B.TECH.–CIVILENGINEERING
IIYEARCOURSESTRUCTURE&SYLLABI

B.Tech.–II YearI Semester

S.No.	Category	Title	L	T	P	Credits
1	23BST07	Numerical and Statistical Methods	3	0	0	3
2	23BST12	Universal Human Values– Understanding Harmony and Ethical Human Conduct	2	1	0	3
3	23CET01	Surveying	3	0	0	3
4	23CET02	Strength of Materials	3	0	0	3
5	23CET03	Fluid Mechanics	3	0	0	3
6	23CEP02	Surveying Lab	0	0	3	1.5
7	23CEP03	Strength of Materials Lab	0	0	3	1.5
8	23CEP04	Building Planning and Drawing	0	1	2	2
9	23BST13	Environmental Science	2	0	0	-
Total			16	02	08	20

B.Tech.IIYearII Semester

S.No.	Category	Title	L	T	P	Credits
1	23MBTU1	(a) Managerial Economics and Financial Analysis (b) Organizational Behavior Business (c) Environment	2	0	0	2
2	23CET04	Engineering Geology	3	0	0	3
3	23CET05	Concrete Technology	3	0	0	3
4	23CET06	Structural Analysis	3	0	0	3
5	23CET07	Hydraulics& Hydraulic Machinery	3	0	0	3
6	23CEP05	Concrete Technology Lab	0	0	3	1.5
7	23CEP06	Engineering Geology Lab	0	0	3	1.5
8	23BSP07	Soft Skills	0	1	2	2
9	23MBTU2	Design Thinking & Innovation	1	0	2	2
Total			15	1	10	21

II Year B.Tech. CE–I Semester

(23BST07)NUMERICAL & STATISTICAL METHODS

Course Outcomes:

After successful completion of this course, the students should be able to:

Cos	Statements	Blooms level
CO1	Apply numerical methods to solve algebraic and transcendental equations	**L2**
CO2	Derive interpolating polynomials using interpolation formulae	**L3**
CO3	Solve differential and integral equations numerically	**L3**
CO4	To identify real life problems into Mathematical Models.	**L2**
CO5	To apply the probability theory and testing of hypothesis in the field of civil Engineering Applications.	**L3**

Pre-requisite: Basic algebraic Equations, Probability, random variables (discrete and continuous) and probability distributions.

UNITI: Solution of Algebraic & Transcendental Equations

Introduction-Bisection Method-Iterative method, Regula- falsi method and Newton Raphson method, System of Algebraic equations: Successive over relation method.

UNIT II : Interpolation

Finite differences- Newton's forward and backward interpolation formulae–Central differences & Gauss forward and backward interpolation formulae-Lagrange's formulae. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least squares.

UNIT III: Solution of Initial value problems to Ordinary differential equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Milne's Predictors Corrector method-Euler's and modified Euler's methods-Runge-Kutta methods (second and fourth order).

UNIT IV: Estimation and Testing of hypothesis, large sample tests

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

UNITV Small sample tests

Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test),$\chi 2$ -test forgoodnessoffit,$\chi 2$-testforindependence of attributes.

Textbooks:

1. SSSastry, Introductory Methods ofNumerical Analysis,PHILearningPrivateLimited.
2. B.S.Grewal,HigherEngineeringMathematics,KhannaPublishers,2017,44thEdition
3. MillerandFreunds,Probabilit yandStatisticsforEngineers,7/e,Pearson,2008.India.

ReferenceBooks:

1. Erwin Kreyszig ,Advanced Engineering Mathematics, JohnWiley &Sons, 2018, 10thEdition.
2. R.K.JainandS.R.K.Iyengar, Advanced Engineering Mathematics, Alpha Science International Ltd.,20 215th Edition (9threprint).
3. Ronald E.Walpole, Probability and Statistics for Engineers and Scientists, PNIE
4. H.K Das,Er.Rajnish Verma, Higher Engineering Mathematics, S.ChandPublications,2014,ThirdEdition(Reprint2021)
5.

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview

https://onlinecourses.nptel.ac.in/noc24_ma05/previewhttp://nptel.ac.in/courses/111105090

II Year B.Tech. CE–I Semester

		P	C
		0	3

(23BST12)UNIVERSAL HUMAN VALUES–UNDERSTANDINGHAR MONYAND ETHICAL HUMAN CONDUCT

(Common to All Branches of Engineering)

Course Objectives:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

COURSE OUTCOMES: At the end of the course, students will be able to		**Blooms Level**
CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	L1
CO2	Identify one's self ,and one's surroundings(family, society, nature)	L1
CO3	Apply what they have learnt to their own self in different day-to-day settings in real life	L3
CO4	Relate human values with human relationship and human society.	L4
CO5	Justify the need for universal human values and harmonious existence	L5
CO6	Develop as socially and ecologically responsible engineers	L3

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I Introduction to Value Education (6 lectures and 3 tutorials for practice session)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself
Lecture3:self-explorationastheProcessforValueEducation
Lecture4: Continuous Happiness and Prosperity–the Basic Human Aspirations
Tutorial2:PracticeSessionPS2ExploringHumanConsciousness Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial3:PracticeSessionPS3ExploringNaturalAcceptance

UNIT II Harmony in the Human Being (6 lectures and 3 tutorials for practice session)
Lecture 7: Understanding Human being as the Co-existence of the self and the

	body. Lecture8:Distinguishing between the Needs of the self and the body Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body. Lecture9: The body as an Instrument of the self Lecture 10: Understanding Harmony in the self Tutorial5:PracticeSessionPS5ExploringSourcesofImaginationintheself Lecture 11: Harmony of the self with the body Lecture12: Programme to ensure self-regulation and Health Tutorial6:PracticeSessionPS6ExploringHarmonyofselfwiththebody
UNIT III	Harmony in the Family and Society (6lecturesand3tutorialsforpractice session) Lecture13: Harmonyinthe Family–the Basic Unit of Human Interaction Lecture 14: 'Trust' – the Foundational Value in Relationship Tutorial7:PracticeSessionPS7ExploringtheFeelingofTrust Lecture 15: 'Respect' – as the Right Evaluation Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture16: Other Feelings, Justice in Human-to-Human Relationship Lecture 17: Understanding Harmony in the Society Lecture18: Vision for the Universal Human Order Tutorial9:Practice Session PS9 Exploring Systems to fulfill Human Goal
UNIT IV	Harmony in the Nature /Existence (4lecturesand2tutorialsforpractice session) Lecture19: Understanding Harmony in the Nature Lecture20: Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature Tutorial10: PracticeSessionPS10 Exploring the Four Orders of Nature Lecture 21: Realizing Existence as Co-existence at All Levels Lecture22: The Holistic Perception of Harmony in Existence Tutorial11:PracticeSessionPS11ExploringCo-existenceinExistence
UNIT V	Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session) Lecture 23: Natural Acceptance of Human Values Lecture24: Definitiveness of (Ethical) Human Conduct Tutorial12:Practice SessionPS12 Exploring Ethical Human Conduct Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order Lecture26:Competence in Professional Ethics Tutorial13:PracticeSessionPS13ExploringHumanisticModels in Education Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies Lecture28:Strategies for Transition towards Value-based Life and Profession Tutorial14:PracticeSessionPS14ExploringStepsofTransitiontowards Universal Human Order

Practice Sessions for UNITI–Introduction to Value Education PS1
Sharing about Oneself
PS2ExploringHumanConsciousness PS3
Exploring Natural Acceptance

Practice Sessions for UNITII–Harmony in the Human Being PS4
Exploring the difference of Needs of self and body
PS5ExploringSourcesofImaginationintheself PS6
Exploring Harmony of self with the body

Practice Sessions for UNITIII–Harmony in the Family and Society PS7

Exploring the Feeling of Trust
PS8ExploringtheFeelingofRespect
PS9ExploringSystemstofulfilHumanGoal

Practice Sessions for UNITIV–Harmony in the Nature (Existence) PS10
Exploring the Four Orders of Nature
PS11ExploringCo-existenceinExistence

Practice Sessions for UNITV–Implications of the Holistic Understanding–a Look at Professional Ethics
PS12Exploring Ethical Human Conduct
PS13Exploring Humanistic Models in Education
PS14Exploring Steps of Transition towards Universal Human Order

READINGS:

Text book and Teachers Manual

a. The Textbook

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

b. The Teacher's Manual

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

1. Jeevan Vidya:EkParichaya, ANagaraj,JeevanVidyaPrakashan,Amarkantak,1999.
2. HumanValues,A.N.Tripathi,NewAgeIntl.Publishers,NewDelhi,2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth-by Mohandas Karam chand Gandhi
5. Small is Beautiful-E.F Schumacher.
6. Slow is Beautiful-Cecile Andrews
7. Economy of Permanence-JC Kumarappa
8. Bharat Mein Angreji Raj–Pandit Sunderlal
9. Rediscovering India-by Dharampal
10. Hind Swarajor Indian Home Rule-by Mohandas K.Gandhi
11. India Wins Freedom-Maulana Abdul Kalam Azad
12. Vivekananda-Romain Rolland(English)
13. Gandhi-Romain Rolland(English)

Mode 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 practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity 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.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf

2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf

3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf

5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf

6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf

7.https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf

8.https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385
https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

II Year B.Tech. CE–I Semester

CourseCode& Name	(23CET01) SURVEYING	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

Theobjective ofthiscourseisto:

- Know the principle and methods ofsurveying and measuring ofhorizontaland vertical- distances and angles
- Identificationofsourceoferrorsand rectificationmethods
- Knowsurveyingprinciplestodetermineareasandvolumes
- Settingoutcurvesandusemodernsurveyingequipment'sforaccurateresults
- KnowthebasicsofPhotogrammetrySurveying

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

CO	Statement	BloomsLevel
CO1	Applytheprincipleandmethodsofsurveyingandmeasuringof horizontaland vertical- distances and angles	L2
CO2	Identifythesourceoferrorsandrectification methods	L3
CO3	Applysurveyingprinciplestodetermineareasandvolumes	L2
CO4	Settingoutcurvesandusingmodernsurveyingequipment's	L3
CO5	ApplythebasicsofPhotogrammetrySurveyinginfield	L4

UNIT - I

IntroductionandBasicConcepts: Introduction,Objectives,classificationandprinciplesof surveying, Surveying accessories. Introduction to Compass, leveling and Plane table surveying.

Linear distances - Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections.

PrismaticCompass-Bearings,includedangles,LocalAttraction,MagneticDeclination,and dip –systems and W.C.B and Q.B systems of locating bearings.

UNIT - II

Leveling-Typesoflevels, methodsoflevelling,andDeterminationoflevels,Effectof Curvature of Earth and Refraction.

Contouring-CharacteristicsandusesofContours, methodsofcontour surveying.

Areas-Determinationofareasconsistingofirregular boundaryandregular boundary.

Volumes-Determinationofvolumeofearthworkincuttingandembankmentsforlevel section, capacity of reservoirs.

UNIT - III

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontalanglebyrepetitionmethodandreiterationmethod,measurementofverticalAngle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods oftraversing, traverse computations and adjustments, Introduction to Omitted measurements.

UNIT - IV

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves. Introduction to Tacheometric Surveying.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Introduction to Global Positioning System. Introduction to Drone survey and LiDAR Survey (Light Detection and Ranging).

UNIT - V

Photogrammetry Surveying:

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

Textbooks:

1. Surveying (Vol– 1& 2) by Duggal SK, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2. Textbook of Surveying by C Venkatramaiah, Universities Press 1st Edition, 2011.

Reference Books:

1. Surveying (Vol–1), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain -Laxmi Publications (P) ltd., New Delhi, 18th edition 2024.
2. Surveying (Vol–2), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain -Laxmi Publications (P) ltd., New Delhi 17th 2022.
3. Surveying (Vol–3), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain -Laxmi Publications (P) ltd., New Delhi 16th 2023.
4. Plane Surveying and Higher Surveying‖ by Chandra AM, Newage International Pvt. Ltd., Publishers, New Delhi, 3rd Edition, 2015.
5. Surveying and Levelling by N. Basak Tata McGraw Hill Publishing Co. Ltd. New Delhi, 4th edition, 2014.
6. Surveying (Vol1, 2 &3), by Arora KR, Standard Book House, Delhi. Edition: 12th, 2015.

B.Tech.–IIYear ISemester

CourseCode& Name	(23CET02) STRENGTHOFMATERIALS	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- To impartFundamental concepts of Strength of Material and Principles of Elasticityand Plasticity Stress
- Toimpart conceptsofshear forceandbending momentonvarioustypesofbeams andloading conditions
- To impartconcepts of stresses developedin the cross section and bending equationscalculationofsectionmodulusofsectionswithdifferent crosssections.
- The concepts above will be utilized in measuring deflections in beams under variousloading and support conditions.
- To classifycylindersandcolumns basedontheirthicknessand to derive equations formeasurement of stresses across the cross section when subjected to external pressure.

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

CO	Statement	Blooms level
CO1	Tounderstandthebasicmaterialsbehaviorundertheinfluenceofdifferent externalloadingconditions andthesupport conditions.	L2
CO2	Todrawthediagramsindicatingthevariationofthekeyperformancefeatures likeaxialforces,bendingmomentandshearforcesinstructuralmembers.	L3
CO3	To acquire knowledgeof bending conceptsand calculationof sectionmodulus and for determination of stresses developed in the beams	L2
CO4	Toanalyzethedeflectionsduetovariousloadingconditions.	L3
CO5	Toassess stresses across sectionofthethin, thickcylinders andcolumns toarrive at optimum sections to withstand the internal pressure using Lame's equation	L4

UNIT - I

Simple Stresses and Strains: Elasticity and plasticity — Types of stresses and strains — Hooke's law—Factorofsafety, Poisson'sratio -RelationshipbetweenElasticconstants — Bars of varying section — stresses in composite bars.

UNIT - II

ShearForce and Bending Moment: Definition of beam — Types of beams — Concept of shear force and bending moment — Point of contra flexure — Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformlyvaryingloads,partialuniformlydistributedloads,coupleandcombinationofthese loads.

UNIT - III

Flexuraland ShearStresses:

FlexuralStresses: Theoryofsimplebending—Assumptions—Derivationofbending equation, Neutral axis — Determination of bending stresses — section modulusof rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections — Design of simple beams

Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections. Torsion–circular shaftsonly.

UNIT - IV

DeflectionofBeams: DoubleintegrationandMacaulay'smethods—Determinationofslope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combinationofthese loads. Mohr's theorems — Moment area method — application to simple cases of cantilever.

UNIT - V

Introduction – Classificationofcolumns – Axially loaded compression members – Euler 's cripplingloadtheory–DerivationofEuler'scriticalloadformulaeforvariousendconditions – Equivalent length – Slenderness ratio– Euler 's critical stress – Limitations of Euler 's theory– Rankine – Gordonformula – Eccentric loading and Secant formula – Prof. Perry's formula.

Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferentialstresses—hoop,longitudinalandvolumetricstrains—changesindiameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae, distributionof hoop and radialstresses acrossthe thickness, compound cylinders- distribution of stresses

Textbooks:

1. StrengthofMaterialsbyR. K. Bansal,LakshmiPublications,16th Edition,2022.
2. StrengthofMaterialsbyB.S.BasavarajaiahandP.Mahadevappa,Universities Press3rd Edition, 2010
3. StrengthofMaterialsby J.K.GuptaandS.K.Gupta,Cengagepublications2nd edition ,2024

ReferenceBooks:

1. AdvancedMechanicsofSolids, L.SSrinath,McGrawHillEducation, 2017,3rdEdition
2. Strengthof Materials-Fundamentalsand Applications,T.D.GunneswaraRao andMudim by Andal, Cambridge University Press, 2018, 1st Edition
3. Mechanics ofMaterials, Beer and Johnston, McGraw HillIndia Pvt. Ltd., 2020, 8thEdition (SI Units).
4. MechanicsofSolids—EPPopov, Prentice Hall,2nd Edition, 2015.
5. A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SIUnits S. Chand & Co, New Delhi7th edition 2022.
6. StrengthofMaterialsbyS.S.RatanTataMcGrillPublications3rd Edition,2016.

B.Tech.–II Year-ISemester

CourseCode& Name	(23CET03)FLUIDMECHANICS	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- To explain basicsofstatics, kinematicsand dynamicsoffluidsand various measuringtechniques of hydrostatic forces on objects.
- Toimpartabilitytosolveengineeringproblemsinfluidmechanics
- To enable the students measure quantities of fluid flowing in pipes, tanks and channels
- To teach integral forms of fundamental laws of fluidmechanics topredictrelevantpressures, velocities and forces.
- To strengthen the students with fundamentals useful in application-intensive coursesdealing with hydraulics, hydraulic machineryand hydrologyin future courses.

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

COs	STATEMENTS	Blooms level
CO1	Understandtheprinciplesoffluidstatics,kinematicsanddynamics	L2
CO2	Applythelawsoffluidstaticsandconceptsofbuoyancy	L3
CO3	Understandthefundamentalsoffluidkinematicsanddifferentiatetypesoffluid flows	L2
CO4	ApplythePrincipleofconservationofenergyforflowmeasurement.	L3
CO5	Analysethelossesinpipesanddischargethroughpipenetwork.	L4

UNIT - I

Basic concepts and definitions: Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature,Newtonlawofviscosity;Vaporpressure,Boilingpoint,Surfacetension, Capillarity,Bulkmodulusofelasticity,Compressibility.

UNIT - II

Fluid statics: Fluid Pressure: Pressure at a point, Pascal ‘s law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer,UTubeDifferentialManometer.Pressuregauges,Hydrostaticpressureand force:horizontal,verticalandinclinedsurfaces. Buoyancyandstabilityoffloatingbodies.

UNIT - III

Fluidkinematics:

Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminarandturbulentflow;rotationalandirrotationalflow;compressibleandincompressible flow;idealandrealfluidflow;one-,two-andthree-dimensionalflows;Streamline,pathline, streak line and streamtube; stream function, velocity potential function. One, two and three -Dimensionalcontinuityequations inCartesiancoordinates.

UNIT - IV

FluidDynamics:Surfaceandbodyforces;Equationsofmotion–Euler’sequation;Bernoulli ‘s equation – Derivation; Energy Principle; Practical applications of Bernoulli ‘s equation: Venturimeter, orificemeterand Pitot tube; Momentum principle; Forces exerted by fluid flowonpipebend;VortexFlow–FreeandForced;DefinitionsofReynoldsNumber,Froude Number, Mach Number, Weber Number and Euler Number;

UNIT - V

AnalysisOfPipeFlow:Energylossesinpipelines;Darcy–Weisbachequation;Minorlosses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.
Textbooks:
1. P. M. Modiand S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House22nd,2019. 2. K.Subrahmanya,Theory andApplications of Fluid Mechanics,Tata McGraw Hill,2nd edition 2018
ReferenceBooks:
1. R.K.Bansal,AtextofFluidmechanicsandhydraulicmachines,LaxmiPublications (P) Ltd.,NewDelhi11thedition,2024. 2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, UniversitiesPress Pvt Ltd, Hyderabad. 3rd Edition 2009. 3. FluidMechanicsbyFrankM.White,Henry Xue,Tata McGrawHill,9th edition, 2022. 4. C.S.P.Ojha,R.BerndtssonandP.N.Chadramouli, FluidMechanicsand Machinery,Oxford University Press, 2010. 5. Introduction to Fluid Mechanics & Fluid Machines by SK Som, Gautam Biswas, SChakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:

https://archive.nptel.ac.in/courses/112/105/112105269/
https://nptel.ac.in/courses/112104118https://nptel.ac.in/courses/105103192

B.Tech.–II Year-ISemester

CourseCode& Name	(23CEP02)SURVEYINGLAB	L	T	P	C
		0	0	3	1.5

COURSEOBJECTIVES:

- Knowaboutvariouslinear andangularmeasuring instruments
- TakeMeasurementsinthelinearandangularview
- Determinetheareaandvolumebyinterpretingthedataobtainedfrom surveyingactivities
- Knowmodernequipmentsuchastotalstation
- Draftfieldnotesfromsurveydata

COURSEOUTCOMES:

Uponthesuccessfulcompletionofthiscourse,thestudentswillableto:

- Handlevariouslinearandangular measuring instruments
- Measurethe linearandangularmeasurements
- Calculatetheareaandvolumebyinterpretingthedataobtained from surveyingactivities
- Handlemodernequipmentsuchastotalstation
- Preparefieldnotesfromsurveydata

ListofFieldWorks:

1. Chainsurveyofroadprofile withoffsetsincase ofroadwidening.
2. Determinationofdistancebetweentwoinaccessible pointsbyusing compass.
3. Planetable survey; finding theareaofagivenboundarybythemethodofradiation
4. Flylevelling:Heightoftheinstrumentmethod(differentialleveling)
5. Flylevelling:riseandfallmethod.
6. Theodolite survey: determining thehorizontal and vertical anglesby themethod ofrepetition method
7. Theodolitesurvey:findingthedistancebetweentwoinaccessiblepoints.
8. Theodolitesurvey:findingtheheightoffarobject.
9. Determinationofareaperimeterusingtotalstation.
10. Determinationofdistancebetweentwoinaccessiblepointbyusing totalstation.
11. Settingoutacurve
12. Determiningthelevelsofcontours

B.Tech.–II Year-ISemester

CourseCode& Name	(23CEP03)STRENGTHOFMATERIALS LAB	L	T	P	C
		0	0	3	1.5

COURSEOBJECTIVES:

- Todeterminethetensilestrengthandyieldparametersofmildsteel
- Tofindoutflexuralstrengthsof Steel/Woodspecimensandmeasure deflections
- Todeterminethetorsionparametersofmildsteelbar
- Todeterminethehardnessnumbers,impactandshearstrengthsofmetals
- Todeterminetheload-deflectionparametersfor springs

COURSEOUTCOMES:

- Conducttensilestrengthtestanddrawstress-straindiagrams forductilemetals
- Performbendingtestanddetermineload-deflectioncurveofsteel/wood
- Abletoconducttorsiontest anddeterminetorsionparameters
- Perform hardness,impactandshearstrength testsandcalculatehardness numbers,impact and shear strengths
- Abletoconducttestsoncloselycoiledandopencoiledspringsandcalculate deflections

LIST OF EXPERIMENTS:

1.Tension test.
2.Bending test on (Steel/Wood) Cantilever beam.
3.Bending test on simply supported beam.
4.Torsion test.
5.Hardness test.
6.Compression test on Open coiled springs
7.Tension test on Closely coiled springs
8.Compression test on wood/ concrete
9.Izod / Charpy Impact test on metals
10.Shear test on metals
11.Use of electrical resistance strain gauges.
12. Continuous beam – deflection test.

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B.Tech.–II Year-ISemester

CourseCode&Name	(23CEP04)BUILDINGPLANNINGAND DRAWING	L	T	P	C
		0	1	2	2

COURSEOBJECTIVES:

Courseobjectives:

- Initiatingthestudentto differentbuildingbye-lawsandregulations.
- Impartingtheplanningaspectsofresidentialbuildingsandpublicbuildings.
- Givingtrainingexercisesonvarioussignsand bonds.
- Givingtrainingexercisesondifferentbuildingunits.
- Impartingtheskillsandmethodsofplanningofvariousbuildings.

COURSEOUTCOMES:

- Planvariousbuildingsasperthebuilding by-laws.
- Distinguishthe relation betweenthe plan, elevation and cross sectionand identify theform and functions among the buildings.
- Drawsignsandbonds
- Drawdifferentbuildingunits
- Learn theskillsof drawingbuildingelementsandplan thebuildingsasper requirements.

Syllabus:

1. Detailing &DrawingofSignConventions.
2. Detailing&DrawingofEnglishBond.
3. Detailing&DrawingofFlemishBond.
4. Detailing&DrawingofDoors.
5. Detailing &DrawingofWindows.
6. Detailing&Drawing ofVentilators&Roofs.
7. DrawingofLine DiagramofResidentialBuildingsbyusing Building Bye-Laws.
8. DrawingofPlan,Elevation&Section fromlinediagramforasingleStoreyBuilding.
9. DrawingofPlan,Elevation&SectionforHospitalBuilding.
10. DrawingofPlan, Elevation&SectionforIndustrialBuilding.

TextBooks:

1. Planning,designingandScheduling,GurcharanSinghandJagdishSingh
2. Buildingplanninganddrawingby M.Chakraborti.
3. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, NewDelhi.

ReferenceBooks:

1. NationalBuilding Code2016(Volume-I&II).
2. Principles of Building Drawing, M G Shah andC M Kale,Trinity Publications,New Delhi.
3. CivilEngineering drawing and House planning, B. P. Verma, Khanna publishers,New Delhi.
4. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi,and Chennai
5. Building Materials and Construction, G. C Saha and JoyGopalJana, McGraw-HillEducation (P)India Ltd. New Delhi.

II B. Tech-I Sem

(23BST13) ENVIRONMENTAL SCIENCE

(Common to All Branches of Engineering)

Course Code: 23BST13	Environmetal Science (Common to All Branches of Engineering)	L	T	P	C
		2	0	0	0

CourseObjectives:

- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life.
- To save earth from the inventions by the engineers

CourseOutcomes(CO):

CO 1: Grasp multidisciplinary nature of environmental studies and various renewable and nonrenewable resources
CO 2: Understand flow and bio-geo- chemical cycles and ecological pyramids.
CO 3: Understand various causes of pollution and solid waste management and related preventive measures.
CO 4: About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
CO 5: Casus of population explosion, value education and welfare programmes.

UNIT-I	**Multidisciplinary Nature of Environmental Studies and Natural Resources:**	**8Hrs**

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness
Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources

UNIT–II	**Ecosystems ,Biodiversity And Its Conservation**	**8Hrs**

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem. b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity And Its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-III	**Environmental Pollution and Solid Waste Management:**	**8Hrs**

Environmental Pollution: Definition, Cause, effects and control measures of : a. Air Pollution. b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. nuclear hazards **Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV	**Social Issues And the Environment**	**10 Hrs**

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT-V	**Human Population And the Environment**	**8 Hrs**

Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies. Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

Textbooks:

TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
2. Palaniswamy, "Environmental Studies", Pearson education
3. S.Azeem Unnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

ReferenceBooks:

1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
2. M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited
5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.

II B. Tech-II Sem

Course Code	MANAGERIAL ECONOMICS AND FINANCIAL ANALY	S L	T	P	z
23MBTU1a	(Common to All branches of Engineering)	2	0	0	2
	Semester	IV			

Course Objectives:

- 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): Student will be able to

- 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	Lecture Hrs: 8

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	Lecture Hrs: 12

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS - CobbDouglas 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	LectureHrs:12

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	LectureHrs:12

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	LectureHrs:12

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:

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

Reference Books:

- Ahuja Hl Managerial economics Schand,3/e,2013
- S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
- Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
- 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

IIYearB.Tech.CE –II Semester

CourseCode& Name	(23CET04)ENGINEERINGGEOLOGY	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- Toknowtheimportance ofEngineering GeologytotheCivilEngineering.
- Toenablethestudents,understand what mineralsandrocksareandtheir formation andidentification.
- To highlight significance/ importance/ roleofEngineering Geologyinconstruction ofCivil Engineering structures.
- Toenablethestudent,realize itsimportanceandapplicationsofEngineering Geologyin Civil Engineering constructions.
- ConceptsofGroundwateranditsgeophysical methods

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

- Understand the significance ofgeologicalagentsonEarthsurface and its significancein Civil Engineering.
- Identifyandunderstand thepropertiesofMineralsandRocks.
- UnderstandtheconceptsofGroundwateranditsgeophysicalmethods.
- Classifyand measurethe Earthquake prone areas, Landslides and subsidence to practice the hazard zonation.
- Investigate the project site for mega/minicivilengineering projects and site selectionfor mega engineering projects like Dams, Reservoirs and Tunnels.

UNIT - I

Introduction: Branches ofGeology, Importance ofGeologyin CivilEngineering withcase studies, weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

UNIT - II

Mineralogy And Petrology: Definitions of mineraland rock-Different methods ofstudyof mineral and rock. Physical properties of minerals and rocks for megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar, Quartz Group, Olivine,Augite,Hornblende,MicaGroup,Asbestos,Talc,Chlorite,Kyanite,Garnet,Calcite and ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures, texturesand formsof Igneousrocks,Sedimentaryrocks,Metamorphicrocks,andtheirmegascopicstudyofgranite varieties,(pink,gray,green).Pegmatite,Dolerite,Basaltetc.,Shale,SandStone,LimeStone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT - III

Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and theirimportance in Civil Engineering.

UNIT - IV

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

EarthquakesandLandSlides: Terminology,Classification,causesandeffects,Shieldareas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

Geophysics: ImportanceofGeophysicalmethods,Classification,PrinciplesofGeophysical

study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT - V

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

Textbooks:

1. EngineeringGeologybyN. ChennaKesavulu,LaxmiPublications.2nd Edn2014.
2. Engineering& General Geology by Parbin Singh Katson educationalseries 8th2023

ReferenceBooks:

1. EngineeringGeology by SubinoyGangopadhayOxfordUniversity press1st edition,2012.
2. EngineeringGeologybyD.VenkatReddy,VikasPublishing, 2nd Edn,2017,
3. Geology for Engineers and Environmental Society'Alan EKehew, 3rd edn., 2013)Pearson publications.
4. 'EnvironmentalGeology'(2013)K.S.Valdiya,2nded.,McGrawHillPublications.

Web Materials:

1. http://nptel.iitm.ac.in/video.php?subjectId=105105106
2. http://nptel.iitm.ac.in/video.php?courseId=1055&p=1
4. http://nptel.iitm.ac.in/video.php?courseId=1055&p=3
5. http://nptel.iitm.ac.in/video.php?courseId=1055&p=4

IIYearB.Tech.CE–II Semester

CourseCode& Name	(23CET05)CONCRETETECHNOLOGY	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- Learnmaterialsandtheirpropertiesusedintheproductionofconcrete
- Learnthebehaviorofconcreteatfreshstage
- Learnthe behaviorofconcrete athardened stage
- Learntheinfluence ofelasticity,creep andshrinkageonconcrete
- Learnthemixdesignmethodologyandspecialconcretes

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

CO1 Familiarizethebasicingredientsofconcreteandtheirroleintheproduction ofconcrete and its behavior in the field.

CO2 Testthefreshconcretepropertiesandthehardenedconcrete properties. Understandthe basicconceptsofconcrete.Designtheconcretemix byBIS method.

CO3 Evaluate the ingredients ofconcrete through lab test results. realize the importanceof quality of concrete

CO4 Understandthebehaviorofconcreteinvariousenvironments.

CO5 Familiarize thebasicconcepts of special concrete andtheirproduction and applications.

UNIT - I

CEMENTS: Portlandcement –Chemicalcomposition–Hydration,settingof cement,Fineness of cement, Structure of hydrate cement– Testfor physical properties – Differentgrades of cements – Admixtures – Mineral and chemical admixtures – accelerators,retarders,airentrainers,plasticizers,super plasticizers, flyashandsilica fume.
AGGREGATES: Classification ofaggregate – Particle shape & texture – Bond, strength &othermechanical properties of aggregates – Specific gravity,Bulk density,porosity, adsorption&moisturecontentof aggregate–Bulkingof sand–Deleterioussubstances – Soundness –Alkali aggregatereaction –Thermal properties –Sieveanalysis – Finenessmodulus –Gradingcurves –Gradingof fine& coarseAggregates–Maximum aggregatesize- Quality of mixing water

UNIT - II

FRESH CONCRETE: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixedconcrete, Shotcrete

UNIT - III

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing ofHardened Concrete: Compressiontest –Tensiontest –Factors affecting strength – Flexuretest–Splittingtest–Non-destructivetestingmethods–Codalprovisionsfor NDT.

UNIT - IV

ELASTICITY, CREEP & SHRINKAGE – Modulus ofelasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation betweencreep &time – Natureofcreep – Effects ofcreep – Shrinkage –types ofshrinkage.

UNIT - V

MIX DESIGN AND SPECIAL CONCRETES: Ready mixed concrete, Fiber reinforced concrete–Differenttypesoffibers–FactorsaffectingpropertiesofFRC,Highperformance concrete – Self consolidating concrete,Self-healing concrete.

Factors in the choice of mix proportions –Quality control of concrete- Statistical methods-AcceptanceCriteria-ConceptsProportioningofconcretemixesbyACI methodandISCode method.

Textbooks:

1. PropertiesofConcrete byA.M.Neville– PEARSON – 4thedition
2. Concrete TechnologybyM.L. Gambhir. – TataMc. Graw HillPublishers, New Delhi 5thedition 2013.
3. ConcreteTechnologybyJobThomas, CengagaePublications,1stedition,2015.

ReferenceBooks:

1. Concrete Microstructure, Properties of Materialsby P.K. Mehta and Moterio. McGrawHill 4th edition 2014
2. ConcreteTechnology,J.J.BrooksandA.M.Neville,Pearson,2019,2ndEdition.
3. ConcreteTechnologybyM.S.Shetty.– S.Chand&Co.;2004
4. ConcreteTechnologybyA.R.SanthaKumar,OxfordUniversityPress,NewDelhi.

IIYearB.Tech.CE–II Semester

CourseCode& Name	(23CET06)STRUCTURALANLAYSIS	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- Learnenergytheorems
- Learntheanalysisofindeterminate structuresAnalysis of fixed and continuous beams Learn about slope-deflection method
- LearnaboutMoment–distributionmethod

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

- Applyenergytheorems to analyze trusses
- AnalyzeindeterminatestructuresbyusingCastigliano‘s–IItheorem
- Analysisoffixedand continuousbeams
- Analyzecontinuousbeamsandportalframesbyusingslope-deflection method
- Analyzecontinuousbeamsandportalframesbyusing Moment–distributionmethod

UNIT - I

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strainenergyduetoaxialload,bending moment andshear forces–Castigliano‘sfirsttheorem Deflections of simple beams and pin jointed trusses.

UNIT - II

ANALYSIS OF INDETERMINATE STRUCTURES: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with up to two degrees of internal and external indeterminacies – Castigliano ‘s–II theorem.

UNIT - III

FIXED BEAMS&CONTINUOUS BEAMS: Introductionto staticallyindeterminate beams withuniformlydistributedload,centralpoint load,eccentricpoint load,numberofpoint loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams–Deflectionoffixedbeamseffectofsinkingofsupport,effectofrotationofasupport.

UNIT - IV

SLOPE-DEFLECTION METHOD: Introduction-derivation of slope deflection equations-application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

UNIT - V

MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method-Application to continuous beams with and without settlement of supports-Analysis of single bay storey portal frames without sway.

Textbooks:

1. Analysis of Structures – Vol-I&II by V.N.Vazirani&M.M.Ratwani, KhannaPublications, New Delhi.
2. BasicStructuralAnalysisbyC.S.Reddy.,TataMcGrawHillPublishers.3rdedition2017

ReferenceBooks

1. StructuralanalysisbyAslamKassimaliCengagepublications6thedition2020.
2. Structuralanalysis Vol. Iand II byDr. R.Vaidyanathanand Dr.PPerumal– Laxmipublications. 3rd 2016
3. IntroductiontostructuralanalysisbyB. D.Nautiyal,NewAge international publishers,New Delhi.
4. StructuralAnalysis–D.S.PrakasaRao-Universitypress.
5 StrengthofMaterialsandMechanicsofStructuresbyB. C. Punmia, KhannaPublications,New Delhi.

IIYearB.Tech.CE–II Semester

CourseCode& Name	(23CET07)HYDRAULICSANDHYRAULIC MACHINERY	L	T	P	C
		3	0	0	3

COURSEOBJECTIVES:

- ToIntroduceconceptsoflaminarandturbulentflows
- Toteachprinciplesofuniformflows throughopenchannel.
- Toteachprinciplesofnon-uniformflows throughopenchannel.
- Toimpartknowledgeondesignofturbines.
- Toimpartknowledgeondesignofpumps

COURSEOUTCOMES:

Aftersuccessfulcompletionofthiscourse,thestudentsshouldbeableto:

- Understandthecharacteristics oflaminarandturbulent flows.
- Applytheknowledgeoffluidmechanicstoaddresstheuniform flowproblemsinopen channels.
- Solvenon-uniformflowproblemsandhydraulicjumpphenomenoninopenchannelflows.
- Evaluatetheperformanceof impact ofjets onplatesanddesignPeltonwheel, Francisand Kaplan turbine.
- Understandtheprinciples,lossesanditsefficienciesofcentrifugalpumps.

UNIT - I

Laminar&Turbulentflowinpipes: LaminarFlow-Laminar flowthrough:circularpipes, 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 - II

UniformflowinOpenChannels: OpenChannelFlow-Comparisonbetweenopenchannel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Hydraulically efficient channel sections: Rectangular, trapezoidal and triangular channels, Energy and Momentum correction factors

UNIT - III

Non-Uniform flow in Open Channels: Specific energy, critical flow, discharge curve, Specific force,Specificdepth,andCriticaldepth.Measurement ofDischargeandVelocity– GraduallyVaried Flow- Dynamic Equation ofGraduallyVaried Flow. Hydraulic Jump and classification - Elements and characteristics- Energydissipation.

UNIT - IV

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:Classificationofturbines;Peltonwheelanditsdesign.Franci'sturbineand its design - efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT - V

Pumps: Workingprinciplesofacentrifugalpump, workdonebyimpeller;heads,lossesand 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

Textbooks:

1. P.M.ModiandS.M.Seth,HydraulicsandFluidMechanics,StandardBookHouse22nd, 2019.
2. K.Subrahmanya,Theory andApplicationsof FluidMechanics,Tata McGrawHill, 2ndedition 2018

ReferenceBooks:

1. R. K. Bansal, A text ofFluid mechanics and hydraulic machines, Laxmi Publications (P)Ltd., New Delhi 11thedition, 2024.
2. FluidMechanicsbyFrankM. White,HenryXue,TataMcGrawHill, 9thedition,2022.
3. C.S. P.Ojha,R.Berndtsson andP.N.Chadramouli,FluidMechanics and Machinery,Oxford University Press, 2010.
4. IntroductiontoFluidMechanics&FluidMachinesbySKSom,GautamBiswas, SChakraborty 3rd edition 2011

OnlineLearning Resources:

https://nptel.ac.in/courses/105105203https://archive.nptel.ac.in/courses/112/106/112106300/https://archive.nptel.ac.in/courses/112/103/112103249

IIYearB.Tech.CE–II Semester

CourseCode& Name	(23CEP05)CONCRETETECHNOLOGYLAB	L	T	P	C
		0	0	3	1.5

COURSEOBJECTIVES:

Totestbasicpropertiesofingredientsofconcretefreshandhardenedconcrete properties

COURSEOUTCOMES:

CO1 Outlineimportanceoftestingcementanditsproperties
CO2 Assess different properties of Aggregates
CO3 Assessfreshconcretepropertiesandtheirrelevancetohardenedconcrete CO4 Assess hardened concrete properties

1.TestsonCement

Normal Consistency and Fineness of cement.Initialsettingtimeand Finalsettingtimeofcement. Specific gravity and soundness of cement.
Compressivestrengthofcement.

2.TestsonFineAggregates

Gradingand finenessmodulusofFineaggregatebysieveanalysis. Specific gravity of fine aggregate
Waterabsorptionandbulkingofsand.

3.Testson CoarseAggregates

GradingofCoarseaggregatebysieveanalysis.
Specific gravity of coarse aggregate
WaterabsorptionofCoarseaggregates

4.Testson freshConcrete

Workabilityofconcrete bycompactionfactor methodWorkabilityofconcrete byslump test
Workability of concrete by Vee-bee test.

5.TestsonHardenedConcrete

CompressivestrengthofcementconcreteandModulusof ruptureYoung's Modulus and Poisson's Ratio
Splittensilestrengthofconcrete.
Non-Destructivetestingonconcrete(fordemonstration)

IIYearB.Tech.CE–II Semester

CourseCode& Name	(23CEP06)ENGINEERINGGEOLOGY LABORATORY	L	T	P	C
		0	0	3	1.5

COURSEOBJECTIVES:

- ToidentifytheMegascopictypesofOreminerals&Rock formingminerals.
- ToidentifytheMegascopictypesofIgneous,Sedimentary,Metamorphicrocks.
- Toidentifythe topographyofthe site&materialselection

COURSEOUTCOMES:

- IdentifyMegascopicminerals&theirproperties.
- IdentifyMegascopicrocks&theirproperties.
- Identifythesite parameterssuchascontour,slope&aspectfortopography.
- Knowtheoccurrenceofmaterialsusingthestrike&dipproblems.

LISTOFEXPERIMENTS

1. Physicalpropertiesofminerals:Mega-scopeidentificationof
   a) Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group &Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc…
   b) Oreformingminerals–Magnetite,Hematite,Pyrite,Pyralusite, Graphite,Chromite, etc…
2. Megascopicdescriptionandidentificationofrocks.
   a) Igneousrocks–TypesofGranite, Pegmatite,Gabbro,Dolerite,Syenite, GranitePoryphery, Basalt, etc.
   b) Sedimentaryrocks–Sandstone,Ferrugineoussandstone,Limestone,Shale, Laterite,Conglamorate, etc.
   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite &Biotiteschist, Marble, Khondalite, etc.
3. Interpretationanddrawingof sectionsforgeologicalmapsshowingtiltedbeds, faults,unconformities etc.
4. SimpleStructuralGeologyproblems.
5. Boreholedata.
6. Strengthofthe rockusinglaboratorytests.
7. Fieldwork–ToidentifyMinerals, Rocks,Geomorphology&StructuralGeology.

LABEXAMINATIONPATTERN:

1. DescriptionandidentificationofFOURminerals
2. Descriptionand identificationofFOUR (including igneous, sedimentaryand metamorphic rocks)
3. ONEQuestiononInterpretationofaGeologicalmapalongwitha geologicalsection.
4. TWOQuestionsonSimplestrikeandDipproblems.
5. Boreholeproblems.
6. Projectreportongeology.

References:

1. ‘AppliedEngineeringGeologyPractical’sbyMTMautheshaReddy,NewAgeInternational Publishers, 2nd Edition.
2. ‘FoundationsofEngineeringGeology’ byTonyWaltham,SponPress,3rdedition,2009.

IIYearB.Tech.CE–II Semester

(23BSP07) SOFTSKILLS
(COMMON TO ECE, ME &CE)

Course Objectives:

- To encourage all round development to the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To enhance healthy relationship and understanding within and outside an organization
- To function effectively with heterogene outsoars

Course Outcomes

- List out various elements of soft skills (L2)
- Describe methods for building professional image(L2)
- Apply critical thinking skills in problem solving(L3)
- Analyze the needs of an in dividable and team for well-being(L4)
- Assess the situation and take necessary decisions(L5)
- Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being (L6)

UNITI Soft Skills & Communication Skills

Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills -Significance, process, types - Barriers of communication - Improving techniques.

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.

UNITII Critical Thinking

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking - Positive thinking - Reflection

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

UNITIII Problem Solving & Decision Making

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - 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

UNITIV Emotional Intelligence & Stress Management

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. Providingopportunitiesfortheparticipantstonarratecertaincrisisandstress–ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates

UNITV Corporate Etiquette

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette- Corporate grooming tips -Overcoming challenges

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study- Business Etiquette Games

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.

Prescribed Books:

1. Mitra BarunK, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012
2. DrShikha Kapoor ,Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018

ReferenceBooks

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. AlexK,SoftSkillsS.Chand&Co,2012(Revised edition)
3. Gajendra Singh Chauhan &Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality Published by Wiley, 2013
4. Pillai,Sabina&FernandezAgna,SoftSkillsandEmployability Skills,Cambridge University Press, 2018

5. Soft Skills for a Big Impact (English, Paperback, RenuShorey) Publisher: Notion Press
6. Dr.RajivKumarJain,Dr.UshaJain,LifeSkills(PaperbackEnglish)Publisher: Vayu Education of India, 2014

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-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://www.businesstrainingworks.com/training-resource/five-free-business-etiquette-training-games/
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

IIYearB.Tech.CE–II Semester

Course Code	DESIGN THINKING & INNOVATION	L	T	P	C
23MBTU2	(Common to All branches of Engineering)	1	0	2	2
	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): Student will be able to

- Define the concepts related to design thinking. (L1, L2)
- Explain the fundamentals of Design Thinking and innovation (L1, L2)
- Apply the design thinking techniques for solving problems in various sectors. (L3)
- Analyse to work in a multidisciplinary environment (L4)
- Evaluate the value of creativity (L5)
- Formulate specific problem statements of real time issues (L3, L6)

UNIT–I	Introduction to Design Thinking	LectureHrs: 8

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	LectureHrs: 12

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, brainstorming, 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	LectureHrs:12

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	LectureHrs:12

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	LectureHrs:12

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. Activity: How to market our own product, About maintenance, Reliability and plan for startup.
Textbooks:
1. Tim Brown,Change by design, Harper Bollins (2009) 2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.
Reference Books:
1. David Lee, Design Thinking in the Classroom, Ulysses press 2. Shrutin N Shetty, Design the Future, Norton Press 3. William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter. 4. Chesbrough.H, The Era of Open Innovation – 2013
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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