking the plate level-Instrument level-Tilt-Northing-Observation.
Project 1: Surveying the site without any instruments.
Project 2: Surveying the site with the TOTAL STATION instrument

UNIT III
BACK SIGHT, BOUNDARY SURVEY
Layout survey-Road survey-Topographical survey
Project 3: Road survey-Topographical survey
Project 4: Real time project-Surveying the college.

UNIT IV
LEVELS
Bench mark setting, Spot Levels, Level Transfer, Contour survey real time marking / setting out / stake out- Layout marking-Pile marking-Column Marking

UNIT V
DRAWING
Downloading all surveyed data to the computer and implementing the same in AUTOCADD.
Project 5: To draw the boundary map of the site surveyed and find out its area.
Project 6: To draw the map of the block surveyed using the surveyed data.

TEXT BOOKS
1. Chandra A M, "Higher Surveying", New age International Pvt.Ltd., Publishers, New Delhi.
2. Duggal S K, "Surveying (Vol .2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.

REFERENCE BOOKS
1. Arora K R "Surveying Vol. 2 & 3), Standard Book House, Delhi.
2. Surveying (Vol – 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain –Laxmi Publications (P) ltd., New Delhi.

ONLINE RESOURCES
1. https://nptel.ac.in/courses/105/107/105107121/
2. https://nptel.ac.in/courses/105/104/105104100/

E-BOOKS
1. https://tmackinnon.com/2005/PDF/Total-Station-basics--Introduction-to-Using-the-Leica-Total-Station.pdf
2. https://sjce.ac.in/wp-content/uploads/2018/01/01_Total-Station_GPS-1.pdf

BUILDING DRAWING
II B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: Building Drawing	**Course Code:** AS20-01PW02
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Building materials, Construction and Planning	

COURSE OVERVIEW

The main purpose of construction drawings is to provide a graphic representation of what is to be built. Construction drawings should be concise and coordinated to avoid, wherever possible, ambiguity and confusion. Delays and misunderstandings can be minimized by properly coordinating the drawings.

COURSE OBJECTIVES

- Teach the basic signs conventions and symbols in building drawing.
- Get trained in drawing residential and various public buildings manually by procuring a sound knowledge in building byelaws and regulations.

COURSE OUTCOMES

CO#	Course Outcomes
C2110.1	Understand the basic principles of building design and planning.
C2110.2	Interpret a knowledge of building byelaws and regulations recommended for building design
C2110.3	Apply the basic concepts of building in drawing as a way of discovering and developing ideas for designing residential and public buildings.
C2110.4	Develops basic drawing skills create architectural and working drawing
C2110.5	Predict the need for, and ability to engage in life-long learning.
C2110.6	Generate drawings as per the requirements and preparation of technical report

COURSE CONTENT (SYLLABUS)

UNIT I
SIGN CONVENTIONS & SYMBOLS
Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, and white lead etc., Earth, Rock, Timber and Marble.Use of various types of lines in the building drawing; selecting the relevant scale in given situation.

UNIT II
BUILDING BYELAWS AND REGULATIONS
Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT III
RESIDENTIAL BUILDINGS
Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.
a) Drawing of Single storey Residential building (2BHK) with staircase
b) Data drawing- Developed plan, elevation, section and site plan

UNIT IV
PUBLIC BUILDINGS
Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.
a) Drawing of any one public building with given specifications
b) Data drawing- Developed plan, elevation, section and site plan

UNIT V
Given line diagram with specification to draw, plan, section and elevation for Residential and Public building

TEXT BOOKS
1. Construction Planning, Equipment and methods by R.L. Peurifoyetal. – Tata Mc. Graw Hill Publications.
2. Building by laws by state and Central Governments and Municipal corporations

REFERENCE BOOKS
1. Building drawing- M.G.Shah, C.M.kale&S.Y.Patki- McGraw-Hill Publications New Delhi
2. Building Planning & Drawing-Dr.N.KumaraSwamy& A. Kameswara Rao-Charotar Publications

ONLINE RESOURCES
1. https://nptel.ac.in/courses/105/102/105102088/
2. https://nptel.ac.in/courses/105/102/105102176/
3. https://nptel.ac.in/courses/105/102/105102195/

E-BOOKS
1. https://www.pdfdrive.com/building-planning-and-drawing-books.html
2. https://www.pinterest.com/pin/709668853769092852/

VAASTU IN CONSTRUCTION
II B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: Vaastu in Construction	**Course Code:** AS20-01PW03
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Building materials, Construction and Planning	

COURSE OVERVIEW
Vaastu in construction (vaāstu śāstra - literally "science of architecture") is a traditional Indian system of architecture originating in India. Texts from the Indian subcontinent describe principles of design, layout, measurements, ground preparation, space arrangement, and spatial geometry.

COURSE OBJECTIVES
- To equip the students with the knowledge of Vaastu and enable them to apply the knowledge of vaastu in new construction as well as analyze the remedies for existing building or remodeling the design projects as per scientific Vaastu.

COURSE OUTCOMES

CO#	Course Outcomes
C2110.1	Design and assess building with norms of vaastu-shastra.
C2110.2	Describe the importance and necessity of Vaastu building.
C2110.3	Understand the importance of ventilation, light levels, energy levels and air quality of their homes.
C2110.4	Understand the importance of relaxation, comfort and efficiency levels in a building.
C2110.5	Understand buildings vaastu friendly by their own.
C2110.6	Understand the importance of vaastu for their better life.

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Vaastu, Origin of Vaastu, Development of Vaastu System, Components of Vaastu Shastra, Direction analysis of Land and Selection of Land. Basic knowledge of do's and don'ts in Vaastu.

UNIT II
HOME VAASTU EXTERNAL PLANNING
Open Space, Floor level, Roof inclinations, Height factors, Veranda, Balcony, Porch, Basements, Well & Borings, Boundary, Parking, Security Guard Room, Overhead Tank, Underground Storage Tank, Septic Tanks, Sewerage & Water flow, Mezzanine floor.

UNIT III
HOME VAASTU INTERNAL PLANNING
Doors & Entrance, Staircase, Puja Room, Kitchen, Drawing room, Dining Room, Bedroom, Bathroom, Study Room, Store room, Servants room, and Guest room.

UNIT IV
COMMERCIAL VAASTU
External and Internal Planning, Offices, Shops, Restaurants, Showrooms, Schools, Hospitals and Other Commercial Establishments.
Remedial Vaastu**:** Identifying the Vaastu Defects, Rectification of Vaastu Defects in Existing Building (without reconstruction), Color therapy, Discussion on different building Plans.

UNIT V
APPLICATIONS
Vaastu Analysis and Vaastu Comparison, Examples and case studies, live discussion of Vaastu on different plans bring by students in the class, Site Visits, drawing plans according to Vaastu.

TEXT BOOKS
1. Vaastu Shastra in Modern Context by Dr. Anand Bhardwaj- Ph.D. (Vaastu), D.Sc. (Vaastu) - Abhinav Publications.

REFERENCE BOOKS
1. Vaastu Shastra [English] by Ashish Mehta.
2. Practical Vaastu Guidelines by Dr. Anand Bhardwaj- Ph.D. (Vaastu), D.Sc. (Vaastu) - Perfect Printing.

ONLINE RESOURCES
1. http://www.vastu-design.com/vastu-video-workshop/
2. http://www.vaastuinternational.com/vaastushastra.html
3. https://www.academia.edu/27240095/VASTU_IN_CONSTRUCTION_IN_CIVIL_ENGINEERING_POINT_OF_VIEW

E-BOOKS
1. http://library.lol/main/BF0173EDFC0DF1B184484E6FF2BD8F81
2. http://library.lol/main/81398CC7B1546BE5B0F730DFBA3F2D65

PYTHON PROGRAMMING
II B.TECH, I SEMESTER
VALUE ADDED COURSE

Course Title: Python Programming	**Course Code:** AS20-05PW09
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Knowledge on basic programming	

COURSE OVERVIEW

Python is more preferred for its features of portability, productivity and extensive support libraries and seamless integration with components coded in any other programming language. As an information technology undergraduate student, knowledge of Python is highly required for scientific computing and efficient software development

COURSE OBJECTIVES

- Defining the structure and components of a Python program.
- Understanding the use of lists, tuples, and dictionaries in Python programs.
- Identifying and using Python object types.
- Understanding the use of event handling in Python.
- Understanding the use of database connectivity with SQL
- Design object-oriented programs with Python classes.

COURSE OUTCOMES

CO#	Course Outcomes
C2110.1	Defining the structure and components of a Python program.
C2110.2	Understanding the use of lists, tuples, and dictionaries in Python programs.
C2110.3	Identifying and using Python object types
C2110.4	Understanding the use of event handling in Python.
C2110.5	Understanding the use of database connectivity with SQL
C2110.6	Design object-oriented programs with Python classes.

COURSE CONTENT (SYLLABUS)

UNIT I

Introduction to Python, Python Interpreter and its working, Syntax and Semantics, Knowledge, Machines, Languages, Types, Variables Operators and Branching -– Core elements of programs: Bindings, Strings, Input/Output, IDEs, Control Flow, Iteration, Guess and Check

UNIT II

Tuples and Lists: Tuples, Lists, List Operations, Mutation, Aliasing, Cloning – Dictionaries: Functions as Objects, Dictionaries , Example with a Dictionary, Fibonacci and Dictionaries, Global Variables, Functions: Decomposition and Abstraction, Functions and Scope, Keyword Arguments, Specifications, Iteration vs Recursion, Inductive Reasoning, Towers of Hanoi, Fibonacci

UNIT III

Iterations and Comprehensions, Strings and Regular Expressions, Classes and Inheritance: Object Oriented Programming, Class Instances, Methods Classes Examples , Why OOP, Hierarchies, Your Own Types – An Extended Example: Building a Class, Visualizing the Hierarchy, Adding another Class, Using Inherited Methods

UNIT IV

Introduction to tkinter, Top Level Windows, Dialogs, Message and Entry, Event Handling, Menus, Listboxes and Scrollbars, Text

UNIT V

SQL Database interfaces with sqlite3: Basic operations and table load scripts

TEXT BOOKS

1. Mark Lutz ,"LearningPython",OReily, 4th Edition, 2009, ISBN: 978-0-596-15806-4
2. Mark Lutz ,"Programming Python ", O Reily, 4th Edition, 2010, ISBN 9780596158118

REFERENCE BOOKS

1. Tim Hall and J-P Stacey ,"Python 3 for Absolute Beginners" , 2009, SBN:9781430216322

ONLINE RESOURCES

1. https://onlinecourses.nptel.ac.in/noc21_cs67/preview
2. https://stackify.com/learn-python-tutorials/
3. https://nptel.ac.in/courses/106/106/106106145/

E-BOOKS

1. https://cfm.ehu.es/ricardo/docs/python/Learning_Python.pdf
2. http://library.lol/main/8B7F9439FF75AEAC89B8748BDBC1E1D3
3. http://library.lol/main/8288FDBD7E6D373ACCBC9D274FF42B29
4. http://library.lol/main/736D9CC8ADFD335DED6C9EBC003E15D2

GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)
II B.TECH, I SEMESTER
VALUE ADDED COURSE

Course Title: Graphic Design (PHOTOSHOP, CORAL DRAW, 3D MAX)	**Course Code:** AS20-12PW02
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Basic Computer Knowledge	

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

COURSE OBJECTIVES
- 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 OUTCOMES

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 (SYLLABUS)

UNIT I 2D PRIMITIVES

Elements of pictures created in computer graphics – Graphics input primitives and devices. Drawing primitives in open GL and Basic open GL programming - open GL basic Graphics primitives – Output primitives – 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 using Quaternions
Viewing – Visible surface identification – Color Models, 3DTransformations in open GL

UNIT IV MULTIMEDIA BASICS

Introduction and definitions – applications – elements – Animations – Compression – Types of Compressions: 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 Software Applications – Video On demand – Virtual Reality – Augmented Reality – Content based retrieval in digital libraries.

TEXT BOOKS

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

REFERENCE BOOKS

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

ONLINE RESOURCES

1. https://nptel.ac.in/courses/112/102/112102101/
2. https://nptel.ac.in/courses/107/101/107101001/

BASIC MECHANICAL ENGINEERING FOR CIVIL ENGINEERS
II B.TECH., II SEMESTER

Course Title: Basic Mechanical Engineering for Civil Engineers	**Course Code:** AS20-03ES11
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: None	

COURSE OVERVIEW

Basic Mechanical Engineering for Civil Engineers is the applications of power transmission elements, material handling equipment. To understand the mechanical equipment for the usage at civil engineering systems, to familiarize with the general principles and requirement for refrigeration, manufacturing, to realize the techniques employed to construct civil engineering systems.

COURSE OBJECTIVES

To familiarize civil engineering students with the

- Basic machine elements,
- Sources of Energy and Power Generation,
- Various manufacturing processes,
- Power transmission elements, material handling equipment

COURSE OUTCOMES

CO#	Course Outcomes
C221.1	Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
C221.2	Determine resultant of forces acting on a body subjected to a spatial of forces.
C221.3	Solve problem of bodies subjected to friction.
C221.4	Find the location of centroid and calculate moment of inertia of a given section.
C221.5	Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
C221.6	Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

COURSE CONTENT (SYLLABUS)

UNIT I: MACHINE ELEMENTS

Cams, Types of cams and followers, Introduction to engineering materials- Metals, ceramics, composites- Heat treatment of metals.

Riveted joints- methods of failure of riveted joints-strength equations-efficiency of riveted joints- eccentrically loaded riveted joints.

UNIT II: POWER TRANSMISSION ELEMENTS

Gears terminology of spur, helical and bevel gears, gear trains. Belt drives (types). Chain drives.

Material handling equipment: Introduction to Belt conveyors, cranes, industrial trucks, bull dozers

UNIT III: ENERGY

Power Generation: External and internal combustion engines (layouts, element/component description, advantages, disadvantages, applications).

Refrigeration: Mechanical Refrigeration and types – units of refrigeration – Air Refrigeration system, details and principle of operation –calculation of COP

Modes and mechanisms of heat transfer – Basic laws of heat transfer –General discussion about applications of heat transfer.

UNIT IV: MANUFACTURING PROCESSES

Sheet Metal Work: Introduction – Equipment's – Tools and accessories –Various processes (applications, advantages / disadvantages).

Welding: Types – Equipment's – Techniques employed – welding positions- defects-applications, advantages / disadvantages – Gas cutting – Brazing and soldering.

Casting: Types, equipment's, applications

UNIT V: MACHINE TOOLS

Introduction to lathe, drilling machine, milling machine, grinding machine-Operations performed

TEXT BOOKS

1. Kumar, T., Leenus Jesu Martin and Murali, G., Basic Mechanical Engineering, Suma Publications, Chennai, 2007.

REFERENCE BOOKS

1. Prabhu, T. J., Jai Ganesh, V. and Jebaraj, S., Basic Mechanical Engineering, SciTech Publications, Chennai, 2000.
2. Hajra Choudhary, S.K. and Hajra Choudhary, A. K., Elements of Workshop Technology Vols. I & II, Indian Book Distributing Company Calcutta, 2007.
3. Nag, P.K., Power Plant Engineering, Tata McGraw-Hill, New Delhi, 2008.
4. Rattan, S.S., Theory of Machines, Tata McGraw-Hill, New Delhi, 2010.

ONLINE RESOURCES

1. https://nptel.ac.in/courses/112/104/112104118/
2. https://www.classcentral.com/course/swayam-fluid-machines-6562
3. https://nptel.ac.in/courses/112105171/10
4. https://nptel.ac.in/courses/112105171/46

E-BOOKS

1. http://engineering.myindialist.com/2013/introduction-of-cams-and-types-of-cam-and-followers/#.XfSYE9UzbIU
2. https://www.slideshare.net/smuralichinna/unit-2b-power-transmission-by-belts
3. https://www.theengineerspost.com/types-of-belt-drives/
4. https://www.smlease.com/entries/thermal-design/modes-of-heat-transfer-conduction-convection-radiation/
5. http://mech-engineeringbd.blogspot.com/2016/07/refrigerator.html
6. https://welderportal.com/types-of-welding-positions/

PROBABILITY & RANDOM PROCESSES
II B.TECH., II SEMESTER

Course Title: Probability & Random Processes	**Course Code:** AS20-00BS10
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. Students should have knowledge of Basic concepts of probability 2. Students should have knowledge of Addition, Multiplication and Baye's theorems	

COURSE OVERVIEW

- Basic concepts of probability and Random Variables
- Discrete probability distributions like Binomial, Poisson and their properties etc.
- Continuous Probability distributions like Normal, Gamma, and Exponential distributions.
- Concept of fitting of straight line, parabola and other curves
- The testing of hypothesis and large sample procedures

COURSE OBJECTIVES

- The ideas of probability and random variables
- The various discrete probability distributions and their properties.
- The various continuous probability distributions and their properties.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- The statistical methods of studying data samples and identify the Samples to make decisions for samples given.

COURSE OUTCOMES

CO#	Course Outcomes
C222.1	Formulate and solve problems involving random variables
C222.2	Apply statistical methods for analysing experimental data by probability distributions
C222.3	Identify Various discrete and continuous probability distributions and their properties
C222.4	Evaluation of regression and correlation
C222.5	Analyze the statistical methods of studying data samples
C222.6	Analyze to make important decisions for few samples which are taken from a larger data.

COURSE CONTENT (SYLLABUS)

UNIT I: RANDOM VARIABLES

Introduction to Basic Probability; Random variables: Discrete Random Variable; Continuous Random variables; Expectation of Random Variables: Variance of Random variables; Moments.

UNIT II: DISCRETE PROBABILITY DISTRIBUTIONS

Binomial Distributions, Poisson Distributions, Evaluation of statistical parameters for these distributions; Poisson approximation to the binomial distribution.

UNIT III: CONTINUOUS RANDOM VARIABLE & DISTRIBUTIONS

Continuous random variables and their properties; Distribution functions and densities; Normal Distributions; Exponential Distributions; Gamma Distributions; Evaluation of statistical parameters for these distributions.

UNIT IV: APPLIED STATISTICS

Curve fitting by the method of least squares: fitting of straight line; Second degree parabola and more general curves; Correlation and regression: Rank correlation.

UNIT V: TESTING OF HYPOTHESIS

Test of significance**:** Null Hypothesis; Alternative Hypothesis-Type I Error –Type II Error; Large sample test for single proportion; Difference of proportions; Single mean: Difference of means;

Test for single mean; Difference of means for small samples; Test for ratio of variances for small samples.

TEXT BOOKS

1. S C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Khanna Publications
2. S.R.K. Iyengar, R.K Jain Advanced engineering Mathematics ,Narosa publishing house, Fifth Edition,2016.

REFERENCE BOOKS

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. Sheldon Ross, A First Course in Probability, 9 th Edition, Pearson Education India.

ONLINE RESOURCES

1. https://www.my-mooc.com/en/categorie/statistics-and-probability
2. https://www.khanacademy.org/math/statistics-probability

E-BOOKS

1. FUNDAMENTALS OF MATHEMATICAL STATISTICS BY S.C.GUPTHA, V.K KAPOOR
2. PROBABILITY AND STATISTICS FOR ENGINEERS BY MILLER & FREUND'S

ENGINEERING GEOLOGY
II B.TECH., II SEMESTER

Course Title: Engineering Geology	**Course Code:** AS20-01PC06
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 Exam:** 70 Marks
Prerequisites: Nil	

COURSE OVERVIEW
Geology is the study of the earth, its origin, structure, composition, and history. Engineering geology is a very important topic for structural engineers to understand as it helps them properly plan a project when considering the design, location, and other important geological factors.

COURSE OBJECTIVES
- To give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology
- To focus on the core activities of engineering geologists – site characterization and geologic hazard identification and mitigation. Planning and construction of major Civil Engineering projects

COURSE OUTCOMES
CO#	Course Outcomes
C223.1	Collect, analyze, and report geologic data using standards in engineering practice
C223.2	Describe engineering properties of Earth materials and fluids.
C223.3	Identify Rock mass characterization and the mechanics of planar rock slides and topples.
C223.4	Define the weathering process and mass movement.
C223.5	Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels.
C223.6	Identification of suitable tunnels for rock and underground.

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology. Weathering of Rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT II
MINERALOGY & PETROLOGY
Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldsper, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chrorite , Galena , Pyrolusite, Graphite, Magnesite, and Bauxite. Petrology**:** Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laerite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT III
STRUCTURAL GEOLOGY
Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT IV
EARTH QUAKES
Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of Geophysical Studies: Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT V
GEOLOGY OF DAMS, RESERVOIRS, AND TUNNELS
Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling

on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCE BOOKS

1. F.G. Bell, Fundamental of Engineering B.S. Publications, 2005.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution
3. Engineering Geology by Subinoy Gangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers – P.C. Varghese PHI

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/105/105105106/
2. https://nptel.ac.in/courses/105/104/105104191/
3. https://nptel.ac.in/courses/105/104/105104147/

E-BOOKS

1. https://easyengineering.net/ce6301-engineering-geology-eg-question-html/
2. https://explorecivilsights.blogspot.com/2019/01/engineering-geology-handwritten-notes.html
3. https://notes.specworld.in/engineering-geology-pdf-notes-eg-pdf-notes/

STRENGTH OF MATERIALS - II
II B.TECH., II SEMESTER

Course Title: Strength of Materials - II	**Course Code:** AS20-01PC07
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 Exam:** 70 Marks
Prerequisites: Strength of Materials - I	

COURSE OVERVIEW

This subject gives brief knowledge about the nature of stresses developed in simple geometries shafts, springs, columns & cylindrical and spherical shells for various types of simple loads. To calculate the stability and elastic deformation occurring in various simple geometries for different types of loading and To understand the unsymmetrical bending and shear center importance for equilibrium conditions in a structural member of having different axis of symmetry.

COURSE OBJECTIVES

- To understand the nature of stresses developed in simple geometries shafts, springs, columns & cylindrical and spherical shells for various types of simple loads
- To calculate the stability and elastic deformation occurring in various simple geometries for different types of loading.
- To understand the unsymmetrical bending and shear center importance for equilibrium conditions in a structural member of having different axis of symmetry.

COURSE OUTCOMES

CO#	Course Outcomes
C224.1	Describe the concepts and principles, understand the theory of elasticity, and perform calculations.
C224.2	To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
C224.3	Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses.
C224.4	Understand and evaluate the shear center and unsymmetrical bending.
C224.5	Predict an idea to design a system, component, or process.
C224.6	Describe the strength of structures and mechanical components in particular to torsion and direct compression,

COURSE CONTENT (SYLLABUS)

UNIT I
TORSION OF CIRCULAR SHAFTS
Theory of pure torsion – Derivation of Torsion equation - Assumptions made in the theory of pure torsion – Polar section modulus – Power transmitted by shafts – Combined bending and torsion – Design of shafts according to theories of failure. Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel.

UNIT II
COLUMNS AND STRUTS
Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory– Long columns subjected to eccentric loading – Secant formula – Empirical formulae –– Rankine – Gordon formula Straight line formula – Prof. Perry's formula. BEAM Columns**:** Laterally loaded struts – subjected to uniformly distributed and concentrated loads.

UNIT III
DIRECT AND BENDING STRESSES
Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of retaining walls, chimneys and dams – conditions for stability-Overturning and sliding – stresses due to direct loading and bending moment about both axis.

UNIT IV
THIN CYLINDERS
Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells. Thick Cylinders: Introduction - Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage.

UNIT V
UNSYMMETRICAL BENDING
Introduction – Centroidal principal axes of section –Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis. Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

TEXT BOOKS
1. Strength of Materials by R.K Rajput, S. Chand & Company Ltd.
2. Mechanics of Materials by Dr. B. C Punmia, Dr. Ashok Kumar Jain and Dr. Arun Kumar Jain
3. Strength of Materials by R. Subramanian, Oxford University Press.

REFERENCE BOOKS

1. Mechanics of Materials by R.C. Hibbeler, Pearson Education
2. Engineering Mechanics of Solids by Popov E.P. Prentice-Hall Ltd
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, Cambridge Publishers
4. Strength of Materials by R. K. Bansal, Lakshmi Publications House Pvt. Ltd.
5. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd

ONLINE RESOURCES

1. https://nptel.ac.in/courses/112/101/112101095/
2. https://nptel.ac.in/courses/105/105/105105108/
3. https://nptel.ac.in/courses/105/104/105104160/

E-BOOKS

1. https://notes.specworld.in/strength-of-materials-ii-notes-by-mr-ravi-theja-ap-civil/
2. https://easyengineering.net/ce8402-strength-of-materials-ii/
3. https://www.academia.edu/40843847/Strength_of_Materials_by_R_S_Khurmi

HYDRAULICS AND HYDRAULIC MACHINERY
II B.TECH., II SEMESTER

Course Title: Hydraulics and Hydraulic Machinery	**Course Code:** AS20-01PC08
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 Exam:** 70 Marks
Prerequisites: Fluid Mechanics	

COURSE OVERVIEW

A hydraulic press works on the principle of Pascal's law, which states that when pressure is applied to a confined fluid, the pressure change occurs throughout the entire fluid. Within the hydraulic press, there is a piston that works as a pump that provides a modest mechanical force to a small area of the sample.

COURSE OBJECTIVES

- To define the fundamental principles of water conveyance in open channels.
- To discuss and analyze the open channels in uniform and Non-uniform flow conditions.
- To study the characteristics of hydroelectric power plant and its components.
- To analyze and design of hydraulic machinery and it's modelling.

COURSE OUTCOMES

CO#	Course Outcomes
C225.1	Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
C225.2	Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
C225.3	Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
C225.4	Get the knowledge on different hydraulic machinery devices and its principles.
C225.5	Develop of hydropower systems and other practical usages.
C225.6	Differentiate centrifugal and reciprocating pumps.

COURSE CONTENT (SYLLABUS)

UNIT I
OPEN CHANNEL FLOW – I
Introduction to Open channel flow-Comparison between open channel flow and pipe flow, Classification of open channels, Classification of open channel flows, Velocity distribution. Uniform flow – Characteristics of uniform flow, Chezy's, Manning's and Bazin formulae for uniform flow – Factors affecting Manning's Roughness Coefficient "n". Most economical sections. Computation of Uniform flow, Normal depth. Critical Flow: Specific energy – critical depth - computation of critical depth – critical, sub critical and super critical flows-Channel transitions.

UNIT II
OPEN CHANNEL FLOW – II
Non-uniform flow – Gradually Varied Flow - Dynamic equation for G.V.F; Classification of channel bottom slopes – Classification and characteristics of Surface profiles – Computation of water surface profiles by Numerical and Analytical approaches. Direct step method. Rapidly varied flow: Elements and characteristics (Length and Height) of Hydraulic jump in rectangular channel– Types, applications and location of hydraulic jump, Energy dissipation and other uses – Positive and Negative Surges (Theory only).

UNIT III
DIMENSIONAL ANALYSIS AND HYDRAULIC SIMILITUDE
Dimensional homogeneity – Rayleigh's method and Buckingham's pi methods – Dimensionless groups. Similitude, Model studies, Types of models. Application of dimensional analysis and model studies to fluid flow problems. Distorted models. Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency – Angular

UNIT IV
HYDRAULIC TURBINES – I & II
Hydraulic Turbines – I: Elements of a typical Hydropower installation – Heads and efficiencies – Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine – working, working proportions, velocity diagram, work done and efficiency, hydraulic design. Draft tube – Classification, functions and efficiency. Hydraulic Turbines – II :Governing of turbines – Surge tanks – Unit and specific turbines – Unit speed – Unit quantity – Unit power – Specific speed – Performance characteristics – Geometric similarity – Cavitation. Selection of turbines.

UNIT V
CENTRIFUGAL PUMPS
Pump installation details – classification – work done – Manometric head – minimum starting speed – losses and efficiencies – specific speed. Multistage pumps – pumps in parallel – performance of pumps – characteristic curves – NPSH – Cavitation. Hydropower Engineering**:** Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS

1. Fluid Mechanics by Modi and Seth, Standard Book House.
2. Fluid Mechanics by R.K.Bansal, Laxmi Publications Pvt Ltd.
3. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015
4. Fluid mechanics & Hydraulic Machines, Domkundwar & Domkundwar Dhanpat Rai &Co

REFERENCE BOOKS

1. Fluid Mechanics by R. C. Hibbeler, Pearson India Education Services Pvt. Ltd
2. Fluid Mechanic & Fluid Power Engineering by D. S. Kumar (Kataria & Sons Publications Pvt. Ltd.).
3. Open channel flow by V.T. Chow (McGraw Hill Book Company).
4. Introduction to Fluid Mechanics and Fluid Machines by SK Som, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited.
5. Hydraulic Machines by Banga & Sharma (Khanna Publishers).

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/106/105106114/
2. https://nptel.ac.in/courses/105/103/105103096/

E-BOOKS

1. https://notes.specworld.in/hydraulics-hydraulic-machines-notes-pdf-hhm-notes-pdf/
2. https://notes.specworld.in/fluid-mechanics-hydraulic-machinery-notes-pdf-fmhm-notes-pdf/
3. https://books.google.co.in/books/about/A_Text_Book_of_Hydraulics_Fluid_Mechanic.html?id=mLy_nAEACAAJ&redir_esc=y

SURVEYING LAB - II
II B.TECH., II SEMESTER

Course Title: Surveying Lab - II	**Course Code:** AS20-01PC09
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 Exam:** 70 Marks
Prerequisites: Surveying and Geomatics and Surveying Lab - I	

COURSE OVERVIEW
Determination of an area using advanced surveying instruments. Development of Contour maps for different terrains. Determination of setting out works and survey by GPS and Minor Instruments.

COURSE OBJECTIVES
- Experiments related to finding height and distances by tachometric, single plane and double plane method.
- Setting out simple curve for construction of road purposes.
- Setting out of works for foundation marking, use of stereoscope for 3-D viewing, Co-ordinate measurements by GPS and Traversing by Total station.

COURSE OUTCOMES
CO#	Course Outcomes
C226.1	Understand the preparation of contour maps.
C226.2	Understand the preparation of Tacheometry system.
C226.3	Measure different setting out works.
C226.4	Develop the positions of stations by using GPS.
C226.5	Understand about the LIDAR surveying.
C226.6	Measure by Minor Instruments

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

Contour Surveying
Preparation of contour maps for different terrains (Total station)
Tacheometry
Tangential system (using theodolite, leveling staff)
Stadia system (using theodolite, leveling staff)
Sub tense system (using theodolite, tape, cross staff, leveling staff)
Setting out Works
Setting out works for buildings (using theodolite, tape, ranging rods)
Setting out works for pipe lines (using theodolite, tape, ranging rods)
Simple curve - right / left handed (using theodolite, tape, ranging rods)
Transition curve (using theodolite, tape, ranging rods)
Compound curve (using theodolite, tape, ranging rods)
Survey by Minor Instruments
Linear, angular and slope measurements (Abney Level, Clinometers)
Survey by GPS
Finding position of stations using G.P.S
LIDAR Surveying
LIDAR Data Download and Display.
Land-use (socio-economic activity/activities) and Land-cover (grass, asphalt, trees, bare groundwater, etc.) Classification by using LIDAR.

Additional experiments:
1. Curve design for a road.
2. Fly levelling (Differential Levelling)

Open-ended experiments:
1. Column marking for a building.

TEXT BOOKS
1. Clark D, " Plane and Geodetic Surveying", Vols. I and II, C.B.S. Publishers and Distributors, Delhi, Sixth Edition, 1971.

REFERENCE BOOKS
1. James M. Anderson and Edward M. Mikhail, "Introduction to Surveying ", McGraw Hill Book Company, New Delhi, 1985.
2. Wolf P.R. "Elements of Photogrammetry", McGraw Hill Book Company, New Delhi, 1988.

ONLINE RESOURCES
1. https://nptel.ac.in/courses/105/103/105103176/
2. https://nptel.ac.in/courses/105/107/105107157/
3. https://nptel.ac.in/courses/105/104/105104100/

E-BOOKS
1. https://notes.specworld.in/surveying-lab-manual-pdf-surveying-1-lab-manual-pdf/
2. http://www.uoh.edu.sa/Subgates/Faculties/CM/Departments/Civil/PublishingImages/Pages/Survey-lab/SURVEYING%20MANUAL_MAHAMID.pdf

ENGINEEIRNG GEOLOGY LAB
II B.TECH., II SEMESTER

Course Title: Engineering Geology Lab	**Course Code:** AS20-01PC10
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 Exam:** 70 Marks
Prerequisites: Engineering Geology	

COURSE OVERVIEW
Engineering geology Lab deals with variety of minerals and rock specimen for students to study different types of rocks and minerals. Features: Rock Specimen, Mineral Specimen.

COURSE OBJECTIVES
- To provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

COURSE OUTCOMES

CO#	Course Outcomes
C227.1	Understands the method and ways of investigations required for Civil Engg projects.
C227.2	Identify the various rocks, minerals depending on geological classifications.
C227.3	Understand couple geologic expertise with the engineering properties of rock
C227.4	Determine unconsolidated materials in the characterization of geologic sites for civil work projects and the quantification of processes such as rock slides and settlement.
C227.5	Determine electric resistivity meter.
C227.6	Identify technical laboratory report

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

1. Study of physical properties of minerals.
2. Study of different group of minerals.
3. Study of Crystal and Crystal system.
4. Identification of minerals: Silica group: Quartz, Amethyst, Opal; Feldspar group: Orthoclase, Plagioclase; Cryptocrystalline group: Jasper; Carbonate group: Calcite; Element group: Graphite; Pyroxene group: Talc; Mica group: Muscovite; Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum.
5. Identification of rocks (Igneous Petrology): Acidic Igneous rock: Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff. Basic rock: Gabbro, Dolerite, Basalt and its varieties, Trachyte.
6. Identification of rocks (Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties, Laterite, Limestone and its varieties, Shales and its varieties.
7. Identification of rocks (Metamorphic Petrolody): Marble, slate, Gneiss and its varieties, Schist and its varieties. Quartzite, Phyllite.
8. Study of topographical features from Geological maps. Identification of symbols in maps.
9. Simple structural Geology Problems (Folds, Faults & Unconformities)

Additional experiments:

1. Recognizing rock characteristics
2. Hardness of rock

Open-ended experiments:

1. Simple structural geology problems.

TEXT BOOKS

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.

REFERENCE BOOKS

1. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd , 2014
2. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/105/105105106/
2. https://nptel.ac.in/courses/105/104/105104200/

E-BOOKS

1. https://easyengineering.net/textbook-of-engineering-geology-book/
2. https://www.researchgate.net/publication/311767178_FUNDAMENTALS_OF_ENGINEERING_GEOLOGY_A_TEXTBOOK_BY_PROF_DR_HUSSEIN_H_KARIM

HYDRAULICS & HYDRAULIC MACHINERY LAB
II B.TECH., II SEMESTER

Course Title: Hydraulics & Hydraulic Machinery Lab	**Course Code:** AS20-01PC11
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 Exam:** 70 Marks
Prerequisites: Hydraulics & Hydraulic Machinery	

COURSE OVERVIEW

This lab deals with determination of different properties and characteristics of fluid in hydraulic Machinery and turbines used to generate power.

COURSE OBJECTIVES

- To identify the behavior of analytical models introduced in lecture to the actual behavior of real fluid flows.
- To explain the standard measurement techniques of fluid mechanics and their applications.
- To illustrate the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- To analyze the laboratory measurements and to document the results in an appropriate format.

COURSE OUTCOMES

CO#	Course Outcomes
C228.1	Describe the basic measurement techniques of fluid mechanics and its appropriate application.
C228.2	Interpret the results obtained in the laboratory for various experiments.
C228.3	Develop the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
C228.4	Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.
C228.5	Determine draw correct and sustainable conclusions.
C228.6	Identify technical laboratory report

COURSE CONTENT (SYLLABUS)

LIST OF EXPERIMENTS

1. Verification of Bernoulli's equation
2. Determination of Coefficient of discharge for a small orifice by a constant head method
3. Calibration of Venturimeter / Orifice Meter
4. Calibration of Triangular / Rectangular/Trapezoidal Notch
5. Determination of Minor losses in pipe flow
6. Determination of Friction factor of a pipe line
7. Determination of Energy loss in Hydraulic jump
8. Determination of Manning's and Chezy's constants for Open channel flow.
9. Impact of jet on vanes
10. Performance Characteristics of Pelton wheel turbine
11. Performance Characteristics of Francis turbine
12. Performance characteristics of Keplan Turbine
13. Performance Characteristics of a single stage / multi stage Centrifugal Pump

Additional experiments:

1. Reynold's experimental set up
2. Meta-centric height determination

Open-ended experiments:

1. Determination of capillary rise or fall in tubes with different diameters.

TEXT BOOKS

1. Modi P.N. and Seth S.M., Hydraulics and Fluid Mechanics. Standard Book House. New Delhi, 2017.

REFERENCE BOOKS

1. A text book of Fluid Mechanics and Hydraulic Machines by RK Bansal

ONLINE RESOURCES

1. https://nptel.ac.in/courses/105/105/105105203/
2. https://nptel.ac.in/courses/105/103/105103021/
3. https://nptel.ac.in/courses/105/103/105103096/

E-BOOKS

1. https://notes.specworld.in/hydraulics-hydraulic-machines-notes-pdf-hhm-notes-pdf/
2. https://notes.specworld.in/fluid-mechanics-hydraulic-machinery-notes-pdf-fmhm-notes-pdf/
3. https://books.google.co.in/books/about/A_Text_Book_of_Hydraulics_Fluid_Mechanic.html?id=mLy_nAEACAAJ&redir_esc=y

GENDER SENSITIZATION
II B.TECH., II SEMESTER

Course Title: Gender Sensitization	**Course Code:** AS20-00MC02
Teaching Scheme (L:T:P): 3:0:0	**Credits:** 0
Type of Course: Lecture	**Total Contact Periods:** 48Hrs
Continuous Internal Evaluation: 0 Marks	**Semester End Exam:** 100 Marks
Prerequisites: General politics and economics of work	

COURSE OVERVIEW
Gender sensitization refers to the raising sensitization of gender equality concerns. It helps people in examining their personal attitudes and beliefs and questioning the realities of both sexes. Gender sensitization make people understand the difference between sex and gender, how gender is socially constructed and the stereotypes around gender roles It helps them determine which assumptions in matters of gender are valid and which are stereotyped. Need of gender sensitization is to create awareness among the working professionals about the importance of gender sensitivity in organization. Without being sensitive to the needs of a particular gender, an individual may refrain from understanding the opposite gender.

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

COURSE OUTCOMES
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 labor 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.

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 Textbook on Gender by Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, published by Telugu Akademi, Hyderabad, Telangana State, 2015.

REFERENCE BOOKS

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdul ali Sohaila. "I Fought For My Life...and Won."

ONLINE RESOURCES

1. https://nptel.ac.in/courses/110/105/110105080/
2. https://nptel.ac.in/courses/109/103/109103122/
3. http://www.womenwarpeace.org/issues/violance/GBVnairobi/finale
4. http://www.unmillenuim project; org/goals/index.htm.
5. http://www.womenwarpease.org
6. http://www.womenanddevelopment.org/issues/violance/GBVnairobi/finale
7. http://www.unmillenuim project; org/goals/index.htm.
8. http://www.mcrhrdi.gov.in/adr%202016/presentations/Gender%20Sensitisation%20For%20FCs.pdf

E-BOOKS

1. https://mangaloreuniversity.ac.in/sites/default/files/2019/Course%20-%206%20Gender%20School%20&%20Society%20-%20English%20Version.pdf
2. http://ncw.nic.in/notice/gender-sensitization-module-gender-sensitization-and-legal-awareness-programme-collaboration

MICROSOFT PROJECT (MSP)
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Microsoft Project (MSP)	**Course Code:** AS20-01PW04
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Building Drawing and Building Materials, Construction and Planning	

COURSE OVERVIEW

Microsoft Project is a project management software program that is designed to assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads. Microsoft Project is a powerful program that helps you plan and manage a range of projects.

COURSE OBJECTIVES

- Communicate effectively using appropriate MS Project vocabulary.
- Use critical thinking and problem solving skills in designing a project.
- Create grammatically correct and esthetically pleasing reports.

COURSE OUTCOMES

CO#	Course Outcomes
C2210.1	Develop accurate project task, time, and resource.
C2210.2	Develop cost relationships following current professional and/or industry standards.
C2210.3	Design and create accurate Gantt charts.
C2210.4	Arrange business setting using specialized vocabulary associated with Microsoft Project.
C2210.5	Create critical management information for those responsible for specific project segments.
C2210.6	Generate Varies Reports using Microsoft Project 2019

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Introduction to Microsoft Project- MS Project 2019 - User Interface- Understand the MS Project User Interface-Its applications- Construction projects-Industrial Projects etc.

UNIT II
SETTING PROJECT OPTIONS
Budget a Project- Calendar Types and Create Project Calendar-Task Management. Team Planner –Tasks Attribution

UNIT III
CREATE MILESTONES IN MS PROJECT
Task Management Final-create recurring task in MS Project 2019

UNIT IV
RESOURCE TYPES (CONCEPTS) IN MS PROJECT
Defining Resource-Work -Cost - Material Assigning Resources in Microsoft Project 2019

UNIT V
GENERATING AND EXECUTION OF REPORTS
Generating varies reports using Microsoft project 2019, Execution of general building project on MS Project 2019

TEXT BOOKS
1. Microsoft Project 2019 Step by Step by Lewis Cindy, Chatfield Carl, Johnson Timothy.

REFERENCE BOOKS
1. Microsoft Project 2019 for Dummies Book by Cynthia Snyder.
2. Microsoft Project 2016 Step by Step - Channah F. Naiman.

ONLINE RESOURCES
1. https://www.coursera.org/specializations/managing-major-engineering-projects
2. https://www.coursera.org/learn/construction-scheduling

E-BOOKS
1. https://www.tutorialspoint.com/ms_project/ms_project_introduction.htm
2. https://www.uis.edu/informationtechnologyservices/wpcontent/uploads/sites/106/2013/04/IntroductiontoProject2010.pdf

PRIMAVERA
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Primavera	**Course Code:** AS20-01PW05
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Building Materials, Construction and Planning	

COURSE OVERVIEW
Understanding the concept of planning using primavera software. By learning the course of primavera, purpose to know project cost, time of completion, scheduling of project and resources of material and labour.

COURSE OBJECTIVES
- Preparing the schedule for the activities required in the project
- Setting the base line for the project, to complete the project as per schedule time
- Scheduling the resources for material, labour and equipment
- Preparing the calendar, WBS and OBS for the structure.

COURSE OUTCOMES

CO#	Course Outcomes
C2210.1	Preparing the complete schedule of project including material, labour, equipment and other activities.
C2210.2	Understanding the concept of WBS and OBS of the structure
C2210.3	Explain the concept of critical path and Pert for the project
C2210.4	Create the total float, free float for the project
C2210.5	Create the links for activity and events as early start-early finish, latestart-late finish
C2210.6	Develop charts such as Gantt chart, bar charts based on the resources assigned for the project

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Introduction- what is primavera? - Required Background Knowledge- Purpose of Planning - Project Planning Metrics - Planning Cycle - Levels of Planning - Monitoring and Controlling a Project.

UNIT II
CREATING A PROJECT PLAN
Understanding Planning and Scheduling Software - Enterprise Project Management - Understanding Your Project - Creating Projects - Defining the Calendars - Creating a New Global or Project Calendar - Creating a New Shared Resource Calendar - Creating New Personal Resource Calendars - Personal and Shared Calendars Calculation and Display - Move, Copy, Rename and Delete a Calendar - Copy a Calendar from One Project to Another - Calendars for Calculating Project, WBS and Other Summary Durations.

UNIT III
CREATING THE WORK BREAKDOWN STRUCTURE
Defining the Project Breakdown Structures - Adding Activities- Adding Activities And Organizing Under The WBS - Calculation of Activity Durations in Days, Weeks or Months - Adding the Logic Links - Developing a Closed Network - Scheduling the Project - Critical Path - Total Float - Free Float - Relationship Colors - Formatting the Display – Layouts and Filters.

UNIT IV
SCHEDULING WITH RESOURCES, ROLES AND BUDGETS
Creating and Using Resources - Creating and Using Roles - The Relationship between Resources and Roles - Activity Type and Duration Type – Budgets - Resource Usage Profiles and Tables - Resource Optimization- Bar Chart Options Form - Progress Line Display on the Gantt chart.

UNIT V
CREATING A PRIMAVERA PROJECT WBS
Opening and Navigating the WBS Window - Creating and Deleting a WBS Node - WBS Node Separator - Work Breakdown Structure Lower Pane Details - WBS Categories - Why a Primavera WBS is Important - Creating the Work Breakdown Structure – Execution of general building project on primavera software.

TEXT BOOKS
1. Planning & control using Oracle Primavera P6 by Paul E. Harris

REFERENCE BOOKS
2. Construction project management by Kumar Neeraj Jha.
3. Construction planning and management by P S Gahlot & B M Dhir

ONLINE RESOURCES
1. https://www.udemy.com/course/project-management-with-primavera-p6/

E-Book
1. https://www.planacademy.com/how-to-learn-primavera-p6-professional/
2. https://www.oracle.com/in/industries/construction-engineering/primavera-p6/

ADVANCED SURVEYING
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Advanced Surveying	**Course Code:** AS20-01PW06
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Surveying and Surveying Lab	

COURSE OVERVIEW

Modern Surveying is unimaginable without the use of electronic equipment and information technology. Surveying with conventional systems has been completely replaced with advanced automated systems. Total Station, Global Positioning System (GPS), Remote Sensing and Geographical Information System (GIS) have all become an inextricable part of surveying.

COURSE OBJECTIVES

- To make students aware with different advance surveying methodologies applied to carry out large scale survey works as modern instruments have largely changed the approach to survey works with the principles being same.
- To prepare the students to handle the errors they are likely to come across any large scale survey works

COURSE OUTCOMES

CO#	Course Outcomes
C2210.1	Apply the knowledge of geometric principles to arrive at surveying problems.
C2210.2	Understand field activities which provide real application of theoretical principles of surveying.
C2210.3	Understand the preparation of plans/maps by using field observations.
C2210.4	Identify suitable instruments and appropriate method of survey.
C2210.5	Apply the knowledge of surveying equipment's in different operations in civil engineering projects.
C2210.6	Integrate simultaneously field work and office work.

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION OF AUTO LEVEL & THEODOLITE INSTRUMENT
About the Auto Level and Theodolite instrument-Operations-Applications-Advantages-Disadvantages.

UNIT II
SETTING UP OF THE INSTRUMENT
Fixing the station point-Setting the instrument-Checking the plate level-Instrument level.

UNIT III
FIELD WORK SURVEYING
Project-1: Fixing the Permanent Bench mark at required place by using Fly Levelling. (Transfer of Permanent B.M.)
Project-2: Traverse Survey of Closed boundary by using Theodolite and check with Gales Traverse table.

UNIT IV
USE OF AUTO LEVEL & THEODOLITE IN BUILDING CONSTRUCTIONS
Project-3: To mark the excavation lines, centre lines of all the columns of the plan of a proposed building on the actual site of work as per plan of the building to facilitate earth cutting.
Requirements: Detailed plan and drawings of the building and site plan of the area are required. Site plan.

UNIT V
USE OF AUTO LEVEL & THEODOLITE IN ROAD CONSTRUCTIONS
Project-4: i) To mark the points and taking levels on center line of the road, and in transverse direction in the actual site of work as per the requirements of the road to facilitate earth cutting, filling and fixing the road level. ii) Detailed drawings of the L.S. and C.S. are prepared based on the levelling work.

TEXT BOOKS
1. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi.
2. Duggal S K, "Surveying (Vol .1), Tata McGraw Hill Publishing Co. Ltd. New Delhi.

REFERENCE BOOKS
1. Arora K R "Surveying Vol. 1&2), Standard Book House, Delhi.
2. Surveying (Vol – 1&2), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi.
3. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi

ONLINE RESOURCES
1. https://nptel.ac.in/courses/105/104/105104100/
2. https://nptel.ac.in/courses/105/107/105107121/

E-BOOKS
1. https://www.academia.edu/25746683/ADVANCED_SURVEYING_LECTURE_MODULE
2. https://sites.google.com/site/4thsemnotes/engineering-docs

SOLAR PLANT DESIGN AND ENGINEERING
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Solar Plant Design and Engineering	**Course Code:** AS20-02PW05
Teaching Scheme (L:T:P): 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 75 Marks
Prerequisites: Basic Electrical Engineering	

COURSE OVERVIEW
Learn the design fundamentals of photovoltaic projects. Gain knowledge and skills from engineers with real-life experience in solar energy and electrical delivery fields. One will also understand solar plant components and PV modules; DC system and AC collector design; civil and geotechnical issues; and interconnection to distribution and the bulk power grid.

COURSE OBJECTIVES
- To understand the fundamental concepts, principles, analysis and design of solar power plant
- To know the various possibilities, advantages, limitations of solar power plant.

COURSE OUTCOMES

CO#	Course Outcomes
C2210.1	Understand the performance and characteristics of conventional vehicles
C2210.2	Understand the Performance and environmental impact of hybrid vehicles
C2210.3	Understand the Performance of hybrid vehicles and Electric vehicle in traction system.
C2210.4	Understand different Electric components and controls used in Hybrid and Electric Vehicles
C2210.5	Understand the different strategies related to energy storage systems
C2210.6	Understand the different strategies related to energy management systems

COURSE CONTENT (SYLLABUS)

UNIT I
INTRODUCTION
Energy Scenario, Solar Energy, Average energy received from sun, History of PV cell, Terminology Used in Solar PV System, Fundamentals of Solar PV Cell, Equivalent Circuit of Solar Cell, Design and Structure of Solar PV Module/Panel, Number of Solar Cells in a Panel
Effect of Environmental Parameters on the Performance of a Solar PV Panel; effect of Tilt angle and shading

UNIT II
DESIGN OF AN ON-GRID SOLAR SYSTEM

Energy requirement, Panel capacity and quantity, Position of panels; Tilt and Azimuth, Maximum power tracking (MPPT), MPPT device; usage and advantages Series, Parallel and Mixed layout connection of panels, Selection of layouts and Inverters

UNIT III
ELECTRICAL CHARACTERISTICS OF SOLAR PANELS
Voltage- Current curve of solar panel; Definitions of Open circuit voltage, short circuit current, maximum power voltage, maximum power current, maximum power

UNIT IV
PERFORMANCE ANALYSIS OF SOLAR PANELS
Losses in panel; shadow and cable, Panel efficiency, Inverter efficiency, Overall efficiency of panel
Performance Ratio (PR); Standard definition, Formula of PR, Classification, An example of simple PR calculation.

UNIT V
PROTECTION DEVICES FOR ON-GRID SOLAR POWER PLANT
Lightning arrester, Earthing, DC/AC Box, Fuse, Surge protection device, Miniature circuit breaker, Solar meter, Net meter.

TEXT BOOKS
1. Principles of solar engineering, Third edition, D. Yogi Goswami, CRC Press, Taylor & Francis Group
2. Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Chethan Singh Solanki, PHI Publications

REFERENCE BOOKS
1. Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Solanki C.S, PHI Publications
2. A Practical Guide for Total Engineering of MW capacity Solar PV Power Project, A.S.Kapur, White Falcon Self Publishing Platform
3. Solar Power: Energy Of The Future, Nirmala Rao Khandpekar, SBS Publishers and Distributors Pvt Ltd.

ONLINE RESOURCES
1. https://nptel.ac.in/courses/117/108/117108141/

E-BOOKS
1. http://library.lol/main/69D3AE28ABE3AEB02EB36FED5AAA6FA0
2. http://library.lol/main/9FCD65510E672D9E8F91EE78D72B00E4
3. http://library.lol/main/FFE204D1C5ADD5990245876139EEEA30

SENSOR TECHNOLOGY
II B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: Sensor Technology	**Course Code:** AS20-04PW04
Teaching Scheme (L:T:P) 0:0:2	**Credits:** 1
Type of Course: Project Work	**Total Contact Periods:** 32Hrs
Continuous Internal Evaluation: 25 Marks	**Semester End Exam:** 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
3. http://library.lol/main/31BE5601549E2B4B0C1D45AAE4D35C32