



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
(Established by Govt. of A.P., ACT No.30 of 2008)
ANANTHAPURAMU – 515 002 (A.P) INDIA

CIVIL ENGINEERING

II B.TECH.

SEMESTER - III							
S.No.	Course Code	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	20A54301	Probability and Statistics for Civil Engineering	BS	3	0	0	3
2.	20A01301	Advanced Strength of Materials	PC	3	0	0	3
3.	20A01302T	Fluid Mechanics and Hydraulic Machines	PC	3	0	0	3
4.	20A01303T	Surveying	PC	3	0	0	3
5.	20A52301 20A52302 20A52303	Humanities Elective– I Managerial Economics & Financial Analysis Organizational Behavior Business Environment	HS	3	0	0	3
6.	20A01304	Basic Civil Engineering Laboratory	PC	0	0	3	1.5
7.	20A01302P	Fluid Mechanics and Hydraulic Machines Lab	PC	0	0	3	1.5
8.	20A01303P	Surveying Lab	PC	0	0	3	1.5
9.	20A05305	Skill oriented course - I Application development with Python	SC	1	0	2	2
10.	20A52201	Mandatory noncredit course – II Universal Human Values	MC	3	0	0	0
11.	20A99301	NSS/NCC/NSO Activities	-	-	-	2	0
Total							21.5

SEMESTER - IV							
S.No.	Course Code	Course Name	Category	Hours per week			Credits
				L	T	P	
1.	20A54401	Mathematical Modeling & Optimization Techniques	BS	3	0	0	3
2.	20A01401T	Engineering Geology	ES	3	0	0	3
3.	20A01402	Structural Analysis – I	PC	3	0	0	3
4.	20A01403T	Concrete Technology	PC	3	0	0	3
5.	20A01404T	Environmental Engineering - I	PC	3	0	0	3
6.	20A01401P	Engineering Geology Lab	ES	0	0	3	1.5
7.	20A01405	Concrete Materials Lab	PC	0	0	3	1.5
8.	20A01404P	Environmental Engineering Lab	PC	0	0	3	1.5
9.	20A52401	Skill oriented course – II Soft Skills	SC	1	0	2	2
10.	20A99401	Mandatory non-credit course - III Design Thinking for Innovation	MC	2	1	0	0
Total							21.5
Mandatory Community Service Internship for 6 weeks duration during Summer Vacation							



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Note:

1. Eligible and interested students can register either for Honors or for a Minor in IV Semester as per the guidelines issued by the University
2. Students shall register for NCC/NSS/NSO activities and will be required to participate in an activity for two hours in a week during third semester.
3. Lateral entry students shall undergo a bridge course in Mathematics during third semester



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Course Code	Probability and Statistics for Civil Engineering		L	T	P	C
20A54301			3	0	0	3
Pre-requisite	NIL	Semester	III			
Course Objectives:						
This course aims at providing the student with the knowledge on <ul style="list-style-type: none"> • The theory of Probability and random variables. • Usage of statistical techniques like testing of hypothesis, testing of significance, chi-square test and basic concepts of Least square methods 						
Course Outcomes (CO):						
At the end of the course, student will be able to <ul style="list-style-type: none"> • Understand the concepts of probability, sampling distributions, test of hypothesis and Curve fitting. • Explain the characteristics through correlation and regression tools. • Apply Probability theory to find the chances of happening of events. • Understand various probability distributions and calculate their statistical moments. • Solve the problems on testing of hypothesis on large samples and small samples and fitting of the curves. 						
UNIT - II	Elementary Statistics		9 Hrs			
Introduction to statistics- definition-advantages-limitations-frequency distribution tables-Arithmetic mean, median, mode for grouped and ungrouped data-variance, standard deviation, co-efficient of variation. Correlation –properties, correlation co-efficient-Regression-properties-Regression co-efficient- relation between correlation co-efficient and Regression co-efficient.						
UNIT - I	Probability Theory		8 Hrs			
Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye’s theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.						
UNIT - III	Random variables & Distributions		8 Hrs			
Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties-Uniform distribution-exponential distribution						
UNIT - IV	Testing of Hypothesis		9 Hrs			
Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems						
UNIT - V	Testing of significance & Curve fitting		9 Hrs			
Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), χ^2 - test for goodness of fit, χ^2 - test for independence of attributes . Curve Fitting: Fitting of Linear, Quadratic, Exponential curves, Least squares method						
Textbooks:						
1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons.						



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2. Vijay K Rohatgi, Statistical Inference, Aug 2003, Dover Publications Inc.

Reference Books:

1. S.P.Gupta, Statistical Methods, 33rd Edition, Sultan Chand & Sons. 2. M.K.Jain, S.R.K.Iyengar and R.K.Jain,
2. Numerical Methods for Science and Engineering Computation, 6th Edition, New Age International Publishers.

Online Learning Resources:

<http://nptel.ac.in/courses/111105090/>
<http://nptel.ac.in/courses/111106112>



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CIVIL ENGINEERING

Course Code	Advanced Strength of Materials		L	T	P	C
20A01301			3	0	0	3
Pre-requisite	Engineering Mechanics	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • To demonstrate analytical methods for determining strength & stiffness and assess stability of structural members. • To enable the student analyze indeterminate trusses • To make the student to understand the analysis procedures for analyzing fixed and Continuous beams. • To enable the student to undergo analysis procedure using slope deflection method and moment distribution method. • To enable the student to analyze the two hinged and three hinged arches 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Determine deflection at any point on a beam under simple and combined loads • Apply energy theorems for analysis of indeterminate structures • Analyze indeterminate structures with yielding of supports • Analyze beams and portal frames using slope deflection and moment distribution methods • Analyze bending moment, normal thrust and radial shear in the arches 						
UNIT - I	Deflection of Beams					
Uniform bending – slope, deflection and radius of curvature – Differential equation for elastic line of a beam – Double integration and Macaulay’s methods. Determination of slope and deflection for cantilever and simply supported beams under point loads, U.D.L. uniformly varying load-Mohr’s theorems – Moment area method – application to simply supported and overhanging beams- analysis of propped cantilever beams under UDL and point loads.						
UNIT - II	Torsion					
Torsion: Theory of pure torsion – Assumptions and Derivation of Torsion formula for circular shaft – Torsional moment of resistance – Polar section modulus – power transmission through shafts – Combined bending and torsion – Springs -Types of springs – deflection of close coiled helical springs under axial pull and axial couple – Carriage or leaf springs.						
UNIT – III	Columns and Struts					
Introduction – classification of columns – Axially loaded compression members – Euler’s crippling load theory – derivation of Euler’s critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler’s critical stress – Limitations of Euler’s theory – Rankine – Gordon formula – eccentric loading and Secant formula – Prof. Perry’s formula.						
UNIT - IV	Springs					
Axial load and torque on helical springs - stresses and deformations - strain energy - compound springs - leaf springs.						
UNIT - V	Thin and Thick Cylinders					
Introduction - Thin Cylindrical shells - hoop stress - longitudinal stresses - Lamé’s theory - Design of thin & thick cylindrical shells- Wire wound thin cylinders - Compound cylinders - Shrink fit - compound cylinders						



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Textbooks:

1. Bansal R. K, "Strength of Materials", Laxmi Publications, 2010.
2. B. C. Punmia Strength of Materials by.- Laxmi publications.

Reference Books:

1. Schaum's outline series Strength of Materials, Mc Graw hill International Editions.
2. L.S. Srinath, Strength of Materials, Macmillan India Ltd., New Delhi
3. Gere J.M. and Goodno B.J. "Strength of Materials" Indian Edition (4th reprint), Cengage Learning India Private Ltd., 2009.
4. R.S.Khurmi and N.Khurmi, "Strength of Materials (Mechanics of Solids)", S Chand And Company Limited, Ramnagar, New Delhi-110 055
5. B. S. Basavarajaiah and P. Mahadevappa, "Strength of Materials" 3rd Edition 2010, in SI UNITS, Universities Press Pvt Ltd, Hyderabad.



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CIVIL ENGINEERING

Course Code	Fluid Mechanics and Hydraulic Machines (Common to Civil & Mechanical)		L	T	P	C
20A01302T			3	0	0	3
Pre-requisite	Physics, Chemistry	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • To impart ability to solve engineering problems in fluid mechanics • To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects. • To enable the students measure quantities of fluid flowing in pipes, tanks and channels • To Introduce concepts of uniform and non-uniform flows through open channel. • To impart knowledge on design of turbines and pumps. 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Familiarize basic terms used in fluid mechanics • Understand the principles of fluid statics, kinematics and dynamics • Understand flow characteristics and classify the flows and estimate various losses in flow through channels • Analyze characteristics for uniform and non-uniform flows in open channels. • Design different types of turbines, centrifugal and multistage pumps. 						
UNIT - I	Introduction to Fluid Statics					
Distinction between a fluid and a solid - characteristics of fluids - 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. pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.						
UNIT - II	Fluid kinematics and Dynamics					
Classification of fluid flow - 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; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation :Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;						
UNIT - III	Analysis Of Pipe Flow					
Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series. Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Stoke's law, Measurement of viscosity. Reynolds experiment, Transition from laminar to turbulent flow. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram – Introduction to boundary layer theory.						
UNIT - IV	Flow in Open Channels					
Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Uniform flow. Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Broad Crested Weir. Gradually						



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Varied Flow Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.	
UNIT - V	Hydraulic Machines
Impact of Jets- Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - velocity triangles at inlet and outlet - Work done and efficiency - Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines - Cavitation - Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies – Introduction to Reciprocating Pump.	
Textbooks:	
<ol style="list-style-type: none"> 1. P. M. Modi and S. M. Seth, “Hydraulics and Fluid Mechanics”, Standard Book House 2. K. Subrahmanya, “Theory and Applications of Fluid Mechanics”, Tata McGraw Hill 	
Reference Books:	
<ol style="list-style-type: none"> 1. R. K. Bansal, A text of “Fluid Mechanics and Hydraulic Machines”, Laxmi Publications (P) Ltd., New Delhi. 2. K. Subramanya, Open channel Flow, Tata McGraw Hill. 3. N. Narayana Pillai, Principles of “Fluid Mechanics and Fluid Machines”, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009. 4. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, “Fluid Mechanics and Machinery”, Oxford University Press, 2010. 5. Banga & Sharma, “Hydraulic Machines”, Khanna Publishers. 	
Online Learning Resources:	
<ol style="list-style-type: none"> 1. https://www.coursera.org/courses?query=fluid%20mechanics 2. https://www.udemy.com/topic/fluid-mechanics/ 3. https://onlinecourses.nptel.ac.in/noc21_ce31/preview 4. https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-01-unified-engineering-i-ii-iii-iv-fall-2005-spring-2006/fluid-mechanics/ 5. http://lms.msitonline.org/mod/folder/view.php?id=138 	



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Course Code	SURVEYING		L	T	P	C
20A01303T			3	0	0	3
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> To make the student to get well conversant with the fundamentals of various basic methods and instruments of surveying. To introduce to the students in identifying reduced level of the ground and its profile for finding areas and volumes of embankments and cuttings. To make the student to use angular measuring instruments for horizontal and vertical control. To enable the student to set simple horizontal curves. To introduce the knowledge construction surveys and usage of modern instrument such as total station. 						
Course Outcomes (CO):						
At the end of the course, the student will be able to: <ul style="list-style-type: none"> Calculate angles, distances and levels Identify data collection methods and prepare field notes Understand the working principles of survey instruments Estimate the volumes of earth work Able to use modern survey instruments. 						
UNIT - I	Introduction and Basic Concepts of surveying					
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, indirect methods- optical methods- E.D.M. method. Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip. Plane table surveying: Introduction, accessories, setting up of plane table, techniques, testing, adjustments, errors, advantages and disadvantages						
UNIT - II	Levelling, Contouring and Computation of Areas & Volumes					
Levelling - Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Effect of Curvature of Earth and Refraction. Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours. Computation of Areas and Volumes: Areas - Determination of areas consisting of irregular boundary and regular boundary, Planimeter. Volumes - Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.						
UNIT - III	Theodolite Surveying					
Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible. Traversing: Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements.						
UNIT - IV	Tacheometric Surveying					
Principles of Tacheometry, stadia and tangential methods of Tacheometry. Curves: Types of curves and their necessity, elements of simple circular curve, setting out of simple horizontal circular curves – Basics of Total Station and GPS.						



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UNIT - V	Construction surveys
Introduction-staking out buildings-pipelines and sewers-highwaysculverts. Bridge surveys-determining the length of a bridge-locating centres of piers- surface surveys and tunnel alignment-underground surveys-connection of surface and underground surveys-levelling in tunnels.	
Textbooks:	
<ol style="list-style-type: none"> 1. C.Venkatramaiah, “Text book of surveying”, 2nd edition, Universities press, 2018. 2. Arora K R “Surveying” Vol 1, 2 & 3, Standard Book House, Delhi, 2004. 	
Reference Books:	
<ol style="list-style-type: none"> 1. S K Duggal, “Surveying” (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004. 2. R. Subramanian, “Surveying and leveling” Oxford university press, New Delhi. 3. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, “Surveying” (Vol – 1, 2 & 3), - Laxmi Publications (P) ltd., New Delhi. 4. R. Agor Khanna Publishers 2015 “Surveying and leveling”. 5. Arthur R Benton and Philip J Taety, “Elements of Plane Surveying”, McGraw Hill – 2000. 	
Online Learning Resources:	
<ol style="list-style-type: none"> 1. https://www.udemy.com/course/surveying/ 2. https://onlinecourses.nptel.ac.in/noc20_ce18/preview 3. https://freevideolectures.com/course/98/surveying 	

Course Code	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
20A52301		3	0	0	3



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	(Common to All branches of Engineering)		
Pre-requisite	NIL	Semester	III
Course Objectives:			
<ul style="list-style-type: none"> • To inculcate the basic knowledge of micro economics and financial accounting • To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost • To Know the Various types of market structure and pricing methods and strategy • To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions. • To provide fundamental skills on accounting and to explain the process of preparing financial statements 			
Course Outcomes (CO):			
<ul style="list-style-type: none"> • Define the concepts related to Managerial Economics, financial accounting and management. • Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets • Apply the Concept of Production cost and revenues for effective Business decision • Analyze how to invest their capital and maximize returns • Evaluate the capital budgeting techniques • Develop the accounting statements and evaluate the financial performance of business entity. 			
UNIT - I	Managerial Economics		
Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.			
UNIT - II	Production and Cost Analysis		
Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least-cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns - Internal and External Economies of scale. Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.			
UNIT - III	Business Organizations and Markets		
Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies			
UNIT - IV	Capital Budgeting		
Introduction – Nature, meaning, significance, functions and advantages. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)			
UNIT - V	Financial Accounting and Analysis		



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Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions- Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). **Financial Analysis** - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:

1. Varshney&Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019

Reference Books:

1. Ahuja HI Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

Online Learning Resources:

<https://www.slideshare.net/123ps/managerial-economics-ppt>
<https://www.slideshare.net/rossanz/production-and-cost-45827016>
<https://www.slideshare.net/darkyla/business-organizations-19917607>
<https://www.slideshare.net/balarajbl/market-and-classification-of-market>
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396>
<https://www.slideshare.net/ashu1983/financial-accounting>



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Course Code	ORGANISATIONAL BEHAVIOUR (Common to All branches of Engineering)		L	T	P	C
20A52302			3	0	0	3
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • To enable student's comprehension of organizational behavior • To offer knowledge to students on self-motivation, leadership and management • To facilitate them to become powerful leaders • To Impart knowledge about group dynamics • To make them understand the importance of change and development 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Define the Organizational Behaviour, its nature and scope. • Understand the nature and concept of Organizational behaviour • Apply theories of motivation to analyse the performance problems • Analyse the different theories of leadership • Evaluate group dynamics • Develop as powerful leader 						
UNIT - I	Introduction to Organizational Behavior					
Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective -Understanding Individual Behaviour –Attitude -Perception - Learning – Personality.						
UNIT - II	Motivation and Leading					
Theories of Motivation- Maslow's Hierarchy of Needs - Herzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Clelland's theory of needs–Mc Gregor's theory X and theory Y– Adam's equity theory – Locke's goal setting theory– Alderfer's ERG theory .						
UNIT - III	Organizational Culture					
Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader- Women and Corporate leadership.						
UNIT - IV	Group Dynamics					
Introduction – Meaning, scope, definition, Nature- Types of groups - Determinants of group behavior - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building - Conflict in the organization– Conflict resolution						
UNIT - V	Organizational Change and Development					
Introduction –Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development						
Textbooks:						
1. Luthans, Fred, Organisational Behaviour, McGraw-Hill, 12 Th edition 2011 2. P Subba Ran, Organisational Behaviour, Himalya Publishing House 2017						
Reference Books:						
<ul style="list-style-type: none"> ▪ McShane, Organizational Behaviour, TMH 2009 ▪ Nelson, Organisational Behaviour, Thomson, 2009. ▪ Robbins, P. Stephen, Timothy A. Judge, Organisational Behaviour, Pearson 2009. ▪ Aswathappa, Organisational Behaviour, Himalaya, 2009 						
Online Learning Resources:						
httphttps://www.slideshare.net/Knight1040/organizational-culture-9608857s://www.slideshare.net/AbhayRajpoot3/motivation-165556714 https://www.slideshare.net/harshrastogi1/group-dynamics-159412405 https://www.slideshare.net/vanyasingla1/organizational-change-development-26565951						



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Course Code	Business Environment		L	T	P	C
20A52303	(Common to All branches of Engineering)		3	0	0	3
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • To make the student to understand about the business environment • To enable them in knowing the importance of fiscal and monetary policy • To facilitate them in understanding the export policy of the country • To Impart knowledge about the functioning and role of WTO • To Encourage the student in knowing the structure of stock markets 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Define Business Environment and its Importance. • Understand various types of business environment. • Apply the knowledge of Money markets in future investment • Analyse India's Trade Policy • Evaluate fiscal and monetary policy • Develop a personal synthesis and approach for identifying business opportunities 						
UNIT - I	Overview of Business Environment					
Introduction – meaning Nature, Scope, significance, functions and advantages. Types-Internal & External, Micro and Macro. Competitive structure of industries -Environmental analysis- advantages & limitations of environmental analysis& Characteristics of business.						
UNIT - II	Fiscal & Monetary Policy					
Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy - Demand and Supply of Money –RBI -Objectives of monetary and credit policy - Recent trends- Role of Finance Commission.						
UNIT - III	India's Trade Policy					
Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.						
UNIT - IV	World Trade Organization					
Introduction – Nature, significance, functions and advantages. Organization and Structure - Role and functions of WTO in promoting world trade - GATT -Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures.						
UNIT - V	Money Markets and Capital Markets					
Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI – Stock Exchanges - Investor protection and role of SEBI, Introduction to international finance.						
Textbooks:						
<ol style="list-style-type: none"> 1. Francis Cherunilam (2009), International Business: Text and Cases, Prentice Hall of India. 2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13th Revised Edition.HPH2016 						



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Reference Books:

- 1.K. V. Sivayya, V. B. M Das (2009), Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black (2009), International Business Environment Text and Cases, Prentice Hall of India, New Delhi, India.
3. Chari. S. N (2009), International Business, Wiley India.
- 4.E. Bhattacharya (2009), International Business, Excel Publications, New Delhi.

Online Learning Resources:

- <https://www.slideshare.net/ShompaDhali/business-environment-53111245>
- <https://www.slideshare.net/rbalsells/fiscal-policy-ppt>
- <https://www.slideshare.net/aguness/monetary-policy-presentationppt>
- <https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982>
- <https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt>
- <https://www.slideshare.net/viking2690/wto-ppt-60260883>
- <https://www.slideshare.net/prateeknepal3/ppt-mo>



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CIVIL ENGINEERING

Course Code	Basic Civil Engineering Laboratory		L	T	P	C
20A01304			0	0	3	1.5
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • developing general manual and machining skills in the students • understand the basic properties of materials • development of dignity of labor • safety at work place and selection of tools • team working 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Identify tools and equipment used and their respective functions. • Identify different types of materials and their basic properties. • Use and take measurements with the help of basic measuring tools/equipment. • Select proper tools for a particular operation. • Select materials and tools to make a job as per given specification/drawing. 						
List of Experiments:						
<ol style="list-style-type: none"> 1. Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape only. 2. Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape and cross staff. 3. Construct a wall of height 50 cm and wall thickness 1½ bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm. 4. Construct a wall of height 50 cm and wall thickness 2 bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm. 5. Computation of Centre of gravity and Moment of inertia of a given rolled steel section by actual measurements. 6. Installation of plumbing and fixtures like Tap, T-Joint, Elbow, Bend, Threading etc; 7. Plastering and Finishing of wall 8. Application of wall putty and painting a wall 9. Application of base coat and laying of Tile flooring of one square meter 10. Preparation of soil cement blocks for masonry and testing for compressive strength 11. Casting and testing of Fly ash Blocks 12. Preparation of cover blocks for providing cover to reinforcement 						
References:						
<ol style="list-style-type: none"> 1. Workshop Technology Vol. I, II, III by Manchanda; India Publishing House, Jalandhar. 2. Workshop Training Manual Vol. I, II by S.S. Ubhi; Katson Publishers, Ludhiana. 3. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd., New Delhi 4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi 5. Workshop Technology by B.S. Raghuwanshi; Dhanpat Rai and Co., New Delhi 6. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi. 						



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CIVIL ENGINEERING

Course Code	FLUID MECHANICS AND HYDRAULIC MACHINES LAB (Common to Civil & Mechanical)		L	T	P	C
20A01302P			0	0	3	1.5
Pre-requisite	NIL	Semester	III			
Course Objectives:						
By performing this laboratory, the student will be able to know the fluid flow measurements by considering different types flow measurement devices and working principles of various pumps and motors.						
Course Outcomes (CO):						
By performing the various tests in this laboratory the student will be able to know the principles of discharge measuring devices and head loss due to sudden contraction and expansion in pipes and working principles of various pumps and motors.						
List of Experiments:						
<ol style="list-style-type: none"> 1. Verification of Bernoulli's equation. 2. Calibration of Venturi meter. 3. Calibration of Orifice meter 4. Determination of Coefficient of discharge for a small orifice by constant head method. 5. Determination of Coefficient of discharge for a small orifice by variable head method. 6. Determination of Coefficient of discharge for an external mouth piece by Constant head method. 7. Determination of Coefficient of discharge for an external mouth piece by variable head method. 8. Calibration of contracted Rectangular Notch. 9. Calibration of contracted Triangular Notch. Determination of friction factor 10. Determination of loss of head in a sudden contraction. 11. Determination of loss of head in a sudden Expansion. 12. Performance test on Impulse turbines 13. Performance test on reaction turbines (Francis and Kaplan Turbines) 14. Impact of jet 15. Performance test on centrifugal pumps, determination of operating point and efficiency 						
References:						
<ol style="list-style-type: none"> 1. Fluid Mechanics & Hydraulic Machines A Lab Manual by <u>Ts Desmukh</u> (Author), <u>Laxmi Publications (P) Ltd</u> 2. Fluid Mechanics & Machinery Laboratory Manual by <u>N Kumara Swamy</u> (Author), <u>Charotar Books Distributors</u> 3. Lab. Manual of Fluid Mechanics & Machines by <u>Gupta, Chandra</u> (Author), <u>cbspd</u> (Publisher) 						
Online Learning Resources/Virtual Labs:						
1. http://eerc03-iiith.vlabs.ac.in/						



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CIVIL ENGINEERING

Course Code	SURVEYING LAB		L	T	P	C
20A01303P			0	0	3	1.5
Pre-requisite	NIL	Semester	III			
Course Objectives:						
By performing this laboratory, the student will be able to know the usage of various surveying equipment's and their practical applicability						
Course Outcomes (CO):						
By performing the various tests in this laboratory the student will be able to know the principles of surveying in chain surveying, compass surveying, plane table surveying, levelling, theodolite surveying and total station						
List of Experiments:						
<ol style="list-style-type: none"> 1. Setting up of Right angles using cross staff 2. Plane table survey; finding the area of a given boundary 3. Two Point Problem by the plane table survey. 4. Fly levelling: Height of the instrument method and rise and fall method. 5. Fly levelling; Longitudinal Section and Cross sections of a given road profile. 6. Theodolite Survey: Determining the Horizontal and Vertical Angles 7. Finding the distance between two inaccessible points using Theodolite 8. Tachometric survey: Heights and distance problems using tachometric principles. 9. One Exercise on Curve setting. 10. Developing a Contour map 						
References:						
<ol style="list-style-type: none"> 1. Engineering Surveying Laboratory Manual by Robert Hamilton, George Murgel of Kendall/Hunt Publishing Co 						
Online Learning Resources/Virtual Labs:						
<ol style="list-style-type: none"> 1. http://sl-iitr.vlabs.ac.in/ 						



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CIVIL ENGINEERING

Course Code	Application Development with Python		L	T	P	C
20A05305			1	0	2	2
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • To learn the basic concepts of software engineering and life cycle models • To explore the importance of Databases in application Development • Acquire programming skills in core Python • To understand the importance of Object-oriented Programming 						
Course Outcomes (CO):						
Students should be able to <ul style="list-style-type: none"> • Identify the issues in software requirements specification and enable to write SRS documents for software development problems • Explore the use of Object oriented concepts to solve Real-life problems • Design database for any real-world problem • Solve mathematical problems using Python programming language • 						
Module 1. Basic concepts in software engineering and software project management						
Basic concepts: abstraction versus decomposition, the evolution of software engineering techniques, Software development life cycle Software project management: project planning and project scheduling Task: 1. Identifying the Requirements from Problem Statements						
Module 2. Basic Concepts of Databases						
Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, <u>Data Definition Language(DDL) Statements: (Create table, Alter table, Drop table)</u> , <u>Data Manipulation Language(DML) Statements</u> Task: 1. Implement Data Definition Language(DDL) Statements: (Create table, Alter table, Drop table) 2. Implement Data Manipulation Language(DML) Statements						
Module 3. Python Programming:						
Introduction to Python: Features of Python, Data types, Operators, Input and output, Control Statements, Looping statements						
Python Data Structures: Lists, Dictionaries, Tuples.						
Strings: Creating strings and basic operations on strings, string testing methods.						
Functions: Defining a function- Calling a function- Types of functions-Function Arguments- Anonymous functions- Global and local variables						
OOPS Concepts; Classes and objects- Attributes- Inheritance- Overloading- Overriding- Data hiding						



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Modules and Packages: Standard modules-Importing own module as well as external modules
 Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages

Working with Data in Python: Printing on screen- Reading data from keyboard- Opening and closing file- Reading and writing files- Functions-Loading Data with Pandas-Numpy

Tasks:

1. OPERATORS

- a. Read a list of numbers and write a program to check whether a particular element is present or not using membership operators.
- b. Read your name and age and write a program to display the year in which you will turn 100 years old.
- c. Read radius and height of a cone and write a program to find the volume of a cone.
- d. Write a program to compute distance between two points taking input from the user (Hint: use Pythagorean theorem)

2. CONTROL STRUCTURES

- a. Read your email id and write a program to display the no of vowels, consonants, digits and white spaces in it using if...elif...else statement.
- b. Write a program to create and display a dictionary by storing the antonyms of words. Find the antonym of a particular word given by the user from the dictionary using while loop.
- c. Write a Program to find the sum of a Series $1/1! + 2/2! + 3/3! + 4/4! + \dots + n/n!$. (Input :n = 5, Output : 2.70833)
- d. In number theory, an abundant number or excessive number is a number for which the sum of its proper divisors is greater than the number itself. Write a program to find out, if the given number is abundant. (Input: 12, Sum of divisors of 12 = 1 + 2 + 3 + 4 + 6 = 16, sum of divisors 16 > original number 12)

3: LIST

- a. Read a list of numbers and print the numbers divisible by x but not by y (Assume x = 4 and y = 5).
- b. Read a list of numbers and print the sum of odd integers and even integers from the list.(Ex: [23, 10, 15, 14, 63], odd numbers sum = 101, even numbers sum = 24)
- c. Read a list of numbers and print numbers present in odd index position. (Ex: [10, 25, 30, 47, 56, 84, 96], The numbers in odd index position: 25 47 84).
- d. Read a list of numbers and remove the duplicate numbers from it. (Ex: Enter a list with duplicate elements: 10 20 40 10 50 30 20 10 80, The unique list is: [10, 20, 30, 40, 50, 80])

4: TUPLE

- a. Given a list of tuples. Write a program to find tuples which have all elements divisible by K from a list of tuples. test_list = [(6, 24, 12), (60, 12, 6), (12, 18, 21)], K = 6, Output : [(6, 24, 12), (60, 12, 6)]
- b. Given a list of tuples. Write a program to filter all uppercase characters tuples from given list of tuples. (Input: test_list = [(“GFG”, “IS”, “BEST”), (“GFg”, “AVERAGE”), (“GfG”,), (“Gfg”, “CS”)], Output : [(,“GFG”, “,IS”, „BEST“)]).
- c. Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input : tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output : 3)

5: SET

- a. Write a program to generate and print a dictionary that contains a number (between 1 and n) in the form (x, x*x).
- b. Write a program to perform union, intersection and difference using Set A and Set B.



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- c. Write a program to count number of vowels using sets in given string (Input : "Hello World", Output: No. of vowels : 3)
- d. Write a program to form concatenated string by taking uncommon characters from two strings using set concept (Input : S1 = "aacdb", S2 = "gafd", Output : "cbgf").

6: DICTIONARY

- a. Write a program to do the following operations:
- i. Create a empty dictionary with dict() method
 - ii. Add elements one at a time
 - iii. Update existing key's value
 - iv. Access an element using a key and also get() method
 - v. Deleting a key value using del() method
- b. Write a program to create a dictionary and apply the following methods:
- i. pop() method
 - ii. popitem() method
 - iii. clear() method
- c. Given a dictionary, write a program to find the sum of all items in the dictionary.
- d. Write a program to merge two dictionaries using update() method.

7: STRINGS

- a. Given a string, write a program to check if the string is symmetrical and palindrome or not. A string is said to be symmetrical if both the halves of the string are the same and a string is said to be a palindrome string if one half of the string is the reverse of the other half or if a string appears same when read forward or backward.
- b. Write a program to read a string and count the number of vowel letters and print all letters except 'e' and 's'.
- c. Write a program to read a line of text and remove the initial word from given text. (Hint: Use split() method, Input : India is my country. Output : is my country)
- d. Write a program to read a string and count how many times each letter appears. (Histogram).

8: USER DEFINED FUNCTIONS

- a. A generator is a function that produces a sequence of results instead of a single value. Write a generator function for Fibonacci numbers up to n.
- b. Write a function merge_dict(dict1, dict2) to merge two Python dictionaries.
- c. Write a fact() function to compute the factorial of a given positive number.
- d. Given a list of n elements, write a linear_search() function to search a given element x in a list.

9: BUILT-IN FUNCTIONS

- a. Write a program to demonstrate the working of built-in statistical functions mean(), mode(), median() by importing statistics library.
- b. Write a program to demonstrate the working of built-in trigonometric functions sin(), cos(), tan(), hypot(), degrees(), radians() by importing math module.
- c. Write a program to demonstrate the working of built-in Logarithmic and Power functions exp(), log(), log2(), log10(), pow() by importing math module.
- d. Write a program to demonstrate the working of built-in numeric functions ceil(), floor(), fabs(), factorial(), gcd() by importing math module.

10. CLASS AND OBJECTS

- a. Write a program to create a BankAccount class. Your class should support the following methods for
- i) Deposit
 - ii) Withdraw



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iii) GetBalance

iv) PinChange

b. Create a SavingsAccount class that behaves just like a BankAccount, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint:use Inheritance).

c. Write a program to create an employee class and store the employee name, id, age, and salary using the constructor. Display the employee details by invoking employee_info() method and also using dictionary (__dict__).

d. Access modifiers in Python are used to modify the default scope of variables. Write a program to demonstrate the 3 types of access modifiers: public, private and protected.

11. FILE HANDLING

a. . Write a program to read a filename from the user, open the file (say firstFile.txt) and then perform the following operations:

- i. Count the sentences in the file.
- ii. Count the words in the file.
- iii. Count the characters in the file.

b. . Create a new file (Hello.txt) and copy the text to other file called target.txt. The target.txt file should store only lower case alphabets and display the number of lines copied.

c. Write a Python program to store N student"s records containing name, roll number and branch. Print the given branch student"s details only.

References:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.
2. RamezElmasri, Shamkant, B. Navathe, "Database Systems", Pearson Education, 6th Edition, 2013.
3. Reema Thareja, "Python Programming - Using Problem Solving Approach", Oxford Press, 1st Edition, 2017.
4. Larry Lutz, "Python for Beginners: Step-By-Step Guide to Learning Python Programming", CreateSpace Independent Publishing Platform, First edition, 2018

Online Learning Resources/Virtual Labs:

1. <http://vlabs.iitkgp.ernet.in/se/>
2. <http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php>
3. <https://python-iitk.vlabs.ac.in>



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CIVIL ENGINEERING

Course Code	Universal Human Values (Common to all branches)		L	T	P	C
20A52201			3	0	0	0
Pre-requisite	NIL	Semester	III			
Course Objectives:						
<ul style="list-style-type: none"> • 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):						
<p>By the end of the course,</p> <ul style="list-style-type: none"> • Students are expected to become more aware of themselves, and their surroundings (family, society, nature) • They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. • They would have better critical ability. • They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). • It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. 						
UNIT - I						8 Hrs
Need, Basic Guidelines, Content and Process for Value Education						
<ul style="list-style-type: none"> • 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. <p>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</p>						
UNIT - II						8 Hrs
Understanding Harmony in the Human Being - Harmony in Myself!						
<ul style="list-style-type: none"> • 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. <p>Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one’s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease</p>						
UNIT - III						8 Hrs



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Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship	
<ul style="list-style-type: none"> • 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	8 Hrs
Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	
<ul style="list-style-type: none"> • 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	10 Hrs
Implications of the above Holistic Understanding of Harmony on Professional Ethics	
<ul style="list-style-type: none"> • 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.	
Textbooks:	
<ol style="list-style-type: none"> 1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1 2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2 	
Reference Books:	



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1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.
2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F.Schumacher. "Small is Beautiful"
6. Slow is Beautiful –Cecile Andrews
7. J C Kumarappa "Economy of Permanence"
8. Pandit Sunderlal "Bharat Mein Angreji Raj"
9. Dharampal, "Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland (English)

MOE OF CONDUCT

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them. Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practicals are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignments and/or activities are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.



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CIVIL ENGINEERING

Course Code	Mathematical Modeling & Optimization Techniques	L	T	P	C
20A54401		3	0	0	3
Pre-requisite	NIL	Semester		IV	
Course Objectives:					
This course enables the students to classify and formulate real-life problem for modeling as optimization problem					
Course Outcomes (CO):					
After the completion of Course, students will be able to					
<ol style="list-style-type: none"> 1. Know about the classifications and stages of mathematical modeling 2. Understand building of mathematical models 3. Study the behavior of mathematical models 4. formulate a linear programming problem and solve it by various methods 5. give an optimal solution in assignment jobs, give transportation of items from sources to destinations. 					
UNIT - I	Introduction to Modelling, Building Models, Studying Models	8 Hrs			
What is mathematical modelling? What objectives can modelling achieve? Classifications of models Stages of modelling . Systems analysis- Making assumptions- Flow diagrams- Choosing mathematical equations.					
UNIT - II	Studying Models	8 Hrs			
Equations from the literature- Analogies from physics-Data exploration, Dimensionless form - Asymptotic behaviour- Sensitivity analysis - Modelling model output					
UNIT - III	Linear programming problems(LPP)	9 Hrs			
Linear programming problems (LPP)-Graphical method-Simplex method-Big M Method-Dual simplex method.					
UNIT - IV	Transportation&Assignment Problem	11 Hrs			
Formulation of transportation model, Basic feasible solution using different methods, Optimality Methods, Unbalanced transportation problem, Degeneracy in transportation problems, Applications of Transportation problems. Assignment Problem: Formulation, unbalanced assignment problem, Travelling salesman problem.					
UNIT - V	Game Theory	11 Hrs			
Formulation of games, Two person-Zero sum game, Mini max and Max min Principle, games with and without saddle point, Rules of dominance, Solving a 2/2 game using graphical method.					
Textbooks:					
<ol style="list-style-type: none"> 1. Mathematical Modeling: by Majid Jaber-Douraki and Seyed M. Moghadas 2. Operations Research , S.D. Sharma. 					
Reference Books:					
<ol style="list-style-type: none"> 1. Mathematical Models in Applied Mechanics A.B. Tayler 2. Operations Research, An Introduction, Hamdy A. Taha, Pearson publishers. 					
Online Learning Resources:					
https://people.maths.bris.ac.uk/~madjl/course_text.pdf					



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CIVIL ENGINEERING

Course Code	Engineering Geology		L	T	P	C
20A01401T			3	0	0	3
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> • To understand weathering process and mass movement • To distinguish geological formations • To identify geological structures and process of rock mass quality. • To identify subsurface information and groundwater potential sites through geophysical investigations • To apply geological principles of mitigation of natural hazards and select sites for dams and tunnels 						
Course Outcomes (CO):						
At the end of the course student will be able to						
<ul style="list-style-type: none"> • Gain basic knowledge on characteristics of rocks and • Gain basic knowledge on characteristics of minerals. • Identify and differentiate rocks using geological classification. • Carry out geo physical investigations for infrastructural projects. • Apply concepts of structural geology for civil engineering structures. 						
UNIT - I	PHYSICAL GEOLOGY				Lecture Hrs	
Geology in civil engineering – branches of geology – structure of earth and its composition weathering of rocks – scale of weathering – soils – landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics – Earth quakes – Seismic zones in India.						
UNIT - II	MINEROLOGY				Lecture Hrs	
Physical properties of minerals – Quartz group, Feldspar group, Pyroxene – hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals - Ore minerals - Iron ores; pyrite; Chlorite						
UNIT - III	PETROLOGY				Lecture Hrs	
Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist.						
UNIT - IV	STRUCTURAL GEOLOGY AND GEOPHYSICAL METHODS				Lecture Hrs	
Geological maps – attitude of beds, study of structures – folds, faults and joints – relevance to civil engineering. Geophysical methods – Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Electrical resistivity methods, and seismic refraction methods.						
UNIT - V	APPLICATION OF GEOLOGICAL INVESTIGATIONS				Lecture Hrs	
Remote sensing for civil engineering applications; site selection for dams and tunnels – Geological conditions necessary for design and construction of Dams, Reservoirs, Tunnels, and Road cuttings – Hydrogeological investigations and mining – Coastal protection structures. Investigation of Landslides, causes and mitigation.						
Textbooks:						
<ol style="list-style-type: none"> 1. N. ChennaKesavulu, “Text Book of Engineering Geology”, 2nd Edition (2009), Macmillan Publishers India. 2. Vasudev Kanithi, “Engineering Geology”, Universities Press Pvt Ltd, Hyderabad. 2012. 						



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Reference Books:

1. Parbin Singh, “Engineering and General Geology”, 8th Edition (2010), S K Kataria& Sons.
2. D.Venkata Reddy, “Engineering Geology, Second edition”, Vikas Publishing house, Pvt, Ltd Richard E. Goodman, “Engineering Geology, Rock in Engineering Construction”, John Wiley & Sons, Inc. 1993.
3. S.K.Duggal, H.K Pandey, N.Rawal, “Engineering Geology”, Mc.Graw Hill Education (India) Pvt. Ltd
4. Billings, M. P., “Structural Geology”, Prentice-Hall India, 1974, New Delhi

Online Learning Resources:

1. <https://nptel.ac.in/courses/105/105/105105106/>
2. <https://freevidelectures.com/course/87/engineering-geology>
3. <https://www.edx.org/course/geology-and-engineering-geology>
4. <https://courses.lumenlearning.com/geo/chapter/reading-the-branches-of-geology/>
5. <https://www.coursera.org/courses?query=geology>



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CIVIL ENGINEERING

Course Code	STRUCTURAL ANALYSIS -I		L	T	P	C
20A01402			3	0	0	3
Pre-requisite	Engineering Mechanics	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> • To demonstrate analytical methods for determining strength & stiffness and assess stability of structural members. • To enable the student analyze indeterminate trusses • To make the student to understand the analysis procedures for analyzing fixed and Continuous beams. • To enable the student to undergo analysis procedure using slope deflection method and moment distribution method. • To enable the student to analyze the two hinged and three hinged arches 						
Course Outcomes (CO):						
<ul style="list-style-type: none"> • Determine deflection at any point on a beam under simple and combined loads • Apply energy theorems for analysis of indeterminate structures • Analyze indeterminate structures with yielding of supports • Analyze beams and portal frames using slope deflection and moment distribution methods • Analyze bending moment, normal thrust and radial shear in the arches 						
UNIT - I	Basic Analysis of Indeterminate Structures					
Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear force – Castigliano’s first theorem - Deflections of simple beams and pin jointed trusses - Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses up to two degrees of internal and external indeterminacy – Castigliano’s second theorem.						
UNIT - II	Fixed Beams & Continuous Beams					
Introduction to statically indeterminate beams- theorem of three moments-uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams –effect of sinking of support, effect of rotation of a support.						
UNIT - III	Slope-Deflection Method					
Introduction- derivation of slope deflection equation- application to continuous beams with and without settlement of supports- Analysis of single bay, single storey, portal frame including side sway.						
UNIT - IV	Moment Distribution Method					
Introduction to moment distribution method- application to continuous beams with and without settlement of supports. Analysis of single storey ,portal frames – including Sway						
UNIT - V	Arches					
Introduction- hinges-transfer of load to arches-linear arch-hinges in the arch-arch action-Horizontal force – three hinged arches – circular arches – springs at different level-Two hinged arches- two hinged circular arches – fixed arches (only theory) - Temperature stresses in arches.						



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Textbooks:
<ol style="list-style-type: none"> 1. C. S. Reddy, “Basic Structural Analysis”, Tata McGraw Hill 2. S. Ramamurtham, “Theory of Structures”, Dhanpat Rai Publishing Company (p) Ltd, 2009
Reference Books:
<ol style="list-style-type: none"> 1. Timoshenko & Young, “Theory of Structures”, Tata McGraw Hill 2. S.S. Bhavikatti, “Structural analysis”, Volume 1 and 2, Vikas publishing house pvt. Ltd. 3. Dr.Vaidyanathan, Dr.P.Perumal, “Comprehensive structural analysis”, Vol-II, Laxmi Publications (P) Ltd. 4. Junarkar S. B., “Structural Mechanics”, Vol I & II, Charotar Publishers
Online Learning Resources:
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/105/105/105105166/ 2. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-571-structural-analysis-and-control-spring-2004/syllabus/ 3. https://www.udemy.com/course/statics-for-engineering-undergrads/?utm_source=adwords&utm_medium=udemyads&utm_campaign=LongTail_la.EN_cc.INDIA&utm_content=deal4584&utm_term=.ag_118445032537.ad_533094112755.kw.de.c.dm.pl.ti.dsa-1212271230479.li_9040221.pd.&matchtype=b&gclid=CjwKCAjw9aiIBhA1EiwAJ_GTSi9B1-IRzq7FUIND1u-mrYI7l0tzc3Tv35FKdG1Tpl-WkGjHlmbxoC920QAvD_BwE



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CIVIL ENGINEERING

Course Code	Concrete Technology		L	T	P	C
20A01403T			3	0	0	3
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> To explain the functional role of ingredients of concrete and apply this knowledge to mix design philosophy To develop fundamental knowledge in the fresh and hardened properties of concrete To inculcate the testing methodology to evaluate the properties of concrete during fresh and hardened stage To impart the knowledge on the behavior of concrete with response to stresses developed. To impart the knowledge on the special concretes and design a concrete mix which fulfils the required properties for fresh and hardened concrete 						
Course Outcomes (CO):						
At the end of the course student is able to						
<ul style="list-style-type: none"> Understand various ingredients of concrete and their role. Examine knowledge on the fresh and hardened properties of concrete. Examine the the behavior of concrete with response to stresses developed Design concrete mixes using various methods. Perceive special concretes for accomplishing performance levels. 						
UNIT - I	Ingredients of concrete					
Cement-chemical composition-hydration process-Bogue's compound-Tests on properties of cement-Types of cement - I.S. Specifications. Aggregates- classification of aggregate – tests on properties of aggregates - characteristics of aggregate - I.S. Specifications. Water-quality of water - characteristics of water - I.S. Specifications. Admixtures – classification of chemical admixtures – properties and limitations – classification of mineral admixtures – properties and limitations - I.S. Specifications.						
UNIT - II	Properties of concrete					
Fresh concrete: Mixing of concrete-workability-factors influencing workability measurement of workability for conventional concrete (Slump Cone, Compaction Factor and Vee-Bee test) & SCC (V-Funnel, L-Box, U- Box, Slump Flow and J-Ring). Hardened concrete: Water/Cement Ratio(Abram's Law)-Gel Space Ratio-tests on hardened concrete -Destructive Tests (Compression, Split Tensile and Flexural)-Semi Destructive Tests (Core Cutter and Pull out test) and Non Destructive Tests (Rebound Hammer-UPV - Radiological methods).						
UNIT - III	Elasticity, Shrinkage and Creep					
Curing of concrete -methods of curing-effects of improper curing-self curing-Modulus of Elasticity-Poisson's Ratio-Dynamic Modulus of Elasticity- Shrinkage and various types - Factors Affecting Shrinkage-Moisture Movement-Creep of Concrete-Factors Influencing Creep.						
UNIT - IV	Concrete Mix Design					
Proportioning of Concrete Mixes-factors influencing - Road Note. No. 4 and IS Code Methods- IS 456 provisions on Durability-Quality Control and Statistical Methods – Mix Design of : High Strength concrete – High Performance Concrete.						
UNIT - V	Special Concretes					
Introduction – Mix Design – Applications of : Light Weight Concretes - Cellular Concrete - No Fines Concrete-High Density Concrete – Fiber Reinforced Concrete-Polymer Concrete-Self Compacting Concrete .						



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Textbooks:
<ol style="list-style-type: none"> 1. A. M. Neville, "Properties of Concrete", Pearson Publication – 4th Edition 2. M.S. Shetty, A. K. Jain, "Concrete Technology Theory and Practice", S. Chand and Company Limited, New Delhi
Reference Books:
<ol style="list-style-type: none"> 1. M. L. Gambhir, "Concrete Technology", Tata Mc. Graw Hill Publishers, New Delhi 2. N. Krishna Raju, "Design of Concrete Mixes", CBS Publishers. 3. P. K. Mehta And J. M. Monteiro, "Concrete: Micro Structure, Properties and Materials" Mc-Graw Hill Publishers 4. J. Prasad, C.G.K. Nair, "Non-Destructive Test and Evaluation of Materials", Tata Mcgraw Hill Publishers, New Delhi 5. Newman, John & Choo, Ban Sang. "ADVANCED CONCRETE TECHNOLOGY- Constituent Materials" Elsevier 2003.
Online Learning Resources:
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc19_ce20/preview 2. https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-054-mechanics-and-design-of-concrete-structures-spring-2004/download-course-materials/ 3. https://www.udemy.com/course/properties-of-fresh-hardened-concrete/?utm_source=adwords&utm_medium=udemyads&utm_campaign=DSA_Catcha ll la.EN cc.INDIA&utm_content=deal4584&utm_term= . ag 82569850245 . ad 5332 20805574 . kw . de c . dm . pl . ti dsa- 52949608673 . li 9040221 . pd . &matchtype=b&gclid=CjwKCAjwmK6IBhBqEiw AocMc8h6K0s2ri4I8hJYzyJ3MytwTDb7ZIC8kzKe-n6t- 649itkeOUSg4eRoChA8QAvD_BwE



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CIVIL ENGINEERING

Course Code	Environmental Engineering - I		L	T	P	C
20A01404T			3	0	0	3
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> • To teach requirements of water and its treatment. • To impart knowledge on sewage treatment methodologies. • To provide facts on Air pollution and control. • To enable with design concepts of wastewater treatment UNITs • To throw light on importance of plumbing. • 						
Course Outcomes (CO):						
At the end of the course, the student will be able to: <ul style="list-style-type: none"> • Understand about quality of water and purification process • Select appropriate technique for treatment of wastewater. • Assess the impact of air pollution • Understand consequences of solid waste and its management • Design domestic plumbing systems 						
UNIT - I	Water quality and treatment:					
Water quality: Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices, water safety plans, Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design. Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes						
UNIT – II	Sewage and Treatment					
Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage-Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water-Quantification and design of Storm water; Sewage and Sullage, Pollution due to improper disposal of sewage, National River cleaning plans, Wastewater treatment – COD & BOD- aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes.						
UNIT - III	Air Pollution					
Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air pollution- Occupational hazards, Urban air pollution automobile pollution, Chemistry of combustion, Automobile engines, quality of fuel, operating conditions and interrelationship. Air quality standards, Control measures for Air pollution, construction and limitations.						
UNIT - IV	Solid Waste Management					
Municipal solid waste-Composition - chemical and physical parameters - Collection, transport, treatment and disposal. waste from commercial establishments and other urban zonesconstruction activities - biomedical wastes, Effects of solid waste on environment. Disposal of solid waste-Disposal methods- Integrated solid waste management.						



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CIVIL ENGINEERING

UNIT - V	Domestic Plumbing
Types of home plumbing systems for water supply and waste water disposal, high rise building plumbing-Pressure reducing valves, Break pressure tanks, Storage tanks, Building drainage for high rise buildings, various kinds of fixtures and fittings. Role of Government authorities in water supply, sewerage disposal	
Textbooks:	
<ol style="list-style-type: none"> 1. G. S. Birdi, "Water supply and sanitary Engineering", Dhanpat Rai & Sons Publishers. 2. Peavy, H.S, Rowe, D. R. Tchobanoglous, "Environmental Engineering", Mc-Graw – Hill International Editions, New York 1985. 	
Reference Books:	
<ol style="list-style-type: none"> 1. B.C. Punmia, Ashok Jain & Arun Jain, "Water Supply Engineering", Vol. 1, Waste water Engineering, Vol. II, Laxmi Publications Pvt. Ltd, New Delhi. 2. MetCalf and Eddy, "Wastewater Engineering", Treatment, Disposal and Reuse, Tata McGraw- Hill, New Delhi. 3. S. M. Patil, "Plumbing Engineering Theory, Design and Practice", 1999. 4. K. N. Duggal, "Elements of Environmental Engineering", S. Chand Publishers. 	
Online Learning Resources:	
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/103/107/103107084/ 2. https://ocw.mit.edu/courses/environment-courses/ 3. https://learningpath.org/articles/Free Online Environmental Engineering Courses from Top Universities.html 4. https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ge22/ 	



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CIVIL ENGINEERING

Course Code	ENGINEERING GEOLOGY LAB		L	T	P	C
20A01401P			0	0	3	1.5
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
The object of the course is to enable the students to identify the physical characteristics various rocks						
Course Outcomes (CO):						
At the end of the course the students will be able to classify various types of rocks, their properties and they will be familiar with interpretation of geological maps.						
List of Experiments:						
<ol style="list-style-type: none"> 1. Physical properties of minerals: Mega-scopic identification of Rock forming minerals – Quartz group, Feldspar group, 2. Identification of Rock forming minerals Garnet group, Mica group 3. Physical properties of minerals: Mega-scopic identification of Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc... 4. Physical properties of minerals: Mega-scopic identification of Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc... 5. Megascopic description and identification of Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc... 6. Megascopic description and identification of Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc... 7. Megascopic description and identification of Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc... 8. Interpretation and drawing of sections for geological maps showing tilted beds 9. Interpretation and drawing of sections for geological maps showing faults, 10. Interpretation and drawing of sections for geological maps showing unconformities etc. 11. Simple Structural Geology problems. 12. Strength of the rock using laboratory tests. 						



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CIVIL ENGINEERING

Course Code	Concrete Materials Lab		L	T	P	C
20A01405			0	0	3	1.5
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> • To find the various physical characteristics of cement, coarse and fine aggregates • To find the various properties of green and hardened concrete. 						
Course Outcomes (CO):						
At the end of the course, the student will be able						
<ul style="list-style-type: none"> • To find the characteristics of fine and coarse aggregates • To understand the workability behaviour of concrete through various tests 						
List of Experiments:						
<ol style="list-style-type: none"> 1. Grading Curve of Coarse aggregates 2. Grading Curve of Fine aggregates 3. Bulking of Fine aggregate 4. Specific gravity of coarse aggregate 5. Specific gravity of Fine aggregate 6. Specific gravity of Cement 7. fineness of Cement 8. Normal Consistency of Cement 9. Initial and final setting times of Cement 10. Soundness test of Cement 11. Compressive Strength test of Cement 12. Slump, Compaction factor and Vee-Bee time tests on concrete. 13. Compressive strength of concrete. 14. Split tensile strength of concrete 15. Non destructive tests on concrete (any two) 						



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CIVIL ENGINEERING

Course Code	ENVIRONMENTAL ENGINEERING LAB		L	T	P	C
20A01404P			0	0	3	1.5
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
The object of the course is to enable the students to identify the characteristics of water sample						
Course Outcomes (CO):						
At the end of the course, the student will be able to Understand about quality of water standards						
List of Experiments:						
<ol style="list-style-type: none"> 1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil. 2. Determination and estimation of Total Hardness–Calcium & Magnesium. 3. Determination of Alkalinity/Acidity 4. Determination of Chlorides in water and soil 5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone. 6. Determination of Iron. 7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D. 8. Determination of N, P, K values in solid waste 9. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste. 10. Determination of C.O.D. 11. Determination of Optimum coagulant dose. 12. Determination of Chlorine demand. 13. Presumptive Coliform test. 						
References:						
1.G. S. Birdi “Water supply and sanitary Engineering”, Dhanpat Rai & Sons Publishers. 2.Peavy, H.S, Rowe, D. R. Tchobanoglous, “Environmental Engineering”, Mc-Graw –Hill International Editions, New York 1985						



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CIVIL ENGINEERING

Course Code	Soft Skills		L	T	P	C
20A52401			1	0	2	2
Pre-requisite	NIL	Semester	IV			
Course Objectives:						
<ul style="list-style-type: none"> • To encourage all round development of the students by focusing on soft skills • To make the students aware of critical thinking and problem-solving skills • To develop leadership skills and organizational skills through group activities • To function effectively with heterogeneous teams 						
Course Outcomes (CO):						
By the end of the program students should be able to						
<ul style="list-style-type: none"> • Memorize various elements of effective communicative skills • Interpret people at the emotional level through emotional intelligence • apply critical thinking skills in problem solving • analyse the needs of an organization for team building • Judge the situation and take necessary decisions as a leader • Develop social and work-life skills as well as personal and emotional well-being 						
UNIT – I	Soft Skills & Communication Skills				10 Hrs	
Introduction, meaning, significance of soft skills – definition, significance, types of communication skills - Intrapersonal & Inter-personal skills - Verbal and Non-verbal Communication						
Activities:						
Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity (The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)						
Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.						
Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.						
Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation						
UNIT – II	Critical Thinking				10 Hrs	
Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking						
Activities:						
Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis						
UNIT – III	Problem Solving & Decision Making				10 Hrs	
Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Methods of decision making – Effective decision making in teams – Methods & Styles						
Activities:						
Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion						



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UNIT – IV	Emotional Intelligence & Stress Management	10 Hrs
Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips Activities: Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates		
UNIT – V	Leadership Skills	10 Hrs
Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk-Taking - Team Building - Time Management Activities: Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc. NOTE:- 1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill. 2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear or for good Leadership – Mahendar Singh Dhoni etc.		
Textbooks:		
1. Personality Development and Soft Skills (English, Paperback, Mitra Barun K.) Publisher: Oxford University Press; Pap/Cdr edition (July 22, 2012) 2. Personality Development and Soft Skills: Preparing for Tomorrow, <u>Dr Shikha Kapoor</u> Publisher : I K International Publishing House; 0 edition (February 28, 2018)		
Reference Books:		
1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018. 2. Soft Skills By Alex K. Published by S.Chand 3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley. 4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books 5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press 6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher: Vayu Education of India		
Online Learning Resources:		
1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCYtvXh0E_y-bOO1_q 2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ 3. https://youtu.be/-Y-R9hDI7IU 4. https://youtu.be/gkLsn4ddmTs 5. https://youtu.be/2bf9K2rRWwo 6. https://youtu.be/FchfE3c2jzc		



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CIVIL ENGINEERING

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Course Code	Design Thinking for Innovation (Common to All branches of Engineering)	L	T	P	C
20A99401		2	1	0	0
Pre-requisite	NIL	Semester		IV	
Course Objectives:					
The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.					
Course Outcomes (CO):					
<ul style="list-style-type: none"> ● Define the concepts related to design thinking. ● Explain the fundamentals of Design Thinking and innovation ● Apply the design thinking techniques for solving problems in various sectors. ● Analyse to work in a multidisciplinary environment ● Evaluate the value of creativity ● Formulate specific problem statements of real time issues 					
UNIT - I	Introduction to Design Thinking	10 Hrs			
Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.					
UNIT - II	Design Thinking Process	10 Hrs			
Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brain storming, product development					
Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.					
UNIT - III	Innovation	8 Hrs			
Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity.					
Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.					
UNIT - IV	Product Design	8 Hrs			
Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.					
Activity: Importance of modelling, how to set specifications, Explaining their own product design.					
UNIT - V	Design Thinking in Business Processes	10 Hrs			
Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.					



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Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Textbooks:

1. Change by design, Tim Brown, Harper Bollins (2009)
2. Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons.

Reference Books:

1. Design Thinking in the Classroom by David Lee, Ulysses press
2. Design the Future, by Shrrutin N Shetty, Norton Press
3. Universal principles of design- William lidwell, kritinaholden, Jill butter.
4. The era of open innovation – chesbrough.H

Online Learning Resources:

<https://nptel.ac.in/courses/110/106/110106124/>
<https://nptel.ac.in/courses/109/104/109104109/>
https://swayam.gov.in/nd1_noc19_mg60/preview



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CIVIL ENGINEERING

COMMUNITY SERVICE PROJECT

.....Experiential learning through community engagement

Introduction

- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will be benefited with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and also emerge as a socially responsible institution.

Objective

Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of the society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
- To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project

- Every student should put in a 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, house-wives, etc
- A log book has to be maintained by each of the student, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty incharge.



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- Evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.
- The Community Service Project should be different from the regular programmes of NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project report should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training

Procedure

- A group of students or even a single student could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.
- The Community Service Project is a twofold one –
 - First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.
 - Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like –
 - Agriculture
 - Health
 - Marketing and Cooperation
 - Animal Husbandry
 - Horticulture
 - Fisheries
 - Sericulture
 - Revenue and Survey
 - Natural Disaster Management
 - Irrigation
 - Law & Order
 - Excise and Prohibition
 - Mines and Geology
 - Energy
 - Internet
 - Free Electricity
 - Drinking Water

EXPECTED OUTCOMES



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BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes

- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development
- Improved ability to understand complexity and ambiguity

Personal Outcomes

- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills

Social Outcomes

- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development

- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity

Relationship with the Institution

- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS

- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES

- Improved institutional commitment
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY

- Satisfaction with student participation
- Valuable human resources needed to achieve community goals
- New energy, enthusiasm and perspectives applied to community work
- Enhanced community-university relations.



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SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions and modifications. Colleges are expected to focus on specific local issues for this kind of projects. The students are expected to carry out these projects with involvement, commitment, responsibility and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of projects. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting shall be ensured.

For Engineering Students

1. **Water facilities and drinking water availability**
2. **Health and hygiene**
3. **Stress levels and coping mechanisms**
4. **Health intervention programmes**
5. **Horticulture**
6. **Herbal plants**
7. **Botanical survey**
8. **Zoological survey**
9. **Marine products**
10. **Aqua culture**
11. **Inland fisheries**
12. **Animals and species**
13. **Nutrition**
14. **Traditional health care methods**
15. **Food habits**
16. **Air pollution**
17. **Water pollution**
18. **Plantation**
19. **Soil protection**
20. **Renewable energy**
21. **Plant diseases**
22. **Yoga awareness and practice**
23. **Health care awareness programmes and their impact**
24. **Use of chemicals on fruits and vegetables**
25. **Organic farming**
26. **Crop rotation**
27. **Floury culture**
28. **Access to safe drinking water**
29. **Geographical survey**
30. **Geological survey**
31. **Sericulture**



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32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilisation of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complimenting the community service project the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programmes are;

Programmes for School Children

1. Reading Skill Programme (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Programme on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Programme on Socially relevant themes.

Programmes for Women Empowerment

1. Government Guidelines and Policy Guidelines
2. Womens' Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship

General Camps

1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti Plastic Awareness
9. Programmes on Environment
10. Health and Hygiene
11. Hand wash programmes
12. Commemoration and Celebration of important days

Programmes for Youth Empowerment

1. Leadership
2. Anti-alcoholism and Drug addiction



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3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development

Common Programmes

1. Awareness on RTI
2. Health intervention programmes
3. Yoga
4. Tree plantation
5. Programmes in consonance with the Govt. Departments like –
 - i. Agriculture
 - ii. Health
 - iii. Marketing and Cooperation
 - iv. Animal Husbandry
 - v. Horticulture
 - vi. Fisheries
 - vii. Sericulture
 - viii. Revenue and Survey
 - ix. Natural Disaster Management
 - x. Irrigation
 - xi. Law & Order
 - xii. Excise and Prohibition
 - xiii. Mines and Geology
 - xiv. Energy

Role of Students:

- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also with the Governmental Departments. If the programme is rolled out, the District Administration could be roped in for the successful deployment of the programme.
- An in-house training and induction programme could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.



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- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (One Week)

- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmes to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. Community Immersion Programme (Three Weeks)

Along with the Community Awareness Programmes, the student batch can also work with any one of the below listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to the experiential learning about the community and its dynamics. Programmes could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks work to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that particular habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University.

Throughout the Community Service Project, a daily log-book need to be maintained by the students batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them.