Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Teaching and Examination Scheme 2025-26

B.Tech. Civil Engineering

Sr. No.	Br.	Year	Sem.	Course Code	Course Name	Category	Teaching & Learning Scheme					Exam Hrs.	Marks			Credit
							Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester					
							L	T	P	SL			CIE	SEE	Total	
1	CE	II	III	HSUL301/ HSUL302	Managerial Economics and Financial Accounting/ Technical Communication	HSMC	15	0	0	15	30	3	40	60	100	1
2	CE	II	III	MAUL305	Advanced Engineering Mathematics-I	BSC	45	15	0	60	120	3	40	60	100	4
3	CE	II	III	CEUL301	Strength of Materials	PCC	45	15	0	60	120	3	40	60	100	4
4	CE	II	III	CEUL302	Surveying	PCC	45	0	0	45	90	3	40	60	100	3
5	CE	II	III	CEUL303	Building Materials and Construction	PCC	45	0	0	45	90	3	40	60	100	3
6	CE	II	III	CEUL304	Engineering Geology	ESC	30	0	0	30	60	3	40	60	100	2
7	CE	II	III	CEUP320	Surveying Lab	PCC	0	0	45	-	45	3	60	40	100	1.5
8	CE	II	III	CEUP321	Professional Development Lab	PCC	0	0	30	-	30	3	60	40	100	1
9	CE	II	III	CEUP322	Geology Lab	ESC	0	0	30	-	30	3	60	40	100	1
10	CE	II	III	CEUP323	Building Planning and Drafting Lab-I	ESC	0	0	45	-	45	3	60	40	100	1.5
11	CE	II	III	CEUP324	Building Material Testing Lab	PCC	0	0	30	-	30	3	60	40	100	1
12	CE	II	III	CEUT330	Industrial Training	PSIT	0	0	30	-	30	3	60	40	100	1
13	CE	II	III	CEUA300	Social Outreach, Discipline & Extra Curricular Activities	SODECA	-	-	-	-	-	-	-	-	100	0.5
14	CE	II	III	NU99.5 / NU99.4	Soft Skills Training /Technical Training	NC	-	-	-	-	-	-	40	60	100	0
															Total	**24.5**

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Teaching and Examination Scheme 2025-26

B.Tech. Civil Engineering

Sr. No.	Br.	Year	Sem.	Course Code	Course Name	Category	Teaching & Learning Scheme					Exam Hrs.	Marks			Credit
							Classroom Instruction (CI) (in hours per semester)		Lab Instruction (LI) (in hours per semester)	Term Work (TW) and Self Learning (SL) (TW+ SL) (in hours per semester)	Total no. of Hours per semester					
							L	T	P	SL			CIE	SEE	Total	
1	CE	II	IV	HSUL401/ HSUL402	Managerial Economics and Financial Accounting/ Technical Communication	HSMC	15	0	0	15	30	3	40	60	100	1
2	CE	II	IV	MAUL403	Advanced Engineering Mathematics-II	BSC	45	0	0	45	90	3	40	60	100	3
3	CE	II	IV	CEUL401	Structural Analysis-I	PCC	45	0	0	45	90	3	40	60	100	3
4	CE	II	IV	CEUL402	Fluid Mechanics and Hydraulic Engineering	PCC	45	15	0	60	120	3	40	60	100	4
5	CE	II	IV	CEUL403	Concrete Technology	ESC	45	0	0	45	90	3	40	60	100	3
6	CE	II	IV	CEUL404	Environmental Engineering	PCC	45	0	0	45	90	3	40	60	100	3
7	CE	II	IV	CEUP420	Fluid Mechanics and Hydraulic Engineering Lab	PCC	0	0	30	-	30	3	60	40	100	1
8	CE	II	IV	CEUP421	Concrete Lab	ESC	0	0	45	-	45	3	60	40	100	1.5
9	CE	II	IV	CEUP422	Building Planning and Drafting Lab-II	PCC	0	0	45	-	45	3	60	40	100	1.5
10	CE	II	IV	CEUP423	Environmental Engineering Lab	PCC	0	0	30	-	30	3	60	40	100	1
11	CE	II	IV	CEUP424	Structural Engineering Lab	PCC	0	0	30	-	30	3	60	40	100	1
12	CE	II	IV	CEUA400	Social Outreach, Discipline & Extra Curricular Activities	SODECA	-	-	-	-	-	-	-	-	100	0.5
13	CE	II	IV	NU99.4 / NU99.5	Technical Training /Soft Skills Training	NC	-	-	-	-	-	-	40	60	100	0
															Total	**23.5**

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Strength of Materials	**Course Code**: CEUL301	**Credit**: 4
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 hrs.	**Teaching Scheme:** CI (60) + TW & SL(60) = 120 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Statics of Particles and Rigid Bodies:** Fundamental laws of mechanics, System of forces, Resultant force, Resolution of force, Moment and Couples, Free body diagram, Conditions for equilibrium, Lami's theorem	2
3	**Centroid & Moment of inertia:** Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I of composite section, Polar moment of inertia, principle axis and principle moment of inertia.	5
4	**Simple Stresses and Strains:** Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus, Principle of Superposition, Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress, Poisson's ratio, Volumetric strain, Bulk modulus, Relation between elastic constants, Thermal stresses, Mohr's circle & its application. Introduction to theories of failures. Introduction to Plane stress and Plane strain	12
5	**Bending of Beams:** Bending moment, Shear force, and Axial thrust diagrams for statically determinate beams subjected to various types of loads and moments, Point of Contra-flexure, relation between load, shear force, and bending moment	10
6	**Theory of simple bending:** Distribution of bending and shear stresses for simple and composite sections, Combined direct and bending stress	6
7	**Torsion:** Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion	4
8	**Columns:** Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae, middle third rule, core of a section.	5
Problem Solving Sessions		15
	Total	**60**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Strength of Material	B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publication (P) Ltd.	10th(2018)
2.	Strength of Material	R.S. Khurmi & N. Khurmi	S Chand publication.	13th(2015)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Strength of Material	R K Rajput	S Chand publication	6th(2018)
2.	Strength of Material	R K Bansal	Laxmi Publication (P) Ltd.	6th(2018)

Prerequisite:

1. Students should be aware of the basics of Engineering mechanics and Physics.
2. Students should have basic knowledge about the characteristics of construction materials.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Surveying	**Course Code**: CEUL302	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course.	1
2	**Measurements in Surveying** Principle of surveying, Plan and Maps, Scales, Methods of linear measurement, Temporary and permanent adjustment of instruments, Angular measurement, Measurement of horizontal and vertical angle, correction in linear and angular measurements, Traverse computation, plotting of traverse and determining the closing error, Balancing of traverse, Topographic survey.	9
3	**Levelling** Measurements of elevations, Methods of levelling, Auto Level and Profile/Cross-sectional levelling, Trigonometrical levelling, Errors in levelling. Contours and contour lines, methods of contouring, characteristics, application of contour map, area and volume measurements.	10
4	**Curve Surveying** Types of curves, Elements of simple circular curve, compound curves, reverse curves, and transition curves. Method of setting out simple, circular, transition and reverse curves, types of vertical curves, setting out vertical curves.	11
5	**Advanced Surveying** **Tacheometry Survey:** Stadia system of tacheometry, distance elevation formula for horizontal sights. Determination of tacheometric constants, distance and elevation formula for inclined sights with staff vertical. **Photogrammetry**: Introduction to basic concepts, perspective geometry of aerial photographs, relief and tilt displacements, Terrestrial Photogrammetry, and flight planning, application of drone based surveying.	7
6	**Field Surveying:** Survey Layout for culverts, canals, bridges, road/railway alignment and buildings**.** **Introduction of Modern Surveying Instruments**: Electronic Distance Measurement (E.D.M.), Principle of EDM, Types of E.D.M, GPS, Total Station, DGPS, LIDAR Survey.	7
	Total	**45**

Text Books:

Sr. No.	Title	Author(s)	Publisher	Edition
1	Surveying Vol. 1	Dr. B.C. Punmia, Ashok K. Jain, Arun K. Jain	Laxmi Publication	18th (2023)
2	Surveying Vol. 2	Dr. B.C. Punmia, Ashok K. Jain, Arun K. Jain	Laxmi Publication	18th (2023)
3	Surveying Vol. 1	S.K.Duggal	McGraw Hill Education	5th (2017)
4	Surveying Vol. 2	S.K.Duggal	McGraw Hill Education	5th (2017)

Reference Books:

Sr. No.	Title	Author(s)	Publisher	Edition
1	Surveying and Levelling	R. Subramanian	Oxford University Press	2nd (2012)
2	Surveying for Engineers	J. Uren, W. F. Price	Palgrave Macmillan	4th (2005)
3	Geomatics Engineering	Dr. S.S. Manugula ,Mr. Marga Tashale	Evincepub Publishing	1st (2022)
4	Surveying & Levelling	N.N. Basak	McGraw Hill Education	2nd (2017)
5	Surveying Vo.1	K.R. Arora	Standard book House	17 th (2019)
6	Surveying Vo.2	K.R. Arora	Standard book House	17 th (2019)

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Building Materials and Construction	**Course Code**: CEUL303	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
0	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
1	**Civil Engineering Materials** **Building stones**: classification of stones- characteristics of good building stones, important types of building stones, their properties and uses. Various standard tests on building stones. **Brick**: composition of good brick-earth, manufacturing process of bricks, characteristics of good building bricks, classification and testing of bricks, special types of bricks and their uses. **Tiles** -building tiles; Types of tiles-wall, ceiling, roofing and flooring tiles: their properties and uses; Ceramic, terrazzo and PVC tiles, their properties and uses; Vitrified tiles, Paver blocks, interlocking tiles: their properties and uses. **Lime:** Impurities, Manufacturing, Slaking, Hardening, Classification & Testing. Introduction of Plaster of Paris, PVC materials, Paints, Varnish and Distemper. **Steel and aluminum section**: Properties, types and their uses, prefabrication and modular construction using these materials. **Timber**: Structure, Definitions of related terms, classifications and properties, defects in wood, conversion of wood, seasoning, preservation, fire proofing, ply woods, fiberboards.	**10**
2	**Smart Materials:** Water proofing products, tile adhesive, Polymer modified surface finishing plasters, Polymer enriched high strength Repair Mortar and Micro Concrete, Floorkrete, high performance industrial grouts, Bed jointing material for AAC block, Light weight block for masonry construction, Exterior cladding system, sustainable construction materials. **Plastics:** Thermosetting and thermoplastics and their uses as materials in building, industry e.g. flooring, roofing, wall panelling, pipes, doors etc **Ceiling Materials:** Types of ceiling materials (gypsum board, suspended ceilings, etc.), Installation techniques and considerations, Acoustic and thermal properties of ceiling materials, Introduction to wall finishes.	**8**
3	**Mortar & Plaster**: Preparation of cement mortar and plaster, proportion of mortars and plaster for different types of works, Functions and tests & their uses in various types of pointing & plastering. **Brick and Stone Masonry**: Basic principle of masonry work, different types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry and their relative merits and demerits.	**8**

4	**Building Requirements & Construction System:** Building components, their functions and requirements. Types of construction: load bearing and framed structure construction, RCC beam, column and slab construction, Precast and In-situ construction, Relative merits and demerits. Fire resistance construction, FRC. **Foundation & Site Preparation:** Purpose, types of foundation: like shallow, deep, pile, raft, grillage foundation and their suitability. Depth of foundation, Sequence of construction activity and co-ordination, site clearance, layout of foundation plan.	**8**
5	**Damp Proofing:** Causes and Effects of dampness, Methods and materials for damp proofing, Methods and materials for anti-termite treatment. **Construction and Expansion Joints:** Requirements, Types, material used, Construction details. **Arches and Lintels:** Terms used, types of arches and their construction detail, types of lintels and constructions. **Partition Wall:** Types, purpose and use of partition wall. **Stairs:** Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, Lifts and Ramps. **Roof and Roof Covering:** Purposes, classification of roofs, terms used. Introduction to Solid slab, Flat slab, Shell Roofs and Pitched roofs, and their constructional features. Types of pitched roofs and Trusses, typical constructional details; Roof covering materials, types and typical constructional details.	**10**
	Total	**45**

Text Books:

Sn.	Title	Author(s)	Publisher	Edition
1.	Building Materials	S. K. Duggal	New Age International Publication	4th (2020)
2.	Building Materials : Products Properties And Systems	M. L. Gambhir, Neha Jamwal	McGraw Hill Education	1st (2011)
3.	Materials for Civil and Construction Engineers	Michael S. Mamlouk and John P. Zaniewski	Vikas Publishing House Pvt Ltd.	1st (1998)

Reference Books:

Sn.	Title	Author(s)	Publisher	Edition
1.	Building Materials	P. C. Varghese	PHI Learning	2nd (2015)
2.	Engineering Materials	S.C. Rangwala	Charotkar Publication	43rd (2019)
3.	Building Construction	B. C. Punmia, A.K. Jain	Laxmi Publication	11th (2016)
4.	Building Materials	S. S. Bhavikatti	Vikas Publication	2nd (2018)
5.	Building Construction	S. P. Arora and S. P. Bindra	Dhanpat Rai Publishing Company.	10th (2017)

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Engineering Geology	**Course Code**: CEUL304	**Credit**: 2
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (30) + TW & SL(30) = 60 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**General Geology**: Branches of Geology and its scope in Civil Engineering. Types of weathering; physical and chemical weathering. Geological work of natural agencies like River & Wind. Physical properties of minerals, Geological Time Scale, Plate Tectonics.	6
3	**Petrology**: Formation, texture & structure and classification of Igneous, Sedimentary and Metamorphic rocks. Engineering properties of important rocks for building & road materials.	6
4	**Structural Geology**: Strike, dip, fold, fault, joints and unconformities - terminology, causes, classification, recognition, effects and engineering considerations.	5
5	**Engineering Geology**: Geophysical methods for subsurface analysis (Electrical and Seismic methods). Geological investigation for site selection of dam, tunnel and bridge. Case study of Dam and tunnel.	6
6	**Remote Sensing & GIS**: Introduction and definition. Remote Sensing System, Electromagnetic radiation, remote sensing platforms & sensor's characteristics. Application of Remote Sensing and GIS in various fields of civil engineering.	6
	Total	**30**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Engineering & General Geology	Parbin Singh	.K.Kataria & Sons	8th(2008)
2.	Engineering Geology	N Chenna Kesavulu	Macmillan India Ltd.	2nd(2011)
3.	Applied Engineering Geology	M.T.Maruthesha Reddy	New Age International Publisher	1st(2008)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Remote Sensing and GIS	B.Bhatta	Oxford Publishers	3rd(2021)
2.	Fundamental of Remote Sensing	George Joseph	University Press, Hyderabad	3rd(2018)
3.	Engineering Geology	Vasudev. Kanithi	University press, Hyderabad	1st(2012)

Prerequisite:

1. Students should have primary knowledge of rocks and minerals.
2. Students should have basic knowledge of atmosphere, hydrosphere and lithosphere.
3. Students should have a basic idea of different structures formed in the rocks.
4. Students should have elementary knowledge of techniques like remote sensing and GIS

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Surveying Lab	**Course Code**: CEUP320	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (45)**	

Module No.	Contents
1.	Surveying Measurements • Measure linear distances in the field. • Determine horizontal and vertical angles in the field.
2.	Plotting a building block using surveying instruments.
3.	To determine the difference in elevation using Trigonometric Levelling • Determine the elevation difference when the instruments are in the same vertical plane. • Determine the elevation difference when the instruments are in different vertical planes.
4.	Conduct profile levelling to plot the longitudinal and cross-sections of a road and draw the road profile.
5.	Evaluate the use of GPS technology to collect precise geospatial data for analysis and mapping in civil engineering projects.
6.	Measuring the area of a given field using advanced surveying instruments.
7.	Determine the coordinates of survey stations for accurate positioning by Total Station
8.	Create a detailed topographic map of a given area.

One-week Survey Camp for topographic/ project survey/Contouring be arranged before or after the Term End Exam.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Lab Name: Professional Development Lab	**Course Code**: CEUP321	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3 Hrs	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	To conduct a demo presentation emphasizing opportunities for civil engineering graduates.
2	Introduction of MS word and MS excel.
3	Train students in creating professional and visually appealing presentations: Design principles for effective PowerPoint slides using visuals, graphs, and images for impact and Best practices for presenting technical data clearly. Each student group create and present a PowerPoint presentation based on a case study in civil engineering.
4	Technical writing skills abilities: train students in crafting clear and concise reports, writing professional emails, creating effective project proposals, and documenting research. Each student will submit a technical report on civil engineering related topic.
5	Introduce the latest technologies and trends transforming the civil engineering industry. Use of Building Information Modeling (BIM), 3D printing in construction, Smart materials and their application in construction and Use of AI and machine learning for project management and design.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Geology Lab	**Course Code**: CEUP322	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	To determine Physical properties of Minerals
2	To determine Physical properties of Rocks
3	Identification of minerals in Hand Specimen
4	Identification of rocks in Hand Specimen
5	Identification of geological features through wooden Models a. Structural geological features b. Petrological features c. Engineering geological features
6	Interpretation of Geological Maps (10 Nos.)
7	Dip & Strike Problems (8 Nos.)

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Building Planning and Drafting Lab - I	**Course Code**: CEUP323	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs	**Teaching Scheme: LI (45)**	

Module No.	Contents
1	Drawing Basics, Introduction to CAD and hands on training.
2	Drawing and detailing of typical building components such as foundation, Damp Proof Course, masonry, lintel and arches, stairs, roof and roof coverings.
3	Development of plan and front elevation from line diagram

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: III
Course Name: Building Material Testing Lab	**Course Code**: CEUP324	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	To Determine the consistency, initial setting time and final setting time of cement.
2	To Determine the fineness of cement by a) Sieve analysis, and b) Blaine's air permeability test.
3	To Determine the soundness of cement by Le-Chatlier mould.
4	To Determine the compressive strength of given sample of cement.
5	To Determine the dimension and tolerance of bricks.
6	To Determine the water absorption and compressive strength brick.
7	To Determine water absorption & compressive strength of interlocking tile.
8	To Decide the water cement ratio of cement mortar using flow table test.
9	To Determine the compressive strength of cement mortar.
10	To Determine the bulking of given sample of sand (fine aggregate).

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Syllabus

Name of the Programme: **B.Tech. in Civil Engineering**	**Year**: II	**Semester**: III
Course Name: Advanced Engineering Mathematics-I	**Course Code**: MAUL305	**Credit**: 4
Max Marks: 100	**CIE: 40**	**SEE: 60**
End Term Exam Time: 3 Hrs	**Teaching Scheme:** CI (60) + TW & SL(60) = 120 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Laplace Transform:** Laplace transform with its simple properties, Inverse Laplace Transform with applications to the solution of ordinary and partial differential equations. Initial and final value theorem	12
3	**Fourier Transform:** Discrete Fourier transform, Fast Fourier transform, Complex form of Fourier transform and its inverse, Applications of Fourier transforms to Boundary Value Problems.	11
4	**Complex Variables-I:** Analytic functions, Cauchy–Riemann equations, Elementary conformal mapping with simple applications to Line integral in complex domain, Cauchy's theorem, Cauchy's integral formula.	12
5	**Complex Variables-II:** Taylor's series, Laurent's series, poles, Residues. Evaluations of simple definite real integrals using the theorem of residues. Simple contour integration.	9
Problem Solving Sessions		15
	Total	60

Text Books:

- **Dass, H.K. (2018).** *Advanced Engineering Mathematics* (22nd ed.). S. Chand and Company Ltd.
- **Grewal, B.S. (2017).** *Higher Engineering Mathematics* (44th ed.). Khanna Publication.
- **Kreyszig, E. (2016).** *Advanced Engineering Mathematics* (10th ed.). Wiley India.

Reference Books:

- **Ganesh C. Gorain. (2014).** *Laplace Transformations*. Narosa Publ. House.
- **Ramana, B.V. (2024).** *Higher Engineering Mathematics*. McGraw Hill Education.
- **Ward, B.J. (2015).** *Complex Variables and Applications*. McGraw Hill Education.
- **Kasana, H.S. (2012).** *Complex Variables: Theory and Applications*. PHI Learning.
- **Zill, D.G., & Shanahan, P.D. (2017).** *A First Course in Complex Analysis with Applications*. Jones and Bartlett Publishers.

Prerequisite:

1. **Differential Calculus**
2. **Integral calculus**
3. **Convergence of Series**

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Syllabus

Name of the Programme: B.Tech. Civil Engineering	**Year**: II	**Semester**: III/IV
Course Name: Managerial Economics and Financial Accounting	**Course Code**: HSUL301/401	**Credit**: 1
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3 Hrs	**Teaching Scheme:** CI (15) + TW & SL(15) = 30 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Basic economic concepts** Meaning, nature and scope of managerial economics, deductive vs inductive methods, Economic problems: scarcity and choice, circular flow of economic activity, national income-concepts and measurement.	4
3	**Demand and Supply analysis** Demand-types of demand, determinants of demand, demand function, demand forecasting –purpose, determinants, elasticity of demand, Supply-determinants of supply, supply function, elasticity of supply.	3
4	**Production and Cost analysis** Theory of production- production function, production optimization, least cost combination of inputs, isoquants, law of variable proportions, laws of returns to scale. Cost concepts-explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation.	3
5	**Financial statement analysis** Capital and accounting, profit and loss statement and related concepts, balance sheet and related concepts, financial ratio analysis.	4
	Total	**15**

Text Books:
Managerial Economics by DN Dwivedi (Vikas publishing House)
Financial Management by MR Agarwal (Garima Publication)

Reference Books:
1. Managerial Economics by Varsheney & Maheswari, (S. Chand)
2. Managerial Economics and Financial Analysis by A,R.Aryasri: (TMH)

Prerequisite:
- Knowledge of basic mathematics & business economics.

Course Outcomes:

Course Code	Course Outcomes	Bloom's Level
HSUL302/402 HSUL301/401.1	Describe economic fundamentals like deductive vs. inductive methods and national income concepts and measurement.	L2
HSUL302/402 HSUL301/401.2	Differentiate different demand types and concepts relevant to analyzing demand and supply.	L2
HSUL302/402 HSUL301/401.3	Explain the production and cost analysis laws, concepts, and their implications.	L2
HSUL302/402 HSUL301/401.4	Discuss capital and accounting and also interpret its importance in running a business.	L2
HSUL302/402 HSUL301/401.5	Create and analyze financial statements like balance sheets and profit & loss statements.	L3

Mapping of COs with POs-PSOs:

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HSUL302/402 HSUL301/401.1	2				2			2		2				
HSUL302/402 HSUL301/401.2	2				2			2		2				
HSUL302/402 HSUL301/401.3	2				2			2		2				
HSUL302/402 HSUL301/401.4	2				2			2		2				
HSUL302/402 HSUL301/401.5	2				2			2		2				

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year: II**	**Semester: III**
Course Name: Soft Skills Training	**Course Code: NU99.5**	**Credit: 0(NC)**
Evaluation Criteria: Continuous Evaluation (Appendix 1)	**Teaching Scheme:** CI ( ) + TW & SL( ) = hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Teamwork Skills: Communicating Effectively in Groups** • Group development and decision making • Group conflict, difference, and diversity • Meeting Management	4
2	**Time Management for Personal & Professional Productivity** • Identify Important Time Wasters • Techniques for Time Management • Significance of prioritizing • Avoiding Procrastination of work	6
3	**Leadership and Negotiation Skills** • Managing Talent and Leading Team • Influence and Persuasion • Negotiation Skills, Negotiation Strategies and Styles • Leadership Skills	6
4	**Practical Components/ Field Based Assignments** 1. Watch one interview of any Business Personality of your choice, create and deliver a Power Point Presentation on same personality and include following heads: • Life story • Achievements • Challenges Faced • Your learnings 2. Shoot an Interview with five executive who travel outstation frequently. Ask them to describe what problems they face in communication during these visits and how they deal with such issues? Make checklist of Strategies and tactics that can be used when you travel outstation for business works, to deal with communication issues. Discuss in the class and share your experiences. 3. Create and deliver a Power Point Presentation after taking the editorial pages of the last five days of any business newspaper. Go through the contents and organise your findings under the following heads: • Nature of subject matter (Current affairs, economics, etc.) • Target audience of the various columns • Presentation and organisation of contents • Gaps in information that need to be addressed	8
5	**Business Ethics and Etiquette** • Code of conduct in corporate environments • Professional Values and Workplace Ethics • Business Etiquette Essentials • Workplace Interactions and Communication Etiquette	6
	Total	**30**

Appendix – I

Evaluation scheme

Module No.	Contents	Evaluation Components
1	Teamwork Skills	Expert Talk, Quiz based on Expert Session
2	Time Management	Expert Talk, Quiz based on Expert Session
3	Leadership and Negotiation Skills	Expert Talk, Quiz based on Expert Session
4	Practical Components / Field-Based Assignments	PPT Presentation on Business Personality, Class Discussion, Editorial Analysis PPT
5	Business Ethics and Etiquette	Expert Talk, Quiz based on Expert Session

Additional Notes:

- Rubrics to be used for presentations assessing content, clarity, creativity, and communication.
- Industry exposure by inviting speakers or arranging field visits wherever possible will enhance confidence and communication skills.
- Google Forms/MCQ quizzes for quick and engaging assessments after sessions.
- Certificate will be awarded to students on successfully completing the continuous evaluation and final seminar presentation assessment.

Eligibility Criteria for Certificate
To be eligible for the certificate, participants must fulfill the following requirements:

- Achieve a minimum score of **60% or above** in **each quiz**.
- Maintain a minimum of **75% attendance**, which includes participation in **presentations and workshops**.

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Evaluation Rubric for Presentation –

Swami Keshvanand Institute of Technology, Management & Gramothan – Evaluation Rubric YEAR						
SUBJECT, SEMESTER AND DATE:						
Roll no	**Name**	**Content**	**Delivery**	**Engagement &Eye Contact**	**Knowledge**	**Remarks**
NAME AND SIGNATURE OF THE EXAMINERS:						
INTERNAL:				**EXTERNAL:**		

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Syllabus

Name of the Programme: **B.Tech. in Civil Engineering**	**Year**: II	**Semester**: III/IV
Course Name: Technical Communication	**Course Code**: HSUL302/HSUL402	**Credit**: 1
Max Marks: 100	**CIE: 40**	**SEE: 60**
End Term Exam Time: 3hrs	**Teaching Scheme:** CI (15) + TW & SL(15) = 30 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Basics of Technical Communication** Meaning, aspects and style of technical communication Reading Strategies: Skimming, Scanning, SQ3R, ERRQ	2
3	**Advanced Grammar** Articles Prepositions Conditionals Common Errors	6
4	**Technical Writing** Business Letters E-mail Writing Minutes of Meeting Resume Writing	4
5	**Advanced Technical Writing** Technical Reports Technical Proposals	2
	Total	**15**

Text Books:

1. Technical Communication: Principles and Practice by Meenakshi Raman and Sangeeta Sharma.Third Edition. New Delhi: OUP. **2017**

Reference Books:

1. Effective Technical Communication by M. Ashraf Rizvi, New Delhi: Tata McGraw-Hill Publishing Company Ltd.

2. Effective Technical Communication edited by G. Venkatraman, Pearson, 2024

3. Technical Communication: Process and Product by Sharon Gerson and Steven Gerson, Pearson, 2014

Prerequisite:

1. Basics of Technical Communication

- Introduction to technical communication
- knowledge of technical documents
- use of tools for reading and writing

2. Advanced Grammar

Basic Strategies of Grammar

3. Technical Writing

Differentiating between technical and creative writing

4. Advanced Technical Writing

- Knowing the basics of advance writing strategies.
- Knowing the part of language in advance writing

Course Outcomes:

Course Code	Course Outcomes	Bloom's Level
HSUL401.1	Recall the meaning and characteristics of technical communication.	**L1**
HSUL401.2	Understand the various techniques for reading technical texts.	**L2**
HSUL401.3	Demonstrate the correct usage of advanced grammar	**L2**
HSUL401.4	Produce cohesive letters, e-mails, MOM and resume	**L3**
HSUL401.5	Produce technical reports and proposals in proper format	**L3**

Mapping of COs with POs-PSOs:

Course Code	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
HSUL401.1	-	-	-	-	-	-	-	-	-	1	-	1	-	-
HSUL401.2	-	-	-	-	-	-	-	-	-	1	-	1	-	-
HSUL401.3	-	-	-	-	-	-	-	-	-	3	-	2	-	-
HSUL401.4	-	-	-	-	-	-	-	-		3	-	2	-	-
HSUL401.5	-	-	-	-	-	-	-	-	-	3	-	2	-	-
Weighted Average	-	-	-	-	-	-	-	-	-	3	-	2	-	-

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Structural Analysis -I	**Course Code**: CEUL401	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Plane Trusses:** Types of structures, Trusses, Support Conditions, Types of Loadings, Classification of trusses, Basic assumptions of truss analysis (zero force member, tension or compression member), Method of joints, Method of sections.	5
2	**Deflection of Beams:** Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method, and conjugate beam method and their application to statically determinate prismatic beams.	8
3	**Analysis of Indeterminate Structures:** Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portals with & without sway etc.), Releases in structures, Maxwell's reciprocal theorem, and Betti's theorem. Analysis of prop cantilever structures, Analysis of Indeterminate Structure (fixed and continuous beams) using Area moment method, Conjugate beam method, Three moments Theorem.	12
4	**Energy Methods:** Introduction, Method of minimum strain energy for indeterminate beams, trusses, and plane frames. Deflection of trusses and plane frames by the use of Unit load method. Introduction to complementary and potential energy.	10
5	**Arches, Cables, and Suspension Bridges:** analysis of three hinged, two hinged and fixed-type parabolic arches with supports at the same level and different levels, Introduction to cables and suspension bridges	9
	Total	**45**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Theory of Structures Vol. I	G S Pandit, S P Gupta, R Gupta	Tata McGraw Hill Education P Ltd.	1st
2.	Theory of Structures Vol. II	G S Pandit, S P Gupta, R Gupta	Tata McGraw Hill Education P Ltd.	1st
3.	Theory of Structures SMTS-II	B C Punmia, Ashok Kumar Jain, Arun Kumar Jain	Laxmi Publication (P) Ltd.	13th

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Strength of Materials	G H Ryder	Red Globe Press London	1st
2.	Theory of Structures	S Ramamurtham, R Narayanan	Dhanpat Rai Publishing Company	11th

Prerequisite:

1. Fundamentals to analyze determinate structures.
2. Fundamentals of Mathematics
3. Fundamentals of Mechanics of Solids.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Fluid Mechanics and Hydraulic Engineering	**Course Code**: CEUL402	**Credit**: 04
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (60) + TW & SL(60) = 120 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Fluid Properties**: Definition, Type fluid: - ideal, real, Newtonian, Non-Newtonian and ideal plastic, fluid properties, viscosity, surface tension, compressibility, and elasticity.	3
3	**Fluid Statics:** Basic equations, Pascal's law, type of pressure, pressure measurement: - manometer, and mechanical gauges. **Hydrostatic force: -** hydrostatic pressure law, Forces on plane and curved surfaces, center of pressure. **Buoyancy**: - Conditions of equilibrium for floating bodies, meta-centre & metacentric height.	6
4	**Fluid Kinematics**: Steady and unsteady, uniform and nonuniform, stream lines, path lines, stream tubes, principles of conservation of mass, equation of continuity, acceleration of fluid particles local and connective, Rotational and irrational motions, free and forced vortex, circulation and vorticity, velocity potential and stream function, elementary treatment of flow net. Fluid mass subjected to horizontal and vertical acceleration and uniform rotation. **Fluid Dynamics:** Euler's equations of motion and integration of Euler's equations, Bernoulli's equation for incompressible Fluids, assumptions in Bernoulli's equation. Applications of Bernoulli's equation: Pitot tube, Venturimeter, orifice meter, orifices & mouthpieces, time of emptying of tanks by orifices. Moment equation and its application.	10
5	**Laminar Flow:** Laminar flow through pipes, Relation between shear & pressure gradient. Flow between plates & pipes. Hagen Poiseuille equation, Equations for velocity distribution, pressure difference velocity distribution over a flat plate and in a pipe section, Darcy-Weisbach equation, friction factor, major & minor losses, Hydraulic gradient, total energy line, pipe networks. **Turbulent Flow**: Reynolds equations, Prandtl's mixing length theory, Equations of velocity distribution. **Boundary Layer**: Concept of boundary layer, separation of flow and its control, cavitation.	8
6	**Dimensional Analysis & Models:** Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, Froude's, Weber's, Euler, and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem.	6

7	**Open channel Flow** Uniform, Non-Uniform, and variable flow. Resistance equations of Chezy and Manning. Section factor for uniform flow. Most Efficient rectangular, triangular, and trapezoidal sections. Velocity distribution in open channels. **Gradually varied flow** in Prismatic channels. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. **Rapidly varied flow**: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. velocity distribution in open channels.	**8**
8	**Impact of free Jets:** Impact of a jet on a flat or a curved vane, moving and stationary vane. **Introduction of Hydraulic machines:** Type of pumps and turbines and its brief description. Draft tube and its principle.	**3**
Problem Solving Sessions		**15**
	Total	**60**

Text Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Fluid Mechanics and Hydraulic Machines	R.K. Bansal	Laxmi Publications	10th(2019)
2.	Irrigation Water Power & Water Resource Engineering	Dr. K.R. Arora	Standard Publishers Distributors	4th (2010)
3.	Irrigation & Water Power Engineering	BC Punmia & BB Lal	Laxmi Publication(P) Ltd.	17th (2023)

Reference Books:

Sr.No.	Title	Author (s)	Publisher	Edition
1.	Fluid Mechanics	White, F.M	McGraw-Hill.	7th Ed.
2.	Foundation of Fluid Mechanics	Yuan, S.W.	Prentice-Hall	2nd Ed.
3.	Hydraulics and Fluid Mechanics Including Hydraulics Machines	Dr. P.N. Modi and Dr. S.M. Seth	Standard Publishers Distributors	26th Revised Edition
4.	Fluid Mechanics	K. Subramanya	McGraw Hill	7th Edition
5.	Fluid Mechanics and Hydraulic Machines	Rajput R.K.	S. Chand Publisher	13th Revised Edition

Prerequisite:

1. Students should have basic knowledge of engineering mathematic.
2. Students should have fundamental knowledge of physics.
3. Students should be aware of basic principles of engineering mechanics.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Concrete Technology	**Course Code**: CEUL403	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** to objective, scope and outcome of the subject	1
2	**Ingredients of Concrete**: Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel space ratio and its significance. Aggregates: types, physical properties and standard methods for their determination, grading of aggregate, manufacturing sand (MS). **Concrete**: grade of concrete, proportioning of ingredients, water content and its quality for concrete, water/cement ratio and its role, properties of fresh concrete including workability, air content, flow ability, segregation, bleeding and viscosity etc. Factors affecting methods of determination	10
3	**Admixtures**: Chemical and mineral admixtures, their types and uses: water reducers, accelerators, retarders, water-proofing plasticizers, super plasticizers, air-entraining agents. Use of fly ash, GGBFS, metakaolin and silica fume in concrete, their properties and effect. **Mix Design:** IS method of mix design. Comparison of IS Method with American & British Method.	8
4	**Properties of Hardened Concrete:** strength, permeability, creep, shrinkage, factors influencing, standard tests hardened concrete as per IS code. Aggregate- cement interface, maturity concept. **Durability of concrete**: Cause of deterioration, carbonation, test for durability assessment, carbonation, Sulphate Attack, chloride attack, Acid Attack, corrosion **NDT**: Introduction and their importance. Application & use of rebound hammer, ultra-sonic pulse velocity meter, rebar & cover meter, half-cell potential meter, corrosion resistivity meter, core sampling.	10
5	**Concrete Handling in Field**: Batching, mixing, transportation and placing of concrete, equipment for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipment. **Curing of concrete:** various methods their suitability.	8
6	**Form work:** Requirements and types. Typical formworks and shuttering/centering for columns, beams, slabs walls etc. Slip and moving form work **Special Types of Concrete:** Introduction to high strength concrete, high performance concrete, sulphate resisting concrete, under water concreting, self-compacting concrete, pumpable concrete: light weight aggregate concrete - cellular concrete - high density concrete -fiber reinforced concrete - polymer concrete - Types of polymer concrete, their salient properties and application.	8
	Total	**45**

Text Books:

S. No.	Title	Author(s)	Publisher	Edition/Year
1	Concrete Technology	Shetty, M.S.	Theory and Practice S. Chand and Company, New Delhi	8th /2018
2	Concrete Technology	Santha Kumar , A.R.	Oxford University Press	Standard/2006

Reference Books:

S. No.	Title	Author(s)	Publisher	Year
1	Concrete Technology	Gambhir, M.L.	Tata McGraw Hill	5th /2017
2	Properties of Concrete	Neville A.M.	Pearson Education India	5th /2012
3	Concrete Technology	S.S Bhavikatti	I.K International Publishing House Pvt. Ltd.	1st /2019

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Environmental Engineering	**Course Code**: CEUL404	**Credit**: 3
Max Marks: 100	**CIE:** 40	**SEE:** 60
End Term Exam Time: 3hrs.	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
2	**Quantity and Quality of Water:** Water demand – types of demand, variation in demand, population forecast. Water quality parameters – physical, chemical and microbiological, principles of their analysis. Drinking water quality standards.	5
3	**Water Treatment and Distribution System:** Need for water treatment. Process details and design considerations of treatment units such as aeration, sedimentation, coagulation and flocculation, filtration, disinfection, and water softening. Introduction to advanced water treatment methods such as adsorption, ion exchange and reverse osmosis. Pumps and pumping stations. Pipes, Pipe appurtenances.	12
4	**Wastewater Generation, Collection and Conveyance:** Wastewater Quantity, Classification of wastewater, Sewerage system for domestic wastewater and storm water, Collections, and appurtenances - Design and layout of sewerage systems, Maintenance of sewerage systems, Physical, Chemical and Biological characteristics and their significance.	5
5	**Treatment of Wastewater:** Objectives of Wastewater treatment, Unit Operations and Processes Design criteria, Design of primary treatment System Concepts of Biological treatment and removal mechanism – Aerobic and Anaerobic systems, Design of suspended and attached growth processes, Introduction to extended aeration processes and waste stabilization pond, Design of anaerobic system.	12
6	**Wastewater Disposal and Sludge Handling:** Alternative disposal methods, Self-purification of stream, Standards for disposal alternatives, natural purification of polluted streams. Quantity and quality of sludge, Methods of sludge treatment: sludge digestion and drying beds, Disposal of sludge.	5
7	**Air and Noise Pollution:** Air pollution sources and effects. Meteorology, Control of gaseous and particulate air pollutants, Noise pollution and control	5
	Total	**45**

Text Books:

S.No.	Author (s)	Title	Publisher	Edition	Year
1	B C Punmia, A Jain and A Jain	Water Supply Engineering	Laxmi Publications, New Delhi	2nd	2016
2	B C Punmia, A Jain and A Jain	Wastewater Engineering	Laxmi Publications, New Delhi	2nd	2016
3	G L Karia, R A Christian and N D Jariwala	Wastewater Treatment Concepts and Design Approach	Prentice Learning Private Ltd., New Delhi,	3rd	2013
4	S K Garg	Water Supply Engineering	Khanna Publishers	37	1977
5	S K Garg	Sewage waste disposal and Air pollution Engineering	Khanna Publishers	43	1977

Reference Books:

S.No.	Author (s)	Title	Publisher	Edition	Year
1	Metcalf & Eddy, George Tchobanoglous, Franklin Burton, H. David Stensel	Wastewater Engineering: Treatment and Reuse	Tata McGraw-Hill	4th	2003
2	M L Davis	Water and Wastewater Engineering	McGraw-Hill, New Delhi	1st	2010

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Fluid Mechanics and Hydraulic Engineering Lab	**Course Code**: CEUP420	**Credit**: 01
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1	To verify the Bernoulli's theorem.
2	To determine the coefficient of discharge of Venturimeter
3	To calibrate the Orifice-meter
4	To determine Metacentric Height.
5	To determine C_c, C_v, C_d of an orifice.
6	To determine Coefficient of discharge (C_d) of a V-notch.
7	Impact of Jet on Vanes.
8	To determine the minor losses due to sudden enlargement, sudden, contraction, and bend.
9	To determine the friction factor for the pipes. (Major Losses).
10	To determine Coefficient of discharge (C_d)of Rectangular Notch.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Concrete Lab	**Course Code**: CEUP421	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (45)**	

Module No.	Contents
1.	To determine the fineness modulus of fine aggregate (FA) and coarse aggregates (CA) by sieve analysis.
2.	To determine water absorption & specific gravity of fine aggregate using Pynometer.
3.	To determine water absorption & specific gravity of coarse aggregate.
4.	To determine the workability of fresh concrete by a) slump cone test, b) compaction factor test, and c) Flow table test.
5.	To determine the compressive strength of concrete cube.
6.	To determine the flexural strength of concrete beam.
7.	To design concrete mix with and without admixtures as per IS 10262 recommendations.
8.	To determine the water permeability of concrete as per DIN.
9.	To determine the abrasion resistance value of given sample of tile.
10.	To Assessment of quality of concrete by using Non-destructive test (NDT) apparatus such as Rebound Hammer and Ultrasonic Pulse Velocity Meter.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Building Planning and Drafting Lab - II	**Course Code**: CEUP422	**Credit**: 1.5
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs	**Teaching Scheme: LI (45)**	

Module No.	Contents
1	Implementation of principles of planning, building bye-laws, National Building Code in the different building drawings along with sign convention.
2	Working drawing of a Residential building using BIM based software with following details: (a) Site plan (b) Foundation plan (c) Plan (d) Sectional elevations (e) Front elevation (f) Furniture plan.
3	Electrical Fitting, Water Supply and sanitary plan of buildings.
4	Detailed working drawing of a Commercial building: School/Health Centre/Bank/Library.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Environmental Engineering Lab	**Course Code**: CEUP423	**Credit**: 1
Max Marks: 100	**CIE:** 40	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1.	To Determine the physical characterization of water and wastewater samples like Turbidity, Temperature.
2.	To Determine the chemical characterization of water and wastewater samples like Electrical Conductivity & pH.
3.	To Determine the concentration of different type of solids like total solids, Dissolved solids, Settleable solids, suspended solids, volatile solids, inorganic solids etc. in water and wastewater sample.
4.	To Determine the concentration of Alkalinity and acidity in the given water sample in terms of $CaCO_3$.
5.	To Determine the concentration of Hardness i.e. temporary hardness and permanent hardness in the given water sample in terms of $CaCO_3$.
6.	To Determine the Optimum coagulant dose by performing jar test in the process of coagulation and flocculation process for the treatment of water and wastewater.
7.	To Determine the chemical oxygen demand (COD) of wastewater by using a highly oxidizing agent $K_2Cr_2O_7$.
8.	To Determine the Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD) after 5 day (BOD_5) of wastewater.
9.	To Determine the Break Point Chlorination in the process of disinfection of water
10.	To Determine the nitrate and phosphate concentration in wastewater by spectrophotometer
11.	Method to report MPN number in Bacteriological quality measurement of water.

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Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Structure Engineering Lab	**Course Code**: CEUP424	**Credit**: 1
Max Marks: 100	**CIE:** 60	**SEE:** 40
End Term Exam Time: 3hrs.	**Teaching Scheme: LI (30)**	

Module No.	Contents
1.	To verify Maxwell's Reciprocal theorem.
2.	To find horizontal thrust in a three-hinged arch and to draw influence line diagrams for Horizontal thrust.
3.	To find horizontal thrust in a two hinged arch and to draw influence line diagrams for horizontal Thrust.
4.	To find deflections in a beam having unsymmetrical bending.
5.	Determination of elastic deflection of curved beams.
6.	To analyze the redundant joint.
7.	To study the behavior of different types of struts.
8.	To study the cable geometry and statics for different loading conditions.
9.	Application of software for analysis of structural elements.

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Syllabus

Name of the Programme: **B.Tech. in Civil Engineering**	**Year**: II	**Semester**: IV
Course Name: Advanced Engineering Mathematics-II	**Course Code**: MAUL403	**Credit**: 3
Max Marks: 100	**CIE: 40**	**SEE: 60**
End Term Exam Time: 3 Hrs	**Teaching Scheme:** CI (45) + TW & SL(45) = 90 hrs. per semester	

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction:** Objective, Scope, Outcome of the Course and Prerequisite	1
f	**Numerical Methods-I** Finite differences, Newton's formulae. Sterling's formulae, Lagrange's interpolation formula, Newton's Divided difference formula. Numerical differentiation, Numerical integration: Trapezoidal rule, Simpson's one-third and three eighth rule.	12
3	**Numerical Methods-II** Solution of algebraic and transcendental equations by Newton Raphson and Regula Falsi methods, Solution of ordinary differential equations of first order by Picard's method, Euler's & modified Euler's methods, Miline's method and RungeKutta fourth order method.	11
4	**Statistics & Probability-I:** Elementary theory of probability, Baye's theorem with simple applications, Random Variables and Mathematical Expectation. Theoretical probability distributions – Binomial, Poisson and Normal distributions.	12
5	**Statistics & Probability-II:** Correlation and rank correlation, Regression Analysis, fitting of curves by method of least squares.	9
	Total	**45**

Text Books:

1. **Dass, H.K. (2018).** *Advanced Engineering Mathematics* (22nd ed.). S. Chand and Company Ltd.
2. **Grewal, B.S. (2017).** *Higher Engineering Mathematics* (44th ed.). Khanna Publication.
3. **Veerarajan, T. (2008).** *Probability, Statistics and Random Process* (3rd ed.). Tata McGraw Hill Publishing.

Reference Books:

1. **Kreyszig, E. (2016).** *Advanced Engineering Mathematics*. Wiley India.
2. **Ramana, B.V. (2024).** *Higher Engineering Mathematics*. McGraw Hill Publishing.
3. **Sastry, S.S. (2013).** *Introductory Methods of Numerical Analysis*. PHI Learning India.
4. **Jain, R.K., & Iyenger, S.R.K.** (2013). *Numerical Methods: Problems and Solutions*. New Age Publishing.

Prerequisite:

1. **Basic differentiation and integrations**
2. **Permutations and Combinations**

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

(An Autonomous Institute Affiliated to Rajasthan Technical University, Kota)

Syllabus

Name of the Programme: B.Tech. in Civil Engineering	**Year**: II	**Semester**: IV
Course Name: Technical Training	**Course Code: NU99.4**	**Credit**: 0 (NC)
Evaluation Criteria: Continuous Evaluation(Appendix 1)	**Teaching Scheme:**	**0L+0T+2P**

Module No.	Contents	Classroom Instruction (CI) Hours
1	**Introduction to Civil Engineering Projects & Drawing Interpretation** • Types of Civil Engineering Projects (Residential, Commercial, etc.) • Stakeholders & Roles in a Project • Roles & Responsibilities of Civil Engineers (Site, Structural, Planning, etc.) • Types of Construction Drawings & IS 962 Notations • Hands-on: Reading & Interpreting Real Drawings	6
2	**Bar Bending Schedule, Reinforcement Detailing & Quantity Measurement** • Basics of Bar Bending Schedule (BBS) & IS 2502 • Reinforcement Calculation: Hook, Anchorage, Lapping, etc. • Measurement Book (MB): Purpose, IS 1200 & Recording Methods • Hands-on Tasks: BBS for Slab/Beam, MB Entry • Quantity Estimation Using Drawings	6
3	**Materials, Quality & Safety Management** • Construction Materials: Procurement & Inventory Control • Material Wastage Reduction Techniques & Case Study • Quality Control Measures & IS Testing Standards (4031, 2386, 10262) • Safety Hazards, IS 3764 & NBC, PPE & Safety Checklists • Hands-on: Site Safety Checklist	6
4	**Site Documentation, Project Planning & Execution** • Site & Office Documentation (Detailed Project Report (DPR), Request for Information (RFIs), Contracts, Billing) • Project Phases: Planning to Completion • Team Coordination & Execution Planning • Creating Work Schedules (MS Excel) • Case Study: Execution Challenges on Site	6
5	**Cost Estimation, Problem Solving & Digital Tools** • Estimation Methods: Plinth Area, Cubic Content, Item Rate • BOQ Preparation & Cost Control • On-Site Problems: Material Shortage, Labor Issues, Design Modifications • Digital Tools: AutoCAD, MS Excel, Primavera, BIM (Revit) • Hands-on: BOQ Creation & Simple Project Planning	6
	Total	**30**

Appendix 1

Evaluation Scheme

Evaluation: Assessment will be based on quizzes, viva-voce, presentations, and active participation, including feedback from site visits and expert sessions.

Certification: Certificates will be awarded upon successful completion of all evaluations and the final seminar presentation.