JD-20 & 21 June, 2017 AC after Circulars   - 43 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
CIRCULAR NO.SU/Engg./B.E.IIIrd Yr./64/2018

It is hereby informed to all concerned that, the syllabi prepared by the Board of Studies & recommended by the Dean, Faulty of Science & Technology the **Academic Council at its meeting held on 30 June & 02 July 2018 has accepted the following syllabi in accordance with Choice Based Credits & Grading System for all Branches Third Year Engineering & Second Year of Bachelor of Architecture** under the Faulty of Science & Technology as enclosed herewith:-

Sr.No.	Syllabi as per CBC & GS
[1]	**Third Year B.E.[Civil Engineering],**
[2]	**Third Year B.E [Mechanical Engineering],**
[3]	**Third Year B.E [EE/EEE/Electrical, Electronics & Power,],**
[4]	**Third Year B.E [Chemical Engineering],**
[5]	**Third Year B.E [Instrumentation Engineering],**
[6]	**Third Year B.E [E&TC/E&C/IE/ECT],**
[7]	**Third Year B.E [CSE/IT].**
[8]	**Second Year of Bachelor of Architecture.**

This is effective from the Academic Year 2018-2019 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.No.SU/2018/
Date:- 03-07-2018./ 10497 - 03

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Deputy Registrar,
Syllabus Section

Copy forwarded with compliments to :-
1] **The Principals, affiliated concerned Colleges,**
   Dr. Babasaheb Ambedkar Marathwada University.
2] The Director, University Network & Information Centre, UNIC, with **a** request to upload this Circular on University Website.
   Copy to :-
1] The Director, Board of Examinations & Evaluation,
2] **The Section Officer, [Engineering Unit] Examination Branch,**
3] The Section officer, [Eligibility Unit],
4] **The Programmer [Computer Unit-1] Examinations,**
5] **The Programmer [Computer Unit-2] Examinations,**
6] The In-charge, [E-Suvidha Kendra],
7] The Public Relation Officer,
8] The Record Keeper,

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SCHEME AND DETAILED SYLLABUS

Of

T.E. (Civil Engineering)

Under Choice Based Credit & Grading System

(w.e.f. Academic Year 2018-19)

FOUR YEAR DEGREE COURSE IN SCIENCE & TECNOLOGY

Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD, M.S., INDIA

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Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
FACULTY OF _____ AND TECHNOLOGY

TE (Civil) Syllabus Structure -(w.e.f. June -2018)

Part -I

Subject Code	Subject	Th	Pr/TW	Marks					Credit
		Hrs	Hrs	TH	CT	PR	TW	TOTAL	
CED301	Theory of Structures II	4	-	80	20	-	-	100	4
CED302	Design of Structures-I (Steel)	4	-	80	20	-	-	100	4
CED303	Building Planning and Design	4	4	80	20	50	50	200	6
CED304	Engineering Geology	4	2	80	20	25	25	150	5
CED305	Highway Engineering	4	2	80	20	25	25	150	5
BSH305	Lab III: Communication Skills II	2		-	-		50	50	2
Total		22	8	400	100	100	150	750	26
Total		30							

Part -II

Subject Code	Subject	Th	PR/TW	Marks					Credit
		Hrs	Hrs	TH	CT	PR	TW	TOTAL	
CED306	Design of Structures-II (RCC)	4	-	80	20	-	-	100	4
CED307	Professional Practices	4	4	80	20	25	50	175	6
CED308	Geotechnical Engineering	4	2	80	20	25	25	150	5
CED309	Water Resources Engineering-I	4	-	80	20	-	-	100	4
CED310	Elective I	4	-	80	20	-	-	100	4
CED332	Lab IV: Structural Design & Drawing (Steel)	-	4	-	-	25	50	75	2
CED333	Lab V : Computer Lab III	-	2	-	-	-	50	50	1
Total		20	12	400	100	75	175	750	26
Total		32							

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Electve-I

1. Advanced Concrete Technology
2. Building Maintenance and Repairs
3. Town Planning
4. Computer Applications in Civil Engineering
5. Enviromental Impact Assessment (EIA)

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CED301: Theory of Structures- II

Teaching Scheme:
Theory: 04 Hrs / Week

Examination Scheme:
Theory: 80 Marks
Class Test: 20 Marks

Unit I: Plastic Analysis of Structures

(04)

Introduction, Material behaviour, Theory of Plastic bending and plastic hinge, Plastic Hinge Concept, Shape factor, Ultimate moment of resistance of RCC section, Plastic collapse load (No numerical to be set)

Unit II:
Basic Concepts and Analysis of Indeterminate Beams, Frames and Trusses   (11)

Concept of indeterminacy–Static and Kinematic Indeterminacy, Degree of Indeterminacy-Rigid Plane Frames and Pin-jointed Plane Trusses. Analysis of continuous beams, rectangular portal frames and trusses (Indeterminacy up tosecond degree) by Castigliano's II theorem, lack of fit, temperature changes.
Slope deflection method: Nature of equilibrium methods, the slope deflection equation, Interpretation of the slope deflection equation, Analysis of continuous beam, fixed beam, & overhang beams by slope deflection method, Effect of sinking of supports.

Unit III: Column Analogy Method

(05)

Introduction, Development of the method, Analysis of beams (simple and fixed), Analysis of single bay-single storey frames.

Unit IV: Moment Distribution method
(08)
Iterative methods, Physical interpretation of iterative solutions, Basic concept of Moment Distribution Method, Analysis of continuous beam, fixed beam, & overhang beams by Moment Distribution Method, analysis of portal frames (single bay single storey frames), sway and nonsway analysis.

Unit V: Kani's method

(06)

Analysis of continuous beam, fixed beam, & overhang beams by Kani's Method, analysis of portal frames, sway and non-sway analysis (single bay single storey frames),

Unit VI: Two Hinged Arch

(06)

Analysis of two hinged parabolic, semicircular and circular arches, yielding of supports of two hinged arches, Rib shortening effects, horizontal thrust due to temperature effects on two hinged arches, Influence lines for two hinged arches.

Recommended Books:

1. Fundamentals of Structural Analysis – West & Geschwindner – Wiley India Edition
2. Strucutral Engineering (An Integrated Treatise) – V.V. Sastry – Dhanpat Rai and Co.
3. Basic Structural Analysis - C.S. Reddy – McGraw Hill
4. Theory of Structures - Timoshenko & Goodier - McGraw Hill

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5. Advance Theory of Structures – Sinha & Gayen - Dhanpat Rai and Co.
6. Theory of Structures by S. Ramamrutham and R. Narayan, Dhanpat Rai Publication
7. Theory of Structures, Vol. 1 by Pandit and Gupta
8. Theory of Structures, Vol. 2 by Pandit and Gupta

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CED302: DESIGN OF STRUCTURE – I (Steel)

Teaching Scheme :
Theory: 4 hours/week

Examination Scheme :
Theory: 80 Marks

Class Test: 20 Marks

Objectives:
1. Student will come to know various types of sections used in Steel Structures.
2. Student will able to know how to analyse the steel structure
3. Student will be able to apply the knowledge of steel structure for different analysis
4. Student will able to design steel structure component normally used in Industry.

Unit I: 04

Types of steel structures, grades of structural steel, various rolled steel sections, relevant IS specifications such as IS 800:2007, IS 808:1989, IS 875 part I to III, SP: 6(1), SP: 6(6), IS 4000-1992, codes of welded connections, advantages of steel structures, Philosophy of limit state design for strength and serviceability, partial safety factor for load and resistance, various load combinations, classification of cross section such as plastic, compact, semi compact and slender.

Unit II: 06

Tension member: Types, Limit state due to yielding, rupture and block shear, Design using single and double angle sections and its connections by bolts and welds.

Unit III: 10

Compression member: Behaviour of compression members, modes of failure, classification of cross section, Design of strut in trusses and its connections by bolts and welds. Design of axially loaded column using rolled steel section. Design of built up column, lacing and battening, connection of lacing/ battening with main components by bolts and welds. Column base under axial load: design of slab base, gusseted base. Column base for axial load and uniaxial bending.

Unit IV: 08

Flexural member: Laterally supported and unsupported beams using single rolled steel section with and without flange plate, strength in flexure, check for shear and deflection. Secondary and main beam arrangement for floor of a building, design of beam to beam and beam to column connections using bolts/ welds.

Unit V: 06

Design of welded plate girder: Design of cross section, Curtailment of flange plate, stiffeners and connections.

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Unit VI: 06

Roof Trusses: Assessments of dead load, live load and wind Load

Recommended Books:

Reference codes: IS 875- Part I to V, IS 800-2007

1) Design of Steel Structures by N. Subramanian, Oxford University Press, New Delhi

2) Design of steel structures by Limit State Method as per IS 800:2007 by Bhavikatti S.S., I K International Publishing House, New Delhi.

3) Limit State Design of Steel Structure by V.L. Shah and Gore, Structures Publication, Pune.

4) Teaching Resource Material by INSDAG

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CED 303: Building Planning and Design

Teaching Scheme :
Lectures: 4 Hrs / week

Examination Scheme:
Theory paper: 80 Marks
Class Test: 20 Marks

Objectives:-

1. To understand **General Building concept**
2. To understand **Architectural Composition**
3. To understand Building services
4. To understand the principles of planning and bylaws.
5. To draw plan, elevation and section of load bearing and framed structures.
6. To draw plan, elevation and section of public and industrial structures

Unit- I: Architectural Composition & Orientation of buildings   (07)

Principles of Architectural Composition: Unit, Contrast, Proportion, Scale, Balance, Rhythm, Character. Functional treatment of building: massing, Principles of Building planning, Climate & its influence on Building planning: Solar radiation, air temperature, wind, humidity, precipitation, climatic zones, climate & comfort, earth & its motion, directions & their characteristics. Orientation of buildings: factors affecting orientation, sun, wind, rain, C.B.R.I. – suggestions for obtaining optimum orientation, orientation criteria for Indian conditions.

Unit- II: Building General concept   (06)

Procedure of Building Permission, Structural Audit of Buildings (Conceptual introduction only), Low cost Housing-Materials & Methods (Conceptual introduction only).

Thermal Insulation: General concept, Principles, Materials, Methods, Computation of Heat loss & heat gain in Buildings.

provision for drainage & sanitation, parking spaces, qualifications for registered architects, Engineers & Licensed supervisor, certificate of commencement, completion & occupancy.

Unit-III: Building Services   (07)

Flooring: Types, Factors for Selections of Floorings, Flooring in Ground and Upper floors, Various types of Tiled Flooring, Concrete Flooring (Tremix Flooring).

Electrification: Concealed & Open Wiring, Requirements & Location of various points, Concept of earthing.

Building services: water supply requirement of buildings, sanitary fittings, systems of plumbing, drainage of house, its principles, common terms, drainage plans of buildings, testing of drains, maintenance, pipe sizes and gradients. Septic tanks: domestic & public septic tank, design & commissioning of septic tank.

Unit- IV: Design of Residential Buildings

(04)

Planning of living area, sleeping area & service area, minimum standards specified by building bye- laws, requirement of different purpose rooms of a residential building and their grouping.

Unit- V: Design of Public Buildings

(10)

A) Educational Building: Site selection, design of Class rooms, Library, Assembly hall, administrative area, staff rooms, sanitary & water fittings requirements.

B) Health care buildings: its types, site selection, out- patient dept (OPD), In- patient dept. (IPD), wards, Operation theatre, Radiology dept., Sanitary & water fitting requirements for IPD & OPD, Pathology dept.

C) Hostel Buildings: site selection, Employees hostel, Ladies & working women's hostel, open & closed type hostel, special requirements of ladies hostel, warden's office, residential area, dining area, kitchen, recreation room, store room, sanitary & water fitting requirements.

D) Hotel building: site selection, major components of hotel building – entrance foyer, public rooms, bedrooms, kitchen, food store, laundry, building services, sanitary units.

E) Office buildings: entrance, corridors, storage, sanitary units, canteen.

F) Industrial building: Factory building, godowns & warehouses, site selection, Factory shed, canteen, cloak room, drinking water, entrance, loading & unloading platform, medical aid, office, storage, sanitary block.

Unit VI: Perspective drawing

(06)

Necessity, principle of perspective projection, perspective elements, Onepoint & Two- point perspective. Landscaping: Its necessity, types & materials.

Recommended Books :

1. Building Planning & Drawing – Dr. N. Kumara swamy, A. Kameshwara rao, 6th Edition, Charotar Publications.
2. Building Planning Designing & Scheduling – Gurcharan Singh, Jagdigh singh, Standard Publishers.
3. Planning & Designing of building – Y.S. Sane.
4. Principles of building drawing - M.G. Shah & C.M. Kale
5. Building construction illustrated- Francis D.K. Ching, 4th Edition, Wiley India Edition.
6. National Building Code of India: S.P - 7 (2005)

LAB-I: BUILDING PLANNING AND DESIGN

Teaching Scheme :
Practical: 4 Hrs / week

Examination Scheme :
Term Work: 50 Marks
Pr. / Oral: 50 Marks

Objectives:-
1. To draw plan, elevation and section of load bearing and framed structures.
2. To draw plan, elevation and section of public and industrial structures

Practical Examination:

I) Students should prepare the following working drawings. Individual projects to be planned. Submission of working drawings by 1:50 or suitable scale.

a) Residential building:
i. Layout plan
ii. Floor plans (by hand as well as by computer software)
iii. Elevation (by hand as well as by computer software)
iv. Section through stair (by hand as well as by computer software)
v. Foundation plan
vi. Structural plan
vii. Water supply & drainage layout (on tracing paper)

b) Public building:
i. Layout plan
ii. Floor plans (by hand as well as by computer software)
iii. Elevation (by hand as well as by computer software)
iv. Section through stair (by hand as well as by computer software)
v. Foundation plan
vi. Structural plan
vii. Water supply, drainage layout & fire fitting layout

c) Perspective drawing of above any one building on imperial size sheet.

d) Municipal Submission drawing.

e) Furniture layout plan.

f) Electrification plan.

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CED 304: ENGINEERING GEOLOGY

Teaching Scheme
Theory: 04hrs/week

Examination scheme
Theory: 80 Marks
Class Test: 20 Marks

Objectives:

1. To provide the students with the basic and advance knowledge of Engineering Geology.
2. To have knowledge of different rocks and their properties, Suitability for different construction purpose.
3. To Provide Knowledge of Groundwater and hydrology which is useful while dealing with land drainage, Sanitary engineering, water supply, control of landslides.
4. To provide knowledge of surface waters helps to understand the process of erosion, transportation and deposition, useful for Dam construction, harbor works, soil conservation etc.
5. To Provide Systematic Knowledge of natural Construction material.

Unit I: Physical Geology
06

Normal cycle of regional erosion and weathering, Geological action of Water, river valley development, water fall, meandering, and related features, Transported and deposition by river flood plains such as, Alluvial fans, Levees, Delta and Rejuvenation of river. Interior of Earth. Volcanism and its types. Earthquake, Causes of Earthquake, magnitude and intensity, Location of Epicenter. Mountains and types of Mountains, Minerals, Silicate and non silicate mineral. Physical properties of Minerals.

Unit II: Petrology
07

Igneous rock and its classification based on mode of occurrence, Hatch's Classification, Textures of Igneous rocks and its types, Extrusive and Intrusive type, Dyke, Sill, Batholiths, laccoliths, phacolith, lopolith, vein.

Secondary Rocks: Rock Weathering, Decomposition and Disintegration of rocks, sediments, Classification of sedimentary rocks, Textures and structures of sedimentary rocks, consolidation and cementation, Characters of Shallow water deposits.
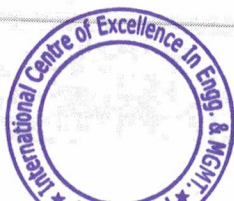
Metamorphic Rocks: Metamorphism, Agents of metamorphism, structures of metamorphic rocks, kinds of metamorphism.

Unit III: Structural Geology
07

Structural Elements of rock-Dip and Strike, Unconformity and its types, Faults, Folds, Joints and their classification and their effects on outcrops, Inliers and outliers

Stratigraphy: Principles of Stratigraphy, Geological time scale, Physiographic Division of India and their characteristics. Major geological formations of India, Ardchean, Cuddapha, Vindhyan, Gondwana, and Deccan trap.

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Unit IV 07

Engineering Geology: Significance of Geology in Civil Engineering, Preliminary Geology investigations, use of Geological maps and sections, Geophysical methods of investigations Resistivity survey, Seismic method. Drilling its Advantages and Limitations, Precautions during drilling, Core recovery and Core logging.

Ground Water: Zonal Distributions of subsurface water, Types of Aquifers, Cone of Depression, Artificial recharge of Ground water, Geological Conditions Favorable for natural springs and seepages, porosity and permeability, hot springs and Geysers.

Unit V 06

Building Stones, requirement of good building stones, and their dependability on geological characters of rocks, common building stones, Building stones of India, Landslides, causes, stability of hill slopes, relation of dip and strike, amount of slope with stability of hill slopes, terminal creep, preventive measures for landslides, Precautions to be taken while making cut in hills.

Unit VI 07

Geology of Dam Sites: Influence of Geological condition on the choice of types and design of Dam. Preliminary Geological investigation at the Dam site, favorable and unsuitable conditions and location of dam, Treatment of rock, fault zone, dykes, joints, permeable and soluble rocks.

Geology of Reservoir site: Dependence of water tightness of physical properties, structure of rocks. Unsuitable and suitable conditions at reservoir site, causes of leakage through the reservoir rim.

Tunneling: Types of Tunnels, Tunnel lining, Important Geological conditions while choosing alignment of tunnel, Exploration during construction, difficulties during tunneling related with local geological conditions, tunneling in Igneous, sedimentary and Metamorphic rocks.

Engineering Geology of Deccan trap: Significance of deccan trap rocks in construction, the suitability of Basalts for Tunneling and at the Dam sites, general difficulties of Basalt at construction sites, Engineering properties of Basalt as a construction material.

Recommended Books:

1. Gupte R.B. A Text Book of Engineering Geology, Pune Vidyarthi Griha prakashan, Pune.
2. K. M. Bangar. Principles of Engineering Geology, Standard publishers and Distributors, Delhi.
3. Parbin Singh. Engineering and General Geology. S.K. Kataria and Sons, New Delhi
4. Venkat Reddy: Engineering Geology for Civil Engineering, Oxford & IBH publishing co. Ltd.

NOTE: Prerequisite: Knowledge of Surveying, Geography is necessary.

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Lab – ENGINEERING GEOLOGY

Teaching Scheme
Practical: 2 Hrs / week

Examination Scheme
Term Work: 25 Marks
Pr. / Oral: 25 Marks

Course Objectives:

1. To Provide the students the knowledge of mineralogy of different types of rocks
2. To have a knowledge of the different types of geological maps and uses of it in civil engineering.

Term work shall be based on syllabus and following assignments

1. Identification and classification of important rock forming minerals and rocks.

2. Geological map reading, construction of section of Geological maps consisting of horizontal and inclined beds, unconformity, faults, folds, dykes etc.

3. Study of solutions of engineering geological problems with the help of these maps.

4. Geophysical Exploration by electrical resistivity method.

5. One site visit with report to study geology and its Engineering applications.

Recommended Books:

1. R.B. Gupte "Textbook of engineering Geology"

2. S.K. Garg "Physical and Engineering Geology"

3. Parbin Singh "Engineering Geology"

4. D. Venkat reddy "Engineering Geology for civil engineers"

5. P.K. Mukerjee "Principles of Geology"

6. K.M. Bangar "Enginering Geology"

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CED305: HIGHWAY ENGINEERING

Teaching Scheme
Theory: 04 Hrs / Week

Examination Scheme
Theory: 80 Marks
Class Test: 20 Marks

Objectives:

To introduce the students of Civil Engineering about highway engineering, more specifically to the history, its role in economy, planning, design, financing, construction & maintenance of roads and highways.

Unit I: History, Economics, Financing & Planning   (06)

Jaykar committee Indian road congress, planning agencies, NHAI, CRRI, Twenty-year plans, Vision 2021, Vision 2025

Highway user benefits, highway economic analysis, importance of highways in Indian economy

Financing of highway projects, PPP models, hybrid model, traditional method – CRF, Road taxes

Significance of highway planning, Classification of roads, planning surveys, National Highway Development Project, Pradhan Mantri Gram Sadak Yojana

Unit II: Alignment and Geometry Design   (10)

Factors influencing highway alignment, Soil suitability analysis - Road ecology - Engineering surveys for alignment, objectives, conventional and modern methods.

Typical cross-section elements of highway, urban roads & rural roads, horizontal curves, transition curves, super-elevation, widening at curves, sight distances, set-back distance.

Vertical curves, gradients, cross-section elements of hilly roads, hair-pin bends.

Unit III: Design of Flexible & Rigid Pavements   (06)

Design principle, Pavement components and their role, IRC method (IRC.37) of Flexible Pavements design, IRC method (IRC.58) of Rigid Pavements design, Westergrad's method.

Unit IV: Highway Construction Material & Practice   (06)

Highway construction materials, their properties and testing methods, CBR test for soil subgrade, tests of aggregate, tests on bitumen, Mix design – marshal Stability Test, IRC specifications, construction machineries, modern material – plastic, geo-fiber, geo-textile, highway drainage.

Unit V: Evaluation & Maintenance of Pavement   (06)

Distresses in flexible pavement and rigid pavement, pavement management system, roughness, present serviceability index, skid resistance.

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Unit VI: Traffic Engineering

(06)

Road user characteristics, vehicular types &characteristics, Traffic studies – volume study, speed study, parking study, accident study, Intersection - types, layouts, design& controls, slip lane, right turn lane, road signs.

Recommended Books:

1) Highway Engineering (10th Edition) by S.K.Khanna, C.E.G.Justo, A.Veeraragavan
2) Traffic and Highway Engineering (5th Edition) by Nicholas J. Garber, Lester A. Hoel
3) Principles of transportation and highway engineering by G. Venkatappa Rao
4) Text book of Highway Engineering by R Srinivasa Kumar
5) Highway Material and Testing by S. K. Khanna, Justo and Veerraghwan.
6) Highway Engineering by Kadiyali
7) Guidelines for the design of flexible pavements, second revision, IRC: 37- 2001
8) Guidelines for the Design of Plain Jointed Rigid Pavements for Highways, IRC: 58-2002
9) Tentative Guidelines for the design of flexible pavements – IRC: 37-2012
10) Specifications for road and bridge works, Ministry of Road transportation & Highways- 2001, Govt. of India, New Delhi.
11) IRC – 67 "Code of Practice for Road Signs"
12) IRC:70, 1977: Guidelines on Regulation and Control of Mixed Traffic in Urban Areas

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Lab- HIGHWAY ENGINEERING

Teaching Scheme
Practical: 02 Hrs / Week

Examination Scheme
Term work: 25 Marks;
Oral: 25 Marks

Lab Objective:

To expose the students of Civil Engineering about highway construction materials, their properties and their testing methods.

Term Work

Term Work shall consist of laboratory journal covering following laboratory tests as prescribed below

Experiment No.	Experiment Title	Note
	Tests on Aggregate	
1.	Aggregate Crushing Test	
2.	Aggregate Impact Test	
3.	Los Angeles Abrasion Test	Any four out of five
4.	Shape Tests	
5.	Water Absorption and Specific Gravity Test	
	Tests on Bitumen	
6.	Penetration Test	
7.	Ductility Test	
8.	Flash & Fire Point Test	
9.	Softening Point Test	Any five out of six
10.	Specific Gravity Test	
11.	Viscosity Test	
	Test on Soil	
12.	California Bearing Ratio Test	Mandatory
	Test on Bitumen Mix Design	
13.	Marshal Stability Test	Mandatory

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BSH :305 -Communication Skill

Semester – 1

Course Code: BSH 305	Title: Communication Skill
Teaching Scheme	Examination Scheme
Theory: 02Hours/Week	Term Work: 50 Marks

Prerequisite:
1. Basic Knowledge of Soft Skills
2. Good understanding of English

Objectives:
1. To imbibe leadership skills
2. To develop interpersonal Skills
3. To introduce corporate etiquettes
4. To imbibe team skills

CONTENTS

Unit 1: Understanding self and Goal Setting   (5 Hours)

- Self-Assessment: Understanding Self Core Competency (SWOT/SWOC)
- Long term and short-term Goal Setting
- Execution Skills

Unit 2:   Interpersonal Skills   (6 Hours)

- Interpersonal Communication
- Conflict Management
- Problem Solving
- Decision Making
- Persuasion and Influence

Unit 3:   Group Dynamics and Team Building   (4 Hours)

- Group Vs Team
- Team Building
- Team Work
- Developing Leadership Skills

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| Unit 4: | **Corporate Etiquette** | (5 |
| Hours) | | |

- Clothing Etiquette, Personal hygiene and grooming
- Time Management
- Influencing Skills (Impression)
- Balancing personal and professional Life
- Ethics, Values and Laws

Text Book:

The Ace of Soft Skills (Gopalaswamy Ramesh) Pearson Publication

Reference Books:

1. **Execution;**   :Ram Charan
(Publisher: Crown Business; 1 edition (June 15, 2002)
Language: EnglishISBN-10: 0609610570ISBN-13: 978-0609610572)

2. **Laws of Teamwork**   : John C Maxwell

3. **Master of Business Etiquette**: Cyrus Gonda
(Author: Cyrus Gonda, Publisher EMBASSY BOOKS, 2017, ISBN 9385492721, 9789385492723)

4. **Goals**   :
(Author: Brain Tracy ISBN: 1-57675-235-6Published by Berrett-Koehler Publishers, Inc)

5. **Interpersonal Skills at work**   :
(Author: John Hayes Second Edition: Routledge)

6. **People Smart**   :
(Author: Freda Hansburgby Berrett-Koehler Publishers, Inc)

Term Work Assessment (50 marks):

The term work shall consist of internal online examination of 50 Marks, conducted at institute level. The marks of the examination shall be forwarded to the University.

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CED306: DESIGN OF STRUCTURES–II (RCC)

Teaching Scheme

Theory: 4 hours/week

Examination Scheme

Theory: 80 Marks

Class Test: 20 Marks

Objectives:

1. Student will come to know various methods of design of RCC Structure.
2. Student will be able to know the various loading consider in analysis of Slab, Beam, Column, and Footing.
3. Student will be able to design different types of RCC Components Reinforced.
4. Student will able to design new types of RCC Structures.

Unit I: (06)

Introduction to various design philosophies of reinforced concrete structures (WSM, LSM), Structural elements, loads on structures and structural properties of concrete, Redistribution of moments and its IS code provision.

Limit State of Serviceability: Significance of deflection , types of deflections and IS provisions.

Limit State of Cracking: Cracking, causes, mechanisms and effects, Classifications, types of cracks , bar detailing rules.

Unit II: (08)

R.C. sections in flexure: Design parameters, maximum values, Analysis and design , singly, doubly reinforced and flanged sections.

Unit III: (06)

Design of beams for shear , bond and torsion

Unit IV: (07)

Design of slab: One way, simply supported, cantilever and continuous. Two way slab - simply supported, continuous and restrained.

Unit V: (05)

Design of staircase: Dog legged staircase and open well staircase

Unit VI: (08)

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Design of column: Axially loaded, short and long, uniaxial and biaxial moments. Design of isolated column footing: axial load and biaxial moments.
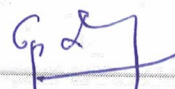
Recommended Books:

Reference codes: I.S.875 part I to V for loading standards & IS.456-2000 for R.C.C.design.

1) Limit State Analysis and Design by P. Dayaratnram, Wheeler Publishing Company, New Delhi
2) Limit State Theory and Design by Dr. V.L. Shah and Dr. S.R. Karve, Pune VidyarthiGruh Publication , Pune.
3) Comprehensive Design of R.C. Structures by Dr. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Standard Book House , New Delhi.
4) RCC Analysis and Design by S. N. Sinha, S, Chand and Co; New Delhi
5) Reinforced Concrete Design by P.C. Varghese, PHI, New Delhi.
6) Reinforced Concrete Design by PillaiMenon, Tata McGraw Hill, New Delhi.
7) Design of Concrete Structures by J N Bandyopadhayay, PHI , New Delhi.

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CED307: PROFESSIONAL PRACTICES

Teaching Scheme
Theory: 04 Hrs / Week

Examination Scheme
Theory: 80 Marks
Class Test: 20 Marks

Unit-I   (7)

a) **Introduction:** Professional practice as career; modes of measurements of civil engineering works ; Details and formats in English & PWD methods of measurements; Methods of taking – out quantities; Introduction to IS 1200 (Rev) & details; Units of measurements; Least counts (errors & accuracy margins) Prime cost: Provisional sum ; Provisional quantities.

b) **Approximate estimates:** Meaning; Necessity; General principles; Methods of preparing approximate estimates for buildings, roads, bridges, water supply schemes, drainage schemes, retaining walls etc.

Unit –II   (7)

Detailed estimates: Rules of measurements; Error margins & degrees of accuracy; Uses of estimates; Essentials of an estimator; Requirements of an estimator, Estimates of building, slab, culverts, septic tank, band –stand , RCC well, steel-truss roof, earthen dam, plumbing works, RCC elements , canals, roads, bridges, earth- works.

Unit –III   (6)

a) **Specifications:** Meaning; Uses & objectives; Types; Detailed Specifications; Provisions & classification; Principles of writing specifications, Drafting detailed specifications – samples (Civil Engg. works)
b) **Rate analysis:** Purpose; Factors affecting rate analysis; Task work; Schedules of rates; Catalogues; D.S.R.; AISSR; Labour wages; Thumb rules for reinforcement; Traditional ratios of concrete; Volume reduction theories; Leads and lifts; Batching; Rate analysis- samples (Civil Engg. works).

Unit –IV   (7)
Contracts: Meaning; objects; Various conditions and categories; Contract documents; Labour laws & patent rights, Agencies involved in construction industry ; Role of engineer in organizations ; Role of architect ; Essentials of valid contracts ; Termination & breach of contracts ; Arbitration ; Damages ,Responsibilities of owner & contractor ; Forms & types of contracts(lump sum ,unit price ,cost plus, piece work,); contract for supply of materials & transport of materials ; Labour contracts ; Negotiated contracts ; demolition contracts.

Unit –V   (7)
a) **Tenders:** Meaning; Categories; Tender notice; Notification in press and media; N.B.C.; Corrigendum; Preparation & submission of tenders, Tenders form & information; E.M.D. & S.D. objectives; Revocation of tenders; Unbalanced tenders; Opening of tenders; Scrutiny of tenders; Acceptance of tenders. (A mockup exercise of preparation, submission, opening of tender document is suggested.)

b) **Valuation:** Meaning; Purpose; Cost, price and value; Values forms and terms; salvage value, scrap value, book value, market value, prospective value, factors affecting value of property, Property forms; Property holdings; Leases; Depreciation; Methods of cost

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depreciation; Incomes and outgoings; Sinking fund and parameters; Year's purchase; Capitalized value; methods of valuation of buildings .

Unit –VI

a) **Govt procedure for work execution:** Work classification; Administrative approval & technical sanction; Bills; Measurement books; N.M.R.; Accounts of works, stores, plants; M.A.S account; Daily diary; Daily work.   (6)

b) **Properties & Estates:** Meaning; Mortgages; Amortization; Deals of property; Registration; Sale deed; Formation of cooperative housing societies; Building bye-laws and Municipal norms; N.A. concept; Loans; Repayments; E.M.I.; Apartment acts; Mathematics of finance; Banking finance terms; New construction works and documents; Real estates.

A. Recommended Books:

1. B. N. Dutta, Estimating and Costing In Civil Engineering, Ubs Publishers Distributors Ltd.
2. S. C. Rangwala, Estimating And Costing, Charotar Publishing House, Anand.
3. G. S. Biridi, Textbook of Estimating & Costing, Dhanapat Rai & Sons. Delhi.
4. B. S. Patil, Civil Engineering Contracts and Estimates, University Press, 2006.
5. M.Chakroborti, Estimating, Costing, Specification and Valuation. Calcutta.

B. Reference Books:

1. Rangwala, S.C., Elements of Estimating and Costing, Professional practice, Charotar Publishing House, Anand.
2. Aggarwal, A., Upadhyay, A.K., Civil Estimating, Costing &Valuation, S.K Kataria & Sons, New Delhi.
3. Chandola, S.P. and Vazirani, Estimating and Costing, Khanna Publication.
4. Kohali D D and Kohali R C,A text book on Estimating, Costing and Accounts,S Chand: New Delhi.

C.Handbook

1. Practical Information for quantity surveyors, property valuers, Architects, Engineers & builders; By, P.T. Joglekar, Published by: Pune Vidyarthi Griha Prakashan, Pune.
2.P.W.D. Hand Book Is Codes

D.Codes

1. I.S.1200 (Part 01 to 25): Methods of Measurement of building & Civil Engineering works.
2. D.S.R: District Schedule of Rates.

E.E-resources: nptel.iitm.ac.in

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Lab: PROFESSIONAL PRACTICES (PRACTICALS)

Teaching Scheme   Examination Scheme
Practical: 04 Hrs / Week   Term Work: 50 Marks
                                                    Pr. /Oral: 25 Marks

Term Work:

1. Procedural report for new construction work and documents.

2. Detailed specifications (Ten samples)

3. Rate analysis (Fifteen samples)

4. Detailed estimate: Road work with cross slope/Railway track.

5. Detailed estimate: Steel truss roof.

6. Detailed estimate: G+1 Building manual and using estimating and costing software.

7. Valuation report of residential building.

8. Preparation of draft tender notice & collecting minimum three tender notice of civil Engineering works.

Practical Examination:-

The oral/practical examination shall consist of viva-voce based on the assignments given during the course, the record of assignments submitted by the candidate and the syllabus of the subject.

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CED308: GEOTECHNICAL ENGINEERING

Teaching Scheme   Examination Scheme
Theory: 04 Hrs / Week   Theory: 80 Marks,
                                                   Class test: 20 Marks

UNIT I: Introduction   (08)

Origin of soil, scope of Geotechnical Engineering, major soil deposits of India, components of soils, soil minerals, Properties of Soil :Mechanical composition of soil, volume and weight relationship, specific gravity, density, relative density, void ratio, porosity, degree of saturation , functional relationship , moisture content, grain size analysis, mechanical and sedimentation analysis, consistency limits soil texture and structure, elementary ideal about swelling, sensitivity and thixotrophy.

UNIT II: Classification of soil   (06)

Particle size classification, Highway research board classification, ISI classification, unified classification. Soil moisture and permeability, soil moisture, effect of moisture content on soil, structural water, absorbed water, capillary water , effective and neutral pressure, hydraulic gradient, seepage of water through soil , permeability, Darcy's law, Discharge velocity and seepage velocity, factors affecting the permeability, Laboratory methods of permeability concept of flow net and its characteristics, Graphical methods of flow net construction and its application to isotropic soil only.

UNIT III: Stress Distribution in soil   (06)

Boussinesq's equation for point load, vertical pressure under loaded circular area and uniformly loaded rectangular area. Newmark's method for uniformly distributed loads, preparation and use of Newmark's chart.

UNIT IV: Compaction and Consolidation   (06)

Proctor density and optimum moisture content, factor affecting compaction, field methods of compaction control and mechanical stabilization of soils. compressibility, relation between pressure and void ratio, laboratory consolidation test. Pre- consolidation pressure in clay. Terzaghi's theory of one dimensional consolidation , degree of consolidation, Determination of Coefficient of consolidation, square root of time fitting method and logarithm of time fitting method, coefficient of consolidation.

UNIT V: Shear Strength   (08)

Concept of shear strength, principles stresses, Mohr's envelops for cohesive, non cohesive and composite soils, General principles of drained, consolidated un-drained and drain tests. Determination of shear strength by direct, unconfined, tri-axial and vane shear tests.

UNIT VI: Earth Pressure and Stability of Slope   (06)

Earth pressure at rest active and passive condition, elementary idea about Rankin's earth Pressure(for cohesive and cohesion less). Factors contributing to slope failures.Classification of slope failures, Infinite and finite slope. The Swedish Method and its application to dry

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cohesive soils and composite soils, friction circle method, Taylor's stability number and stability curve.

Recommended Books

1. Alam Singh, Soil Engineering in Theory and Practice, Geotechnical Testing and Instrumentation Asia Publishing House (p) Ltd. New Delhi.

2. Punimia B.C. "Soil Mechanics and Foundation Engineering" Laxmi Publications Pvt. Ltd., New Delhi. .

3. Murthy V.N.S. Soil Mechanics and Foundation Engineering, UBS Publishers and Distributors, New Delhi.

4. Purushottam Raj "Geotechnical Engineering" Tata McGraw Hill Publishing Company Limited, New Delhi.

5. Kasmalkar B.J. "Geotechnical Engineering", Pune Vidyarthi Griha Prakashan, Sadashiv Peth, Pune.

6. S.K.Gulhati and Manoj Datta "Geotechnical Engineering" Tata McGraw Hill Publishing Company Limited, New Delhi.

7. Iqbal H. khan, "Geotechnical Engineering" PHI publication.

Lab: GEOTECHNICAL ENGINEERING (Practical)

Teaching Scheme
Practical: 02 Hrs / Week

Examination Scheme
Term Work: 25 Marks
Pr. /Oral: 25 Marks

The oral/practical examination shall consist of viva-voice based on the practical work done during the course, the record of experiments submitted by the candidate and the syllabus of the subject. The assessment will be based on perfom1ing an experiment and record of experiments submitted by the candidate. Viva-voice/oral will be based on the syllabus.

The term work shall consist of a record of laboratory experiments any ten from list below.

1. Determination of water content by oven drying method
2. Determination of specific gravity by pycnometer
3. Determination of field density and dry unit weight by core cutter method
4. Determination of field density by sand replacement method
5. Determination of grain size distribution by sieve analysis
6. Determination of grain size distribution by hydrometer analysis
7. Determination of liquid limit of soil
8. Determination of plastic limit of soil
9. Determination of compaction properties of soil by standard proctor test
10. Determination of shear parameters of soil by direct shear method
11. Unconfined compression test
12. Permeability test variable or constant head

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CED 309: Water Resources Engineering–I

Teaching Scheme
Theory: 04 hrs/Week

Examination Scheme
Theory: 80 Marks
Class Test: 20 Marks

Objectives:
1. To apply the knowledge of hydrology for analysis of rainfall, runoff, infiltration, evaporation and transpiration processes.
2. To plot and analyse the hydrographs for estimations of peak flow
3. To apply the knowledge of irrigation requirements on fields along with the watershed management practices.
4. Apply the knowledge of groundwater hydrology in estimating drawdown of groundwater.

Unit I   (08)

Introduction to Hydrology: Definition, Importance and scope of hydrology.

Precipitation: Types and Forms of precipitation, Methods of measurement, Factors affecting precipitation, Estimating missing rainfall data, Mass curves, Hyetograph, Double mass curves (Correction of precipitation data). Determination of average precipitation over the catchment. Frequency of point rainfall.

Evaporation and Infiltration: Evaporation process, evaporimeters, evaporation reduction, Measurement of Evapotranspiration by Penmans equation.

Infiltration process, factors affecting infiltration, effect of infiltration on runoff, groundwater recharge. Infiltration indices.

Unit II   (06)

Runoff: Factors affecting Runoff, Rainfall-Runoff relationships, components of a flood hydrograph, Base flow separation methods, Effective rainfall, runoff hydrograph.

Unit hydrograph: Theory, assumptions, derivation and uses of unit hydrograph. S-Curve hydrographs, Synthetic Unit Hydrograph.

Unit III   (06)

Stream Gauging: Selection of site, various methods and instruments of discharge measurements.

Floods: Definition, factors affecting, estimation of peak flow, frequency analysis: Gumbel's and Log Pearson type-III Distribution and Log Normal Distribution.

Unit IV   (06)

Groundwater Hydrology: Occurrence and distribution Of Groundwater, Specific yield of an aquifer, Movement of groundwater, Darcy's Law, Permeability, Safe yield of basin.

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Hydraulics of wells under steady flow condition in confined and unconfined aquifers. Interference of wells and boundaries.Recharge of Groundwater.

Unit V

(08)

Introduction to irrigation and Water applications to crops: Definition, functions, advantages and necessity, methods of irrigation, surface irrigation, subsurface irrigation and microirrigation. Irrigation efficiencies

Consumptive use of water. Estimation of Consumptive use, factors affecting crop water requirements,irrigation requirements, irrigation water standards, wilting point, Delta, Duty, factors affecting Delta and Duty. Important crops in India, their seasons and crop rotation.

Unit VI

(06)

Watershed Management: Necessity for Conservation of Soil and Water of a watershed. Watershed Development and steps involved in watershed management, Ridge line Treatment, Upper, middle and lower catchment treatments, Drainage line treatments and erosion control.

Water Logging and Drainage: Causes and Effects of water logging, its remedial measures. Drainage of irrigated areas.

Recommended Books:

1. Engineering Hydrology by Subramanya K, Tata Mc Graw Hill, New Delhi
2. Irrigation Engineering By S.K.Garg- Khanna Publishers, Delhi
3. Irrigation, Water Resources and Water Power Engineering By P.N.Modi
4. Engineering Hydrology by Raghunath H.M, New Age International Publishres
5. Watershed Management in India by J.V.S Murthy- Wiley Eastern Publication.

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CED310: ELECTIVE-I: Advanced Concrete Technology

Teaching Scheme
Theory: 4 Hrs/week Theory

Examination Scheme
Examination: 80 Marks
Class Test: 20 Marks

Objectives:

1. To understand the properties of ingredients of concrete.
2. To study the behavior of concrete at its fresh and hardened state.
3. To study about the concrete design mix.
4. To understand special concrete and their use.
5. To study the use of Admixtures in concrete.

Unit I: Fresh Concrete and advanced curing: [08]

a) **Mix design of concrete** – High strength concrete, Self compacting concrete, ultra high strength concrete, high Density concrete, high fly ash concrete, geopolymer concrete, ready mix concrete, green concrete, Shotcrete concrete, Underwater Concrete
b) **Procedures for Concrete Mix Design**
c) **Types of advanced curing**
d) **Types of admixtures used in concrete**

Unit II: Structure of Concrete: [06]

Structure of Concrete: Introduction, Structural Levels, Structure of Concrete in Nanometer Scale: C–S–H Structure, Transition Zone in Concrete, Microstructure of concrete, rheological properties of concrete.

Unit III: Advanced Cementitious Composites: [06]

Fiber-Reinforced Cementitious Composites, High-Strength Cementitious Composites, Polymers in Concrete, Shrinkage-Compensating Concrete, Engineered Cementitious Composite, Tube-Reinforced Concrete, High-Volume Fly Ash Concrete, Structural Lightweight Concrete, Heavyweight Concrete.

Unit IV: Concrete Fracture Mechanics: [08]

Introduction, Linear Elastic Fracture Mechanics, The Crack Tip Plastic Zone, Crack Tip Opening Displacement, Fracture Process in Concrete, Nonlinear Fracture Mechanics for Concrete, Two-Parameter Fracture Model, Size Effect Model, The Fictitious Model by Hillerborg, R-Curve Method for Quasi-Brittle Materials.

Unit V: Nondestructive Testing in Concrete Engineering: [06]

Introduction, Ultrasonic Pulse velocity test, core extraction of compressive strength, Ingradient Analysis, Review of Wave Theory for a 1D Case, Reflected and Transmitted Waves, Attenuation and Scattering, Main Commonly Used NDT-CE Techniques, Non contacting Resistivity Measurement Method

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Unit VI: The Future and Development Trends of Concrete: [06]

Sustainability of Concrete, Deep Understanding of the Nature of Hydration, Load-Carrying Capability–Durability Unified Service Life Design, Theory of High Toughness and Ductile Concrete. Sulfur-infiltrated concrete, Cold weathering concrete and hot weathering concrete.

Recommended Books:

1. Advanced concrete technology by Zonjin Li, Wiley Publication
2. Concrete technology by Mehta and Monterio, Mcgraw Hill Publications.
3. Concrete by Mindees young and Darwin, Prentice Hall Publications.
4. Concrete technology by M.L. Gambhir, Tata Mcgrew Hill publications.
5. Concrete technology by M.S.Shetty, S.Chand Publications.
6. Concrete technology by A.R. Santhakumar, Oxford University Press.
7. Handbook on Non- Destructive Testing of concrete by Malhotra and Carnio, RC Press.
8. Properties of concrete by A.M.Neville, Longman Publishers.
9. Concrete technology by R.SVarshney, Oxford and IBH.
10. Concrete technology by A.M.Neville, J.J.Brooks, AddisionWeslley.
11. Engineered Concrete by Irving Kett, CRC Press.

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CED310: ELECTIVE-I: BUILDING MAINTENANCE AND REPAIRS

Teaching Scheme
Theory: 04 Hrs / Week

Examination Scheme
Theory: 80 Marks
Class Test: 20 Marks

Unit-I (6)

Need for Maintenance, Importance and significance of repair and maintenance of building, Meaning of maintenance, Objectives of maintenance, Factors influencing the repair and maintenance.

Unit-II (7)

Agencies Causing Deterioration (Source, Causes, Effects), Definition of deterioration/decay, Factors causing deterioration, their classification, Human factors causing deterioration, Chemical factors causing deterioration, Environmental conditions causing deterioration, Miscellaneous factors, Effects of various agencies of deterioration on various building materials i.e. bricks timber, concrete, paints, plastics, stones.

Unit-III (7)

Investigation and Diagnosis of Defects, Systematic approach/procedure of investigation, Sequence of detailed steps for diagnosis of building defects/ problems, List non-destructive and others tells on structural elements and materials to evaluate the condition of the building and study of three most commonly used tests.

Unit-IV (7)

Defects and their root causes, Define defects in building, Classification of defects, Main causes of building defects in various building elements, Foundations, basements and DPC Walls, Column and beams , Roof and terraces, Joinery, Decorative and protective finishes, Services, Defects caused by dampness

Unit-V (5)

Materials for Repair, maintenance and protection, Compatibility aspects of repair materials State application of following materials in repairs: Anti corrosion coatings, Adhesives/bonding aids, Repair mortars, Curing compounds, Joints sealants Waterproofing systems for roofs, Protective coatings

Unit-VI (8)

Remedial measures for Building Defects, Preventive maintenance considerations, Surface preparation techniques for repair, Crack repair methods, Epoxy injection, Grooving and sealing, Stitching, Adding reinforcement and grouting, Flexible sealing by sealant, Repair of surface defects of concrete, Bug Holes, Form tie holes, Honey comb and larger voids, Repair of corrosion in RCC elements, Steps in repairing, Prevention of corrosion in reinforcement, material placement techniques with sketches Pneumatically applied (The qunite techniques), Open top placement, Pouring from the top to repair bottom face, Bird's mouth, Dry packing, Form and pump, Preplaced aggregate concrete ,Trowel applied method.

Repair of DPC against rising dampness, Physical methods, Electrical methods, Chemical methods Repair of walls, Repair of mortar joints against leakage, Efflorescence removal Waterproofing of wet areas and roofs, Water proofing of wet areas, Water proofing of flat RCC roofs Various water proofing systems and their characteristics, Repair of joints in buildings, Types of sealing joints with different types of sealants, Techniques for repair of

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joints, Repair of overhead and underground water tanks

A. Recommended Books:-

1. Gahlot P.S. Sanjay Sharma, "Building repairs and maintenance Management" by CBS publishers, New Delhi
2. Nayak, BS: "Maintenance Engineering for civil Engineers" Khanna publishers, Delhi
3. Ransom W H: "Building Failures-Diagnosis and Avoidance" publishing E and F.N Span
4. Hutchinson B D: "Maintenance and Repair of buildings" published by Newness-Butterworth

B.Reference books:-

1. Gupta B.L.and Amit Gupta, Maintenance & Repair of Civil Structures, Standard Publisher Distributors.
2. C.P.W.D. I.B.C., IIT Madras ,Handbook on Seismic retrofit of building, , Narosa publishing house.
3. Guha P.K ,Maintenance and repair of building, New Central book agency (p) Ltd.
4. Nayak, BS: A manual on maintenance engineering, Khanna Publihser

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CED310: ELECTIVE-I: TOWN PLANNING

Teaching Schemes	Examination Schemes
Theory: 04 Hrs / Week	Theory: 80 Marks;
	Class Test: 20 Marks

Objectives:

To introduce the students of Civil Engineering about the principles and concepts of town planning and smart cities

Unit I: History of town planning andPrinciples of Planning   (07)

Historical evolution- ancient, medieval, renaissance and industrial age. Impacts of Industrial revolution on town planning and regional planning.Contemporary developments in planning in India; formation of metropolitan areas; socio-economic impacts ofgrowth of population; rural-urban migration.

Aim, objectives, principles andnecessity of town planning, garden city principle, growth of town.

The interim and comprehensive plans: StructurePlan, Master Plan, Zonal Development Plan and Action plan their purpose and contents.

Unit II: Planning Legislation in India   (07)

Sanitary Commission 1864, Bombay Improvement act -1898, Bombay town planning act, 1915, Maharashtra Regional and Town Planning Act 1966, The Model Town and Country Planning Act 1960&Model Regional & Town Planning & Development Law1985, Urban Development Plans Formulation &Implementation Guidelines1996, Urban and RegionalDevelopment Plan Formulationand Implementation (URDPFI)Guidelines 2014

Building Byelaws: objects of byelaws, functions of local authority, floor space index, set back, light plane off street parking, fire protection bye laws for residential areas, cinemas, multiplex, town halls, gasoline filling stations etc., Building regulations.

Unit III: Smart Cities   (06)

Definition, Smart city planning and management, Fundamentals of smart infrastructure, Designing smart cities for human needs.

Smart city concept in India, Smart City Features

Unit IV: Urban Infrastructure Planning   (09)

Utility planning: Understanding of different types of urban infrastructures (water supply, waste water disposal, solid waste collection and disposal, power & communication) their aim & objectives, interaction between various utility networks and with road networks, negative impacts due to lack of Urban Infrastructure Planning.

Urban Transportation Planning: Land use- transportation inter-relationships, Transport survey, analysis,Travel demand forecasting, Demand and supply of transport services.Planning of public transports system.

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Unit V:Sustainable urban development   (04)

Planning challenges, Components of sustainable development,Urbanization & land scarcity, Sustainable Land Use and Infrastructure,

Unit VI: Housing and Community Planning   (07)

Concepts, definitions and components of Housing, Role of housing in socioeconomic development of a nation.

Infrastructure and community facilities such as park & playground, recreational facilities, open spaces, landscape, public building and town centers.

Neighborhood unit planning, classification of housing, housing problems in India, agencies for housing schemes.

Slums: meaning, causes, effects, precautions to be taken against formation, slum clearance, urban renewal and re-planning of the existing towns, necessity of re-planning, data collection, urban explosion, advantage of urban renewal.

Recommended Books:

1) Building Smart Cities: Analytics, ICT, and Design Thinking by Carol L. Stimmel (For unit III)
2) Sustainable Smart Cities in India: Challenges and Future Perspectives by Poonam Sharma (For unitIII)
3) Smart Cities & Urban Development in India by N. Mani (For unitIII)
4) Sustainable Cities: Urban Planning Challenges and Policyby Kimberly Etingoff (For unitVI & V)
5) Transport Planning and Traffic Safety: Making Cities, Roads, and Vehicles Safer by Geetam Tiwari (For unitIV)
6) Traffic Engineering and Transport Planning by L.R. Kadyali (For unitIV)
7) Planning Sustainable Cities - An infrastructure-based approach By Spiro N. Pollalis (For unitV)
8) Fundamentals of Town planning by G.K. Hiraskar(For unit I & VI)
9) Town planning byRangwala(For unit I & VI)
10) https://smartnet.niua.org/smart-cities-network
11) http://smartcities.gov.in/content/innerpage/what-is-smart-city.php
12) https://www.geogr-helv.net/66/100/2011/gh-66-100-2011.pdf
13) http://evolutionofindianplanninglegislation.blogspot.com/ (For unitII)
14) Smart City by Arun Firodia
15) Town and country planning by N.K. Gandhi
16) Urban Intelligence, Space and Maps by Antoine Picon
17) Town and country planning and housing by Modak and Ambdekar
18) Social Aspects of Urban Development by H.D. Kopardekar

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CED310: ELECTIVE-I: COMPUTER APPLICATIONS IN CIVIL ENGINEERING

Teaching Scheme
Theory: 04 Hrs / Week

Examination Scheme
Theory: 80 Marks;
Class Test: 20 Marks

Objectives of the course:

1. To revise the numerical techniques studied earlier in the context of civil engineering
2. To encourage the student to learn newer career-oriented languages like Python and R
3. To apply the knowhow of software to convert mathematical systems to codes
4. To develop the knowledge of existing software for various applications in civil engineering
5. To spur the interest of students for developing better software in the domain of civil engineering.
6. To develop writing skills in students for Civil Engineering related projects.

Unit

I   Revisiting Numerical Techniques and Statistics   6
Matrix inversion and its computer technique; Conversion of a problem to a matrix-based method: linear regression, multiple linear regression; extension to quadratic and exponential regression; the surveying adjustment problem – observational and conditional methods; the combinations of springs and bars; the boundary value problem and the central difference technique, eigen values and eigen vectors.

II   Modern Languages and applications to Numerical Techniques   7
Introduction to Python; Python lists, arrays and loops, Python libraries and graph plotting, Reading a text file, Implementation of one numerical technique (from Unit I), in Python. Introduction to R; Lists, arrays and loops, R libraries, Implementation of regression-based techniques in R and corresponding plots.

III Applications to Structural Engineering   7
Matrix methods for beams and plates. Analysis of plane and space frames. Analysis of a truss; Design of retaining wall, Introduction to structural engineering software like STAAD PRO / ETABS / ANSYS / FEAST with a relevant case study.

IV   Applications in Geoinformatics and Geotechnical Engineering   7
Concepts of Remote Sensing and GIS, Software for Remote Sensing and GIS, Case study: Classification of satellite data and application to urban evolution / sprawl. Case study: Geostatistical interpolation for understanding environmental pollution, Case study: Application of Remote Sensing and GIS for agriculture (case studies must cover the entire use of RS – GIS software, or Python / R for explanation). Slope stability, earthquake and geotechnical analysis.

V   Applications to Hydrology and Hydraulics Engineering   7
Design of programs for Culvert analysis, Peak runoff, Open channel design, Runoff Hydrograph, Storm Sewer Design, Watershed modelling, Rainfall-runoff modelling, Flood modeler, TUFLOW, HEC-RAS

| VI | **Applications to Transportation Engineering and Construction Management** | 6 |

Computing in the domains of Highway Design, Traffic Engineering and Transportation Planning. Use of spreadsheet (MS-Excel / LibreOfficeCalc / others) for costing and estimation, Project Management basics and application of project management software for Civil Engineering Projects. Case studies covering project management for Civil Engineering related projects (case studies can involve students giving presentations / term work writeups).

Recommended books:

1. T. G. Hicks, Civil Engineering Formulas, Mc Graw Hill.
2. S. Chapra and R. Canale, Numerical Methods for Engineers: With Programming and Software.
3. J. Kiusaalas, Numerical Methods in Engineering with Python, Cambridge University Press
4. V. A. Bloofield, Using R for Numerical Analysis in Science and Engineering, CRC Press
5. A. Twort and G. Rees, Civil Engineering Project Management, Elsevier
6. K. Green, R. G. Congalton, M. Tukman, Imagery and GIS: Best practices for extracting information from imagery, ESRI Press.
7. Y. M. Desai, T. J. Eldho, A. H. Shah, Finite Element Methods with application in Engineering, Pearson.
8. I. Popescu, Computational Hydraulics: Numerical Methods and Modelling, IWA Publishing.
9. J. H. Banks, Introduction to Transportation Engineering, McGraw Hill.
10. M. A. Hicks, R. B. J. Brinkgreve, A. Rohe, Numerical Methods in Geotechnical Engineering, CRC Press.

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CED310: ELECTIVE-I: ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours

Examination Scheme:
Theory Paper: 80 Marks
Class Test: 20 Marks

Objective:

This subject deals with the various impacts of infrastructure projects of civil engineering and to know to impart knowledge on Environmental management and Environmental Impact.

UNIT I: Introduction   (08)

Initial environmental examination, Need for Environmental Impact Assessment (EIA) – Environmental Impact Statement (EIS) – EIA capability and limitations – Legal provisions on EIA-Stages of EIA, Types of EIA.

UNIT II: Sustainable Development   (06)

Sustainable Development – Need for Environmental Impact Assessment (EIA) -Logic of Sustainable Development; Methods To Achieve Sustainable Development.

UNIT III: Methodologies   (06)

Methods of EIA – Check lists – Matrices – Networks – Cost-benefit analysis of alternatives.

UNIT IV: Prediction and Assessment   (06)

Assessment of Impact on land, water and air, noise, social, cultural flora and fauna; Mathematical models; public participation – Rapid EIA.

UNIT V: Environmental Management   (06)

Plan for mitigation of adverse impact on environment – Options for mitigation of impact on water, air, land and on flora & fauna – Addressing the issues related to the Project Affected People. Introduction to ISO and ISO 14000.

UNIT VI: Environmental Audit   (08)

Definitions and concepts, partial audit, compliance audit, methodologies and regulations.

CASE STUDIES: EIA for infrastructure projects – Dams – Highways – Multi-storey Buildings Water Supply and Drainage Projects – Waste water treatment plants,

RECOMMENDED BOOKS:

1. Canter R.L., "Environmental Impact Assessment", McGraw Hill Inc., New Delhi, 1996.
2. Shukla, S.K. and Srivastava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.

REFERENCE BOOKS:

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1. John G. Rau and David C Hooten "Environmental Impact Analysis Handbook", McGraw Hill Book Company, 1990.
2. "Environmental Assessment Source book", Vol. I, II & III. The World Bank, Washington, D.C., 1991.
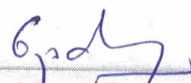3. Judith Petts, "Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.

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CED332: Lab IV: Structural Design and Drawing–I (Steel)

Teaching Scheme
Practical: 4Hrs/ week

Examination Scheme
Term work- 50 Mark
Practical / Oral- 25 Mark

Objectives:
1. Student will come to draw various types of sections used in Steel Structures.
2. Student will able to know how to analyse the steel structure.
3. Student will able to design steel structure & Detailing of Various component & its Joints normally used in Industry.
4. Student will be able to create new types of section.

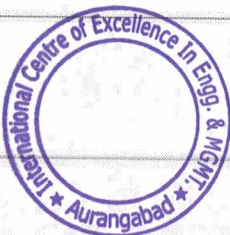**Design of an industrial building which should include the following:**
A) Design of roof truss (Analysis may be carried out using any Structural Analysis and Design software), Design of purlins, Design of connections, Design of beams, Design of columns, Design of base.

B) Design of beam to beam and beam to column connections

C) Design of welded plate girder or gantry girder, design of cross section, curtailments of flange plates, Stiffeners and connections

D) Report of site visit mentioning structural details with relevant sketches of structural connections

Four half imperial size drawing sheet out of which one drawing sheet shall be drawn by using any drafting software.

Oral examination shall be based on the above term work.

Note: Maximum number of students in a group not more than three for design.

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CED 333: Lab-V: Computer Lab-III

Teaching Scheme	**Examination Scheme**
Laboratory: 02 Hrs/ Week	Term Work: 50 Marks

Objectives :

1. Student will able to understand design software.
2. Students will able to use of more advanced techniques in creating geometry.
3. Students will be able to analysing structures using the appropriate Analysis Method.
4. Students will be able to Performing Steel & Concrete Structure Design as per Indian Code.

The assessment of term work shall be done on the basis of the following:

Continuous Assessment

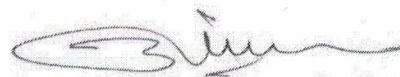- Performing Assignment given in Laboratory by using any structural analysis and design software.

This course provides on overall look over the design software. It demonstrates the steps to be followed to produce the structural analysis & design of two types of buildings; concrete and steel. Also the course concentrate over the different results generated from the program, and howto read them, view them, and finally generate the necessary reports from them. At the completion of this course, the student will be able to:

- ✓ Understand Design software way of doing the job.
- ✓ Creating geometry using different methods.
- ✓ Use of more advanced techniques in creating geometry.
- ✓ Defining the cross section of beams, columns & plates.
- ✓ Defining constant, Specification & Supports.
- ✓ Defining load system.
- ✓ Analyzing your Model using the appropriate Analysis Method.
- ✓ Reviewing the Analysis Results.
- ✓ Performing Steel Design as per Indian Code.
- ✓ Performing Concrete Design as per Indian Code.

The Analysis & design output file of below assignments to be submitted.

1. Assignment No. 1- Analysis and design of Steel portal frames.
2. Assignment No. 2- Analysis and design of Reinforced concrete frames.
3. Assignment No. 3- Analysis of Two-way concrete slab.

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Dr Uttam Kalwane

B.O.S. Member

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