ACADEMIC REGULATIONS

COURSE STRUCTURE AND SYLLABUS

B.TECH.

CIVIL ENGINEERING

Effective for the B.Tech. Students admitted into first year For The academic year

2020-2021

PRAGNANAM BRAHMA
ANITS
(AUTONOMOUS)

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES (AUTONOMOUS)
Approved by AICTE & Affiliated to Andhra University
SANGIVALASA-531162, BHEEMUNIPATNAM MANDAL, VISAKHAPATNAM DISTRICT

INSTITUTE VISION

- To emerge as a world class technical institution

INSTITUTE MISSION

- To impart holistic technical education by providing
- The state of the art infrastructure
- Exceptional technical and teaching expertise
- Best of human value

VISION OF THE DEPARTMENT

- To emerge as a leading Civil Engineering Department globally

MISSION OF THE DEPARTMENT

- Empower our students with contemporary and industry relevant skills in Civil Engineering using outstanding technical and teaching expertise and best of infrastructure
- Nurture holistic development of our students inculcating universal human values and life skills for serving the society as leaders of their profession

Program Educational Objectives (PEOs)

PEO1: Successfully practice Civil Engineering in construction industry, public sector and entrepreneurship, ensuring a prosperous professional career.

PEO2: Pursue higher education and Research for professional development contributing to the advancement of civil engineering through lifelong learning

PEO3: Demonstrate leadership abilities actively contributing to societal needs with a focus on sustainable development and human values.

Program Outcomes

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one‘s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

1. Plan and develop safe, economical and sustainable buildings and other structures based on applicable professional standards, codes and ethics.
2. Analyze and solve stability problems in soils for design of foundations and earth structures and plan and design highway, railway and other transportation systems based on applicable safety standards, codes and ethics.
3. Plan and develop irrigation and water supply systems and analyze and solve problems due to pollution of air, water and land leading to a nourished, richer and healthy society.

III Year Course structure

Semester - I

Course Code	Title of the course	Category	Periods						Sess. Marks	End Exam marks	Total Marks	Cr.
			L	T	P	E	O	Total				
CIV311	Open Elective-I[#]	OE	2	1	0	1	2	6	40	60	100	3
CIV312	Fluid Mechanics-II	PC	2	1	0	2	4	9	40	60	100	3
CIV313	Geotechnical Engineering – II	PC	2	1	0	2	3	8	40	60	100	4
CIV314	Reinforced Concrete Structures-I	PC	2	1	0	2	2	7	40	60	100	3
CIV315	Structural Analysis – II	PC	2	1	0	2	3	8	40	60	100	3
CIV316	Computer Applications in Civil Engineering Lab	SOC	0	0	3	0	1	4	50	50	100	1.5
CIV317	Fluid Mechanics Lab	PC	0	0	3	0	1	4	50	50	100	1.5
CIV318	Technical Seminar	PR	0	0	3	0	1	4	100	-	100	2
CIV319	Quantitative Aptitude-I & Verbal Aptitude-I	HSS	0	0	3	1	3	7	100	0	100	1.5
CIV3110	Summer Internship-I*	PR	0	0	0	0	4	4	100	-	100	1.5
Total			**10**	**5**	**12**	**10**	**24**	**61**	**600**	**400**	**1000**	**24**

Semester - II											
Course Code	**Title of the course**	**Cat**	**Periods**						**Sess. Marks**	**End Exam marks**	**Total Marks**	**Cr.**
			L	**T**	**P**	**E**	**O**	**Total**				
CIV321	Open Elective-II[#]	OE	2	1	0	1	2	6	40	60	100	3
CIV322	Professional Elective – I	PE	3	0	0	1	2	6	40	60	100	3
CIV323	Steel Structures	PC	2	1	0	2	3	8	40	60	100	3
CIV324	Reinforced Concrete Structures-II	PC	2	1	0	2	3	8	40	60	100	4
CIV325	Highway Engineering	PC	2	1	0	1	2	6	40	60	100	4
CIV326	Irrigation Engineering	PC	2	1	0	2	2	7	40	60	100	4
CIV327	Structural Analysis & Design using STAAD Pro	SOC	0	0	3	0	2	5	50	50	100	1.5
CIV328	Transportation Engineering Lab	PC	0	0	3	0	1	4	50	50	100	1.5
CIV329	Quantitative Aptitude-II & Soft Skills	HSS	0	0	3	2	3	8	100	0	100	1.5
CIV3210	Summer Internship-II*	PR	0	0	0	0	4	4	-	-	-	-
Total			**13**	**5**	**9**	**11**	**24**	**62**	**440**	**460**	**900**	**25.5**

 # Open Electives can be either interdisciplinary subjects/emerging subject/MOOCs as decided by the Department.

*** Summer Intership-II** *to be conducted after III year-II semester and evaluated in IV year-I semester*

LIST OF PROFESSIONAL ELECTIVES (CIVIL ENGINEERING) (R 20)

III B.Tech – II Semester

Professional Elective – I (CIV 322)

1. Ground Improvement Techniques
2. Solid Waste Management
3. Repair and Rehabilitation of structures
4. Urban Planning and Smart Cities
5. Optimization Techniques

IV B.Tech – I Semester

1. Transportation engineering - II
2. Disaster Management
3. Earth and Earth Retaining Structures
4. Bridge Engineering
5. RS & GIS applications in Civil Engineering
6. Pre stressed concrete
7. Advanced Fluid Mechanics
8. Advanced Design of structures
9. Water Resources Engineering - II
10. Soil Dynamics and Machine Foundations
11. Introduction to Finite Element Methods
12. Advance Transportation Engineering

13. Wateshed management
14. Advanced Building Construction
15. Earthquake Engineering
16. Environment Impact Assessment
17. Air Pollution Control
18. Engineering Economics and Finance

R 20 III Year
Detailed Syllabus

R 20 III Year I Semester
Detailed Syllabus

FLUID MECHANICS - II

CIV 312 **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Prerequisites:

Engineering Mechanics; Fluid Mechanics - I

Course objectives:

The objective of the course is to enable the student

1. To understand the design philosophy of turbines and pumps
2. To understand the fundamental concept for methods of dimensional analysis
3. To know the design used for supplying water and generating power

Course outcomes:

At the end of the course, the students will be able to:

1. Apply the principles of dimensional analysis and explain the boundary layer theory.
2. Apply the impulse momentum equation to determine the impact of a jet and analyze the forces acting on submerged bodies.
3. Analyze various types of Turbines and their performance characteristics.
4. Analyze various types of Pumps and their performance characteristics.
5. Apply analysis to determine discharge and design the most economical channel section for uniform flow in open channels, while also analyzing non-uniform flow.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3													2
	2	3	3													2
	3	3	3													2
	4	3	3													2
	5	3	3													2

SYLLABUS

UNIT – I **12 Periods**

Dimensional Analysis and Similitude: Dimensional Homogeneity - Methods of Dimensional Analysis – Rayleigh's Method – Buckingham's π theorem – Superfluous and Omitted Variables - Similitude – Model Analysis – Dimensionless numbers – Similarity Laws – Model testing of partially submerged bodies – Types of models.

Boundary Layer Theory: Introduction – characteristics of laminar boundary layer – boundary layer growth over a flat plate (without pressure gradient) –Boundary thicknesses – Stability parameter – Turbulent boundary layer – boundary layer separation – Boundary layer on rough surfaces – laminar sublayer.

UNIT – II **12 Periods**

Flow past submerged bodies: Introduction **–** Types of Drag – Drag on a sphere – Drag on a cylinder – Von Karman Vortex Trail – Drag on a flat plate – Development of Lift on immersed circular cylinder – Magnus effect.

Impact of Jets: Impulse momentum equation – Momentum Correction factor, Force on Stationary flat plate – moving flat plate - Force on Stationary curved vanes – moving curved vanes.

UNIT – III **12 Periods**

Hydraulic Turbines: Introduction -Classification based on Head, Discharge, Hydraulic Action – Impulse and Reaction Turbines, Differences between Impulse and Reaction Turbine, Choice of Type of Turbine, Component Parts & Working principle of a Pelton Turbine, Francis Turbine-Velocity Triangles - Hydraulic and Overall efficiencies.

Performance of turbines: Performance under Unit head, power and speed – Performance under specific conditions - Specific Speed and its importance. Performance Characteristic Curves – Operating Characteristic Curves – Cavitation - Draft Tube.

UNIT – IV **12 Periods**

Centrifugal Pumps: Types of Pumps – Selection Criterion – Comparison between Centrifugal & Reciprocating Pumps - Centrifugal Pumps – Component Parts & Working Principle – Classification of Centrifugal pumps - Cavitation – Maximum Suction lift – NPSH. Specific Speed of pumps – Performance Characteristics of Centrifugal Pumps – Dimensionless characteristics – Constant efficiency curves of Centrifugal Pumps

Reciprocating Pumps: Component Parts – Working Principle of single acting and double acting reciprocating pumps – Discharge Co-efficient, Volumetric efficiency and Slip. Work done and Power Input – Indicator Diagram, Effect of acceleration and friction on Indicator Diagram - Air Vessels.

UNIT – V **12 Periods**

Flow through Open Channels: Classification of open channels, Uniform Flow: Chezy's and Manning's formula, Hydraulic mean depth, hydraulic radius. Most economical trapezoidal and rectangular channel section – Specific energy, Critical Flow.

Steady Rapidly Varied Flow: Hydraulic Jump in a horizontal rectangular channel, Specific force Computation of energy loss.

TEXT BOOKS

1. Modi P.N. & Seth S.M. (2019), "Hydraulics & Fluid Mechanics including Hydraulics Machines", Standard Book House, New Delhi, 22nd Edition.
2. Jain A.K. (1998), "Fluid Mechanics including Hydraulic Machines", Khanna Publishers, New Delhi, 12th Edition.

REFERENCES

1. Kumar K.L. (2016), "Engineering Fluid Mechanics", S. Chand & Company Publishers, New Delhi, 8th Revised Edition.
2. Bansal R.K. (2018), "A Textbook of Fluid Mechanics and Hydraulic Machines", Laxmi Publications, New Delhi., 10th Edition.
3. Frank M. White (2011), "Fluid Mechanics (In SI Units)", Tata McGraw Hill Education, 7th Edition.
4. Schaum's Outline Series (2011), "Fluid Mechanics and Hydraulics", McGraw Hill Education, 3rd Edition.
5. Relevant NPTEL Courses

GEOTECHNICAL ENGINEERING – II

CIV 313 **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Prerequisite:

Engineering Mechanics; Geotechnical Engineering – I.

Course Objectives:

This course will enable the students

1. To analyse the soil conditions to develop required data for design of shallow foundation.
2. To analyse the soil conditions to estimate the load capacity of pile foundations.
3. To apply the relevant theories to estimate lateral earth pressure on retaining walls and analyse slope stability for embankments and earth dams.

Course outcomes:

By the end of the course, student will be able to:

4. Analyse the Strength test data to calculate the shear parameters of soil under any drainage conditions.
5. Analyse and interpret the soil and ground water conditions of a soil mass through Soil exploration and in-situ test data.
6. Apply Earth pressure theories (Rankine and Coulomb) to calculate the Active and Passive earth pressure on a gravity retaining wall.
7. Analyse the soil and ground conditions of a soil mass to calculate the bearing capacity of a shallow foundation.
8. Apply principles of mechanics and calculate the load capacity of piles and Analyse the stability of slope of an earth structure.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	3												2	
	2	2	2		3										3	
	3	3													2	
	4	2	3												3	
	5	3	3												3	

SYLLABUS

UNIT – I 12 Periods

Shear Strength: Introduction- Mohr-Coulomb's failure theory – Laboratory shear tests: Direct shear test – Triaxial compression test– Types of shear tests based on drainage conditions – Unconfined compression test – Vane shear test – Shear strength characteristics of Saturated sands during drained and undrained shear – Critical void ratio and liquefaction – Factors affecting shear strength of sands –

Shear strength characteristics of saturated cohesive soils – Sensitivity.

Learning Outcomes: 1) Determine the shear strength of soil on a horizontal plane by applying Coulomb's theory 2) Determine the shear strength parameters from the test data of direct shear test, triaxial compression test, unconfined compression test and vane shear test 3) Distinguish between different types of shear tests based on drainage condition and identify their practical application 4) Explain the phenomenon of liquefaction and suggest measures to prevent the same

UNIT – II 10 Periods

Subsurface Exploration: Introduction – Need and objectives of soil exploration – Planning of Soil exploration: Depth of Exploration; Number and spacing of Test pits or Borings – Stages in Soil exploration: Site Reconnaissance – Preliminary Exploration – Detailed Exploration: Test pits – Boring: Auger boring, Wash boring and Rotary drilling – In-situ tests: Standard penetration test – Static and dynamic cone penetration test – Types of soil samples: disturbed and undisturbed soil samples – Design Features of soil sampler – Geophysical methods: Seismic refraction and Electrical resistivity method – Geotechnical Investigation report

Learning Outcomes: 1) Explain the objectives of and stages in soil exploration and the planning of soil exploration including depth and spacing of exploration points 2) Explain methods of soil exploration and bring out their advantages and limitations 3) Determine the corrected SPT N value for overburden pressure and dilatancy 4) Determine the design features of the given soil sampler and comment on its suitability 5) Explain the salient features of a standard geotechnical investigation report

UNIT - III 12 Periods

Lateral Earth Pressure – Types of Lateral earth pressure– Active and Passive Earth Pressure – Earth pressure at rest – Rankine's theory – Active earth pressure for cohesion less soils – Active earth pressure for cohesive soils with and without Tension crack – Critical depth – Passive Earth Pressure by Rankine's theory – Coulomb's wedge theory – Rebhan's and Culmann's graphical solutions.

Learning Outcomes: 1) Determine the active and passive earth pressure for the given back conditions by Rankine's theory 2) Determine the active and passive earth pressure for the given back conditions by Coulomb's theory 3) Determine the active earth pressure by Rebhan's and Culmann's graphical methods

UNIT – IV 12 Periods

Bearing capacity of Shallow footings- Design criteria of shallow foundations – Ultimate and safe bearing capacity – Bearing capacity of shallow foundation – Terzaghi's theory – types of shear failure – Effect of water table, shape of footing, eccentricity of load on bearing capacity- Meyerhof's theory – I.S.Code method – Bearing capacity from SPT & SCPT – Plate load test – Types of settlement – Permissible Settlements – Criteria for deciding Depth of foundation.

Learning Outcomes: 1) Determine the Bearing capacity of the given foundation by Terzaghi's theory and I.S.Code method for the given soil conditions 2) Determine the Bearing capacity from SPT and SCPT data based I.S.Code 3) Determine the Bearing capacity and settlement of the foundation from the Plate load test data 4) Explain the criteria for deciding depth of foundation

UNIT – V 14 Periods

Pile Foundations: Necessity of Pile foundations – Classification of pile foundations – Load Transfer mechanism – Estimation of load carrying capacity of pile – Static formula – dynamic formulae: Engineering News Formula – Hiley's formula – Pile load test – Group Action in piles – Pile groups in sand and gravel – Pile groups in clay – Negative skin friction.

Stability of Slopes: Types of Earth Slopes – types of slope failure – Factor of safety – Stability analysis using Swedish circle method – Bishop's Simplified method of slices – Friction circle method – Taylor's stability number.

Learning Outcomes: 1) Explain the necessity of pile foundations and also explain their classification 2) Estimate the load capacity of pile by static and dynamic formulae 3) Explain negative skin friction and estimate the reduction in load capacity due to it 4) Explain the stability analysis of earth slopes by Swedish circle method, Bishop's method of slices, friction circle method and using Taylor's stability number

TEXT BOOKS

1. Narasinga Rao, B.N.D. (2015), Soil Mechanics and Foundation Engineering, Wiley Publishers, New Delhi
2. Arora, K.R. (2008), "Soil Mechanics and Foundation Engineering", Standard Publishers, Delhi.

REFERENCES

1. Gopal Ranjan and Rao, A.S.R. (2007), "Basic and Applied Soil Mechanics", New age International (P) Ltd.
2. Murthy, V.N.S. (2009), "A text book of Soil Mechanics and Foundation Engineering", UBS Publishers & Distributors Pvt. Ltd., New Delhi.
3. Swami Saran (1998), "Analysis and Design of sub structures", Limit State Design, Oxford & IBH Publishing Co. Pvt Ltd., New Delhi.
4. Braja M. Das, (2005), "Principles of Foundation Engineering", Thomson Asia Pvt. Ltd., Singapore.
5. Shashi K Gulhati and Manoj Dutta (2005), Geotechnical Engineering, Tata McGraw Hill, New Delhi
6. Craig, R.F. (2014), "Soil Mechanics", McGraw hill, New Delhi
7. I.S. SP 36 Part – I &Part – II - 1988 Compendium of Indian standards on soil engineering, Part 2: Field testing, Bureau of Indian Standards, New Delhi.
8. Relevant NPTEL Courses.

REINFORCED CONCRETE STRUCTURES - I

CIV 314 **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Prerequisites:

Engineering Mechanics; Strength of materials; Structural Analysis - I.

Course Objectives:

From this course students will learn the following

1. To understand the recommendations of IS: 456-2000
2. To master the concepts of limit state design
3. To learn how to design beams, columns, slabs and footings

Course Outcomes:

At the end of the course, the students will be able to

1. Design singly and doubly reinforced beams by explaining the principles of limit state method.
2. Design flanged sections and design beams for shear and torsion.
3. Design one way, two way and continuous slabs.
4. Design columns subjected to axial loads.
5. Design isolated square and rectangular footings.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	3	3										3		
	2	2	3	3										3		
	3	2	3	3										3		
	4	2	3	3										3		
	5	2	3	3										3		

SYLLABUS

UNIT – I 12 Periods

Design Philosophies – Working Stress Method, Ultimate Load Method and Limit State Method

Introduction to Limit State Design: Concepts of limit state design- Characteristic loads- Characteristic strength -Partial loads and Material Safety factors- Representative stress- Strain curves- Assumptions in limit state design – Stress block parameters – Limiting moment of resistance.

Singly and Doubly Reinforced Beams: Limit state analysis and design of singly reinforced, doubly reinforced beams.

UNIT – II 12 Periods

Flanged Sections: Design of T and L beam sections.

Shear, Torsion and Bond: Limit state analysis and design of sections for shear and torsion – Concept of bond, anchorage and development length, I.S Code provisions. Design examples in simply supported and continuous beams.

UNIT – III 12 Periods

Slabs: Design of one-way slabs – two-way slabs –Continuous slabs using IS coefficients.

UNIT – IV 12 Periods

Columns: Short and Long columns, Minimum eccentricity, short column under axial compression, column with helical and tie reinforcement.

Only for Internal Assessment - (Short columns subjected to uniaxial bending Short columns subjected to biaxial bending and P-M interaction diagrams)

UNIT – V 12 Periods

Footings: Introduction: Different types of footings–Design of isolated square and rectangular footings.

TEXT BOOKS

1. B.C.Punmia, Ashok Kumar Jain, Arun Kmar Jain (2016) "Limit State Design of Reinforced Concrete", Laxmi Publications, Revised edition, India.
2. Varghese P.C.(2008) **"**Limit State Design of Reinforced Concrete", Prentice Hall India Learning Private Limited", 2nd edition, India.

REFERENCES

1. S Unnikrishna, Devdas Menon (2017)"Reinforced concrete design", McGraw Hill Education, Third edition, India.
2. Ashok K Jain (2012)"Reinforced Concrete", New Chand & Brothers-Roorkee, Seventh edition, India
3. S Ramamrutham (2016)"Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Company (P) Ltd.-New Delhi, 17th edition, India.
4. Indian Standard-456-2000, "Plain and Reinforced Concrete – Code of Practice", Fourth Revision.
5. Other Relevant B.I.S. Codes
6. Relevant NPTEL Courses.

STRUCTURAL ANALYSIS - II

CIV 315 **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Prerequisites:

Strength of Materials; Structural Analysis-I.

Course Objectives:

1. Apply suitable methods for analysing statically indeterminate frames.
2. Apply suitable methods for analysing Trusses.
3. Apply suitable methods for analysing Arches and suspension bridges.

Course Outcomes:

At the end of the course the student will be able to

1. Analyse the Statically Indeterminate Trusses
2. Analyse the Statically Indeterminate Frames using SDM & MDM
3. Analyse the Statically Indeterminate Frames using Kanis Method & Column Analogy Method
4. Analyse the Two & Three Hinged Arches & Suspension Bridges
5. Analyse the ILD in beams due to moving Loads

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3											3		
	2	3	3											3		
	3	3	3											3		
	4	3	3											3		
	5	3	3											3		

SYLLABUS

UNIT – I 12 Periods

Analysis of statically indeterminate frames (single storey, single bay portal frames only) using (I) Slope-deflection method (ii) Moment distribution method.

UNIT – II 12 Periods

Analysis of statically indeterminate frames (portal frames with single storey and single bay) using (i) Kanis method, (ii) Column Analogy method.

Analysis of structures for lateral load using portal method and cantilever method. (Only for Internal Assessment)

UNIT – III 12 Periods

Analysis of statically indeterminate trusses (having not more than 7 members and 3 supports) containing (a) External redundant supports (b) internal redundant members using (i) Method of consistent deformation (ii) Castigliano's theorem – II.

UNIT – IV 12 Periods

Arches: Normal thrust, radial shear and bending moment in three hinged and two hinged parabolic and segmental arches.
Suspension bridges: Stresses in loaded cables with supports at the same and different levels. Length of cable; Two and Three hinged stiffening girders.

UNIT – V 12 Periods

Moving loads and Influence lines: Maximum Shear force and Bending moment diagrams for different types of loads. Maximum Bending moment at a section under a wheel load and absolute maximum Bending moment in the case of several wheel loads. Equivalent uniformly distributed live load for Shear force and Bending moment.

TEXT BOOKS

1. Vazirani V.N., M.M Ratwani and S.K Duggal (2006), "Analysis of Structures – Vol-I & II", Khanna Publishers, 17th Edition.
2. C.S. Reddy (2017) "Basic Structural Analysis", McGraw Hill Education, 3rd Edition

REFERENCES

1. C.K.Wang (2017), "Intermediate Structural Analysis" , McGraw Hill International 1st Edition.
2. Devdas Menon (2017) "Structural Analysis", Alpha Science International Ltd, 2nd Edition.
3. Thandavamoorthy (2011), "Structural analysis", Oxford University Press.
4. S.S.Bhavakatti (2010), "Structural analysis Vol I & II", Vikas Publishing House Pvt Ltd, 4th Edition
5. D S Prakash Rao (1996), "Structural Analysis A Unified Approach", Universities Press
6. Relevant NPTEL Courses.

COMPUTER APPLICATIONS IN CIVIL ENGINEERING LAB

CIV 316 **Credits: 1.5**

Instruction: 3 Practicals / week Sessional Marks: 50

End Exam: 3 Hours End Exam Marks: 50

Prerequisites:

Remote Sensing & GIS (Basics)

Course Objective:

The objective of this course is to

1. Maximize the efficiency of planning and decision making
2. Integrate information from multiple sources
3. Eliminate surplus data and minimizing repetition

Course Outcomes:

1. Interpret remote sensing and GIS data for spatial analysis.
2. Design and execute remote sensing and GIS projects like creation of thematic maps, digital elevation modeling etc.,
3. Apply GIS techniques to solve simple civil engineering problems

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3		3	3				3	3		3		2	2
	2	3	3	3		3	3	3		3	3		3		2	2
	3	3	3	3	3	3	3			3	3		3		2	2

SYLLABUS

LIST OF EXPERIMENTS

Exercises in GIS:

1. Digitization of Map/ Toposheet
2. Creation of thematic maps
3. Estimation of features and interpretation
4. Developing digital elevation model
5. Simple applications of GIS in civil engineering

REFERENCES

1. Basudeb Bhatta (2011), "Remote sensing and GIS", Oxford Higher Education, New Delhi, 2nd Edition.
2. Anji Reddy M (2011), "Remote sensing and Geographical information system", B.S Publications, Hyderabad.
3. P.A.Burrough (1998), "Principles of Geographical information systems for land resource assessment", Clarendon Press, Oxford,2nd edition.
4. Relevant NPTEL Courses.

FLUID MECHANICS LAB

CIV 317 **Credits: 1.5**

Instruction: 3 Practicals / week Sessional Marks: 50

End Exam: 3 Hours End Exam Marks: 50

Course Objectives:

The objective of the course is to enable the student

The objective of the course is to enable the student to calibrate different types of flow measuring devices to measure flow in tanks, pipes and open channels.

Course Outcomes:

At the end of this course student will be able to

1. Apply Continuity and Bernoulli's equation to determine the coefficient of discharge for various flow measuring devices used in pipes, channels, and tanks.
2. Prove Bernoulli's and Reynolds equations using apparatus and Determine time of emptying tank through Mouthpiece and orifices.
3. Determine friction factor using Darcy - Weisbach equation and coefficient of impact of jet on vanes.
4. Evaluate performance characteristics of Turbines and Pumps.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	2		3					3	3					2
	2	2	2		3					3	3					2
	3	2	2		3					3	3					2
	4	2	2		3					3	3					2

LIST OF EXPERIMENTS:

1) Calibration of a small orifice by constant head method and falling head method and Time required for emptying the tank through the mouth piece.
2) Calibration of a cylindrical mouth piece by constant head method and falling head method and Time required for emptying the tank through the small orifice.
3) Calibration of Venturi meter
4) Calibration of Flow nozzle meter.
5) Calibration of a trapezoidal notch.
6) Experimental verification of laminar, transition and turbulent flows using Reynold's apparatus.
7) Verification of Bernoulli's Equation.
8) To Study major losses in pipes – Pipe friction – To compute Darcy- Weisbach friction factor.
9) To Study performance characteristics of centrifugal pump
10) To Study performance characteristics of reciprocating pump

11) To Study constant head characteristic curves of Pelton turbine
12) To Study performance characteristics of Francis turbine
13) To compute coefficient of impact of jet on flat and hemispherical vanes

REFERENCES

1. Modi P.N. & Seth S.M. (2017), "Hydraulics & Fluid Mechanics including Hydraulics Machines", Standard Book House, New Delhi, 22nd Edition.
2. Relevant NPTEL Courses.

TECHNICAL SEMINAR

CIV 318 **Credits: 2**

Instruction: Sessional Marks: 100

End Exam: End Exam Marks: -

Course Objectives:

The objective of this course is

1. To enhance the communication skills of the students through participation and giving seminars.
2. To develop an overview of civil engineering and its applications in the students.
3. To promote teamwork and lifelong learning among the students.

Course Outcomes:

At the end of the course the students will be able to

1. Construct detailed presentations by analyzing and synthesizing information.
2. Deliver compelling oral presentations to evaluation committees.
3. Demonstrate effective teamwork and individual problem-solving skills

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3		3	3			3				3			
	2								3		3		3			
	3	3							3	3	3		3			

OUTLINE OF SYLLABUS

Students have to prepare a Report on a case study, design or practical application in civil engineering and make a presentation in teams of maximum 2 students. Duration of each seminar shall be 20 minutes per team including discussion. Evaluation to be done by a Panel of Examiners nominated by HoD with at least one faculty member of specialization related to the seminar topic.

REFERENCES

1. National & International Journals / Reports / Case Studies in civil engineering.
2. NPTEL courses in civil engineering.

QUANTITATIVE & VERBAL APTITUDE – I

CIV 319 **Credits: 1.5**

Instruction: 3 Lectures / week Sessional Marks: 100

End Exam: 3 Hours End Exam Marks: -

Course objectives:

Quantitative Aptitude -I

1. To prepare the students on various principles related to numerical computations.
2. To explain concepts related to numerical estimation.
3. To illustrate and explain the fundamentals related to geometry and mensuration.

Verbal Aptitude-I:

1. To categorize and explain principles of grammar in order to minimize errors in English.
2. To list and quote high frequency words by giving relevant examples.
3. To categorize, apply and use data as per the requirement.
4. To construct and make use of idioms, phrasal verbs and other expressions used in professional contexts.
5. To critically evaluate reading material for better comprehension

Course Outcomes:

Quantitative Aptitude –I

The student will be able to

1. Solve problems related to numerical computations in company specific and other competitive tests.
2. Able to recall and use the concepts to solve problems numerical estimation with respect to company specific and competitive tests.
3. Apply basic principles related to geometry and mensuration & solve questions in company specific and competitive tests.

Verbal Aptitude-I

The student will be able to

1. Detect grammatical errors in the text/sentences and rectify them while answering their competitive/ company specific tests and frame grammatically correct sentences while writing.
2. Answer questions on synonyms, antonyms, hyponyms, hypernyms and other vocabulary-based exercises while attempting company specific and other competitive tests.
3. Use their logical thinking ability and solve questions related to reasoning based exercises.
4. Choose the appropriate word/s/phrases suitable to the given context in order to make the sentence/paragraph coherent.

5. Analyse the given data/text and find out the correct responses to the questions asked based on the reading exercises; identify relationships or patterns within groups of words or sentences.

Mapping of Course Outcomes with Program outcomes:

CO		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
QA	**1**	3	2							1	1					
	2	3	2							1	1					
	3	3	2							1	1					
VA	**1**	2	1							2	3					
	2	1								2	3					
	3	1	2							2	3					
	4	1								2	3					
	5	1	2							2	3					

SYLLABUS

Section –A (Quantitative Aptitude –I)

UNIT I **6Periods**

Numerical computation:

Applications based on Numbers, Chain Rule, Ratio Proportion

UNIT II **6 Periods**

Numerical estimation - I

Applications Based on Time and work, Time and Distance

UNIT III **4 Periods**

Numerical estimation – II

Applications based on Percentages, Profit Loss and Discount, Simple interest and Compound Interest

Partnerships, Shares and dividends

UNIT IV **4 Periods**

Data interpretation

Data interpretation related to Averages, Mixtures and allegations, Bar charts, Pie charts, Venn diagrams

UNIT V **4 Periods**

Application to industry in Geometry and Mensuration

Text Books:

1. Quantitative Aptitude for Competitive Examinations - Quantitative Aptitude by rs agrawal (English, Aggarwal R. S.)-Published year – Revised Edition 2021 – s chand Publications -
2. A Modern Approach to Verbal & Non-Verbal Reasoning (R.S. Aggarwal) Latest Edition 2018 S Chand Publication January 2018

References

1. Quantitative Aptitude - For Competitive Examinations-U.Mohan Rao-5th Edition -2017 - SCITECH publications
2. Quantitative Aptitude by Arun Sharma McGrawhill publications-How to prepare for Quantitative Aptitude -for CAT -9th Edition -Publications 2021
3. Data Interpretation and Data Sufficiency By Ananta Ashisha: Data Interpretation-2012 Last Edition
4. Quantitative Aptitude for Competitive Exams by Abhijit Guha -7th Edition – 2020 latest Edition
5. Quantitative Aptitude by Pearson publications-4th Edition -2019 publications
6. Elementary and Higher algebra by HS Hall and SR knight- GK Publications -2016 Edition

Websites:

1. www.m4maths.com
2. www.Indiabix.com
3. 800score
4. Official GRE site
5. Official GMAT site

Section –B (Verbal Aptitude –I)

UNIT I **7 Periods**

Grammar:

Parts of speech(with emphasis on appropriate prepositions, co-relative conjunctions, pronouns-number and person, relative pronouns), articles(nuances while using definite and indefinite articles), tenses(with emphasis on appropriate usage according to the situation), subject – verb agreement (to differentiate between number and person) , clauses (use of the appropriate clause , conditional clauses), phrases(use of the phrases, phrasal verbs), degrees of comparison(comparing apples and oranges, comparison and number), modifiers(misplaced and dangling modifiers, absence of modifiers), determiners, parallelism in structure(symmetry in two

part sentences), word order, subjunctive mood, redundancy, special types of sentences, miscellaneous types, identifying errors in a given sentence, correcting errors in sentences.

UNIT II **4 Periods**

Vocabulary:

Synonyms and synonym variants (with emphasis on high frequency words), antonyms and antonym variants (with emphasis on high frequency words), homonyms, hyponyms, hypernyms and General idioms.

UNIT III **5 Periods**

Reasoning:

Critical reasoning (understanding the terminology used in CR- premise, assumption, inference, conclusion), Sequencing of sentences (to form a coherent paragraph, to construct a meaningful and grammatically correct sentence using the jumbled text), to use logical reasoning and eliminate the unrelated word from a group.

UNIT IV **4 Periods**

Usage:

Sentence completion (with emphasis on signpost words and structure of a sentence), contextual meanings (to use the appropriate word according to the situation), supplying a suitable beginning/ending/middle sentence to make the paragraph coherent, idiomatic language (with emphasis on business communication), punctuation depending on the meaning of the sentence, run on errors, sentence fragments, coma splices.

UNIT V **4 Periods**

Reading Comprehension:

Types of passages (to understand the nature of the passage), types of questions (with emphasis on inferential and analytical questions), style and tone (to comprehend the author's intention of writing a passage), strategies for quick and active reading(importance given to skimming, scanning), summarizing ,reading between the lines, reading beyond the lines, techniques for answering questions related to vocabulary (with emphasis on the context), supplying suitable titles to the passage, identifying the theme and central idea of the given passages.

Books for Practice

1. **Practical English Grammar A. J. Thomson, A. V. Martinet by Oxford University press -2021**
2. **Remedial English Grammar for Foreign Students by FT wood published by Macmillan *Publishers-2019 Revised Edition***
3. **Objective English-Edgar Torpe, Showick Thorpe-Pearson Education-5th Edition-2016**
4. **Cambridge and Oxford Dictionaries-Revised Editions -2021**

Reference Books and websites:

1. **Barron's by Sharon Welner Green and Ira K Wolf (Galgotia Publications Pvt.Ltd.)-28th Edition-2017**
2. **Websites: Indiabix, 800 score, official CAT, GRE and GMAT sites-Updated**
3. **Word Power Made Easy by Norman Lewis-Goyal Publishers-Revised 2021**

R 20 III Year II Semester
Detailed Syllabus

PROFESSIONAL ELECTIVE-I

GROUND IMPROVEMENT TECHNIQUES

CIV 322 A **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Course Objective

The course content enables students to learn the different techniques for enhancing the properties of soil.

Course Outcomes

At the end of the course the student will be able to;

1. Illustrate various methods of ground improvement and their suitability to different field conditions.
2. Classify different types of Grouting Techniques and their sequence of operation
3. Outline the applications of Vertical Drains and their construction practices.
4. Describe the Types, Functions and Applications of Geosynthetics and identify their Properties.
5. Explain the Types, Objectives and methods of Dewatering Techniques

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3												3	
	2	3	3												3	
	3	3	3												3	
	4	3	3												3	
	5	3	3												3	

SYLLABUS

UNIT – I **12** Periods

Introduction – Need for Ground Improvement, Objectives of Ground Improvement, Classification of Ground Improvement Methods, Mechanical Stabilization- Triangular Chart Method and Rothfutch Method, Blasting, Dynamic Compaction/ Consolidation.
Cement stabilization- Mechanism, factors affecting and properties, use of additives, design of soil cement mixtures, construction techniques.

UNIT – II **12** Periods

Soil & Foundation Grouting – Grouting Equipments, Applications, Classification of grouting based on Materials, Grouting Technique and Sequence of Operation.

UNIT – III **12** Periods

Vertical Drains- Preloading, Sand Drains, Prefabricated - Principle, Band Drains or Wick Drain, Advantages and Disadvantages, Stone columns - Introduction, construction practice, design principles, vibrofloatation techniques and other techniques like dynamic replacement etc.

UNIT – IV **12** Periods

Reinforced Earth – Concept, Materials and Applications.
Geosynthetics-Types, Functions, Applications and Durability
Properties of Geotextiles- Physical, Mechanical and Hydraulic Properties

UNIT – V **12** Periods

Reinforced Earth – Materials, Applications.
Dewatering- Definition, Objectives, Methods of Dewatering- Open Sumps and Ditches, Well point Systems, Deep Well Systems, Vertical Sand Drains, Electro- Osmosis, cut-off walls.

TEXTBOOKS

1. Narasinga Rao B.N.D (2015), Soil Mechanics and Foundation Engineering, Wiley Publishers, pp. 963-1038, 1st Edition.
2. Purushothama Raj P. (1999), Ground Improvement Techniques, Lakshmi Publications, New Delhi.

REFERENCES

1. Hausmann Manfred R. (1990), Engineering Principles of Ground Modification, McGraw-Hill.
2. Moseley, M.D. (1998), Ground Treatment, Blackie Academic and Professional.
3. Venkatappa Rao, G. and Suryanarayana Raju, G.V.S. (1990), "Engineering with Geosynthetics", Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Relevant NPTEL Courses.

SOLID WASTE MANAGEMENT

CIV 322 B **Credits: 3**

Instruction: 3 Lectures / week Sessional Marks: 40

End Exam: 3 Hours End Exam Marks: 60

Prerequisites:

Environmental Science.

Course objectives:

The course content enables students to:

1. Develop insight into the collection, transfer, and transport of municipal solid waste.
2. Explain the design and operation of a municipal solid waste landfill.
3. Examine the design and operation of a resource recovery facility.

Course outcomes:

At the end of the course students are able to:

1. Analyse the characteristics of solid waste and discuss problems due to improper disposal of solid waste
2. Describe the significance of recycling, reuse and reclamation of solid wastes
3. Summarize various methods of collection, transfer and transport of wastes.
4. Classify various methods of processing and transformation of solid wastes
5. Explain Design aspects and operational problems of Landfill

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2			1		1	2			1					2
	2	2					2	2			1					2
	3	2					2	2			1					2
	4	2					2	2			1					2
	5	2		3			2	2			1					2

SYLLABUS

UNIT – I 12 Periods

Introduction: Definition of solid waste, garbage, rubbish, Sources and Types of solid wastes. Characteristics of Solid Wastes - Physical, chemical and biological characteristics- Problems due to improper disposal of solid waste.

UNIT – II 12 Periods

Basic Principles: Definition of Solid Waste Management - Reduction, reuse, recycling and recovery principles of waste management - Waste generation and handling at source-Functional elements of solid waste management

UNIT – III 12 Periods

Collection, Transfer and Transport of Wastes: Collection of solid wastes- Collection methods and service. Transfer station-Processing and segregation of the solid waste- various methods of material segregation.

UNIT – IV 12 Periods

Processing and Transformation of Solid Wastes: Composting: definition-methods of composting-advantages of composting- Incineration: definition- methods of incineration advantages and disadvantages of incineration.

UNIT – V 12 Periods

Disposal of Solid Waste: Volume reduction, Open dumping, land filling techniques. Landfills: classification-Design and Operation of landfills, Land Farming, Deep well injection.

TEXT BOOKS

1. George Tchobanoglous, Hilary Theisen and Samuel Vigil (1993), "Integrated Solid Waste Management", McGraw Hill Publishers, USA, 2nd Edition.
2. Peavy, H.S., Rowe, D.R. and Tchobanoglous, G. (2013), "Environmental Engineering", McGraw-Hill, New York, 7th Edition.

REFERENCES

1. **Oweis, I.S. and Khera, R.P. (1998)**, "Geotechnology of Waste Management", PWS Publishing Co., New York, 2nd Edition.
2. Bagchi, A. (2004), "Design of Landfills and Integrated Solid Waste Management", John Wiley & Sons, New Jersey, 3rd Edition.
3. Sharma, H. D. and Reddy, K. R. (2004) "Geoenvironmental Engineering", John Wiley & Sons, New Jersey, 1st Edition.
4. Relevant NPTEL Courses

REPAIR AND REHABILITATION OF STRUCTURES

CIV 322 C **Credits : 3**
Instruction : 3 Lectures / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Prerequisites:

Engineering Chemistry; Concrete Technology; Reinforced Concrete Structures I & II.

Course Objectives:

1. To learn about the non-destructive testing
2. To know the corrosion control techniques in steel
3. To know about crack control techniques in concrete
4. To adopt different strengthening techniques in concrete structures.

Course outcomes:

By the end of the course, student will be able to:

1. Explain various non-destructive tests to determine structural health
2. Describe miscellaneous non-destructive tests
3. Outline the mechanism of corrosion and its control in steel
4. Identify defects in concrete.
5. Analyse techniques to strengthen reinforced concrete structures.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2				2								2		
	2	2				2								2		
	3	2				2								2		
	4	2				2								2		
	5	2				2		1						2		

SYLLABUS

UNIT – I **12** Periods

Non-destructive strength test

Techniques to test the existing strength- - Destructive tests- core sampling and testing -Non Destructive tests – rebound hammer test, ultrasonic pulse velocity test, pull out test, penetration techniques, acoustic emission techniques.

UNIT – II 12 Periods

Other non – destructive tests

Chemical test – carbonation and chloride content – Corrosion potential assessment – cover meter survey, half cell potential survey, resistivity measurement

Fire damage assessment – differential thermal analysis – X ray diffraction
Structural integrity/ soundness assessment – radiography, impact echo test, dynamic testing of structures –interpretation and evaluation of test result data

UNIT – III 12 Periods

Corrosion

Corrosion of reinforcement- Factors affecting corrosion of reinforcement embedded in concrete-Mechanism of electrochemical corrosion-Chloride attack-Carbonation-Corrosion Control.

UNIT – IV 12 Periods

Failures in concrete

Cracks in concrete-types and causes of concrete cracks-Repair of cracks-Common type of repairs-Sealing, Stitching, providing additional steel, Drilling & Plugging-Polymer based repairs-Resin based repairs.

UNIT – V 12 Periods

Strengthening of Reinforced Concrete structures

Retrofitting-Strengthening of Beams and Columns – Demonstration of Foundations and Slabs-Methodology – Strengthening of RC Structures

TEXT BOOKS

1. "Handbook on Repair And Rehabilitation of RCC Buildings", CPWD Published (2002).

REFERENCES

1. Bungey, J. H., Millard, S.G. and Grantham, M.G. (2006), "Testing of Concrete in Structures", Taylor and Francis, London, 4th Edition.
2. Shetty, M. S., (2006), "Concrete technology" S. Chand Publications, New Delhi, 7th Edition,
3. Ghambir, M.L., (2013), "Concrete technology", McGraw-Hill Education, New Delhi, 5th Edition.
4. Neville, A.M. (2011), "Properties of Concrete", Prentice Hall, New Delhi, 5th Edition.
5. Relevant I.S. Codes.
6. Relevant NPTEL Courses.

URBAN PLANNING AND SMART CITIES

CIV 322 D **Credits: 3**
Instruction: 3 Lectures / week Sessional Marks: 40
End Exam: 3 Hours End Exam Marks: 60

Prerequisite:

Building Planning & Drawing

Course Objectives:

To provide exposure to the student in urban planning and smart cities, the latter being the recent development.

Course outcomes:

By the end of the course, student will be able to:

1. Identify the Goals, Objectives, Components and Benefits of Planning the concept of smart city.
2. Explain the Urbanization Policies in India and the World
3. Discuss the importance of Sustainable Urban Development and its Parameters.
4. Outline Goals and Objectives of Sustainability and their practices.
5. Summarize the report of core indicator requirements with reference to ISO 37120.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3					1	1					2		2	
	2	3					2	1					2		2	
	3	3					1	2					2		2	
	4	3					1	2					2		2	
	5	3					1	2					2		2	

UNIT – I 12 Periods

Introduction: Various definitions of town and country planning; Goals and objectives of planning; Components of planning; Benefits of planning;

Definition of Smart City; Evolution of Smart City concept; Smart City components and characteristics

UNIT – II **12** Periods

Urbanization Policies in India: Over view of world urbanization, National Urbanization policy, basic issues in urbanization policy; role of national and state level policies; five-year plans, latest attempts at urbanization policy formulation in the country; salient features of the report of the

National Commission of Urbanization; Census definition of urban places; functional classification of urban places; India's Smart City Mission

UNIT – III 12 Periods

Sustainable Urban Development: Changing perspectives in man-environment relationship with focus on issues of population, urbanization, resource depletion and pollution; limits to growth vis-a-vis sustainable economy; growth and environmental imperatives of developing vs developed countries; definitions, concepts and parameters in sustainable development with particular reference to Brundtland Commission, Agenda 21, Eco-city approach.

UNIT – IV 12 Periods

STAR Framework of Sustainability: Introduction, Goals & Objectives; Built Environment: Ambient Noise & Light; Community Water Systems; Compact & Complete Communities; Housing Affordability; Infill & Redevelopment; Public Parkland; Transportation Choices;

Climate & Energy: Climate Adaptation; Greenhouse Gas Mitigation; Greening the Energy Supply; Energy Efficiency; Water Efficiency; Local Gov GHG & Resource Efficiency; Waste Minimization;

Natural Systems; Green Infrastructure; Biodiversity & Invasive Species; Natural Resource Protection; Outdoor Air Quality; Water in the Environment; Working Lands;

Innovation & Process; Best Practices & Processes; Exemplary Performance; Local Innovation; Good Governance

UNIT – V 12 Periods

ISO 37120 City indicators: Core Indicator requirements; Supporting Indicator requirements; Data Sources; Environment; Solid waste; Transportation; Urban planning; Wastewater; Water and Sanitation; Reporting and record maintenance

TEXT BOOKS

1. Peter Hall, (2010), "Urban and Regional Planning", Routledge Publishing, 4th Edition.
2. Kulshrestha, S. K., (2012), "Urban and Regional Planning in India - A Handbook for Professional Practice," Sage Publications, New Delhi.

REFERENCES

1. STAR Community Rating System, Version 2.0, October 2016, STAR Communities Washington, DC
2. Sustainable development and resilience of communities-Indicators for city services and quality of life, ISO/DIS 37120, 2018, Switzerland.
3. Relevant NPTEL Courses.

STEEL STRUCTURES

CIV 323 **Credits : 3**
Instruction : 3 Lectures & 1 Tutorial / week Sessional Marks : 40
End Exam : 3 Hours End Exam Marks : 60

Prerequisites:

Engineering Mechanics, Strength of materials, Structural Analysis

Course objectives:

The objective of this course is to

1. Familiarize students with different types of connections and relevant IS codes
2. Understand the design concepts of tension and compression members
3. Familiarize students with concepts of design of flexural members
4. Understand the design concepts of plate girder
5. Familiarize students with different types of column bases and their design

Course outcomes:

At the end of this course the student will be able to

1. Design structural steel bolted joints.
2. Design structural steel welded joints and members subjected to tension.
3. Design structural steel members subjected to compression.
4. Design a column base, structural steel members subjected to bending.
5. Design a welded plate girder.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3	3										3		
	2	3	3	3										3		
	3	3	3	3										3		
	4	3	3	3										3		
	5	3	3	3										3		

SYLLABUS

Note: All the designs should be in the limit state design method as per IS 800-2007

UNIT – I 12 Periods

Introduction: Fundamentals of Design philosophies, Concepts of limit state design of structures, Different types of rolled steel sections. Stress – Strain relationship for mild steel.

Bolted connections: Behaviour of bolted joints, Design strength of ordinary black bolts, high strength friction grip bolts, Simple connections (subjected to only axial load), Eccentric bolted connections (Type - I & Type - II)

UNIT – II 12 Periods

Welded Connections: Advantages of welded joints, Types and properties of welds, Types of joints, weld specifications, Simple connections (subjected to axial load), Eccentric welded connections (Type - I & Type - II)
Tension members: Design of angles and other sections for tension.

UNIT – III 12 Periods

Compression members: Design of axially loaded compression members, built up compression members, Laced and Battened columns. Column splices

UNIT – IV 12 Periods

Column bases: Allowable stress in bearing, Slab base, Gusset base
Beams: Beam types, section classifications, lateral stability of beams, Allowable stress in bending, shear and Bearing stresses, Effective length of compression flange, laterally supported and unsupported beams..

UNIT – V 12 Periods

Plate girders: Design considerations, IS Code of recommendations, Design of welded plate girder, Stiffeners and their connections

TEXT BOOKS

1. Duggal, S.K. (2014) "Limit State Design of steel structures", McGraw Hill Education Private Ltd.
2. Subramanian, N. (2011) "Design of Steel structures", Oxford University Press.

REFERENCES

1. Ramarmutham, S (2014), "Design of steel structures", Dhanpat Rai Publication company.
2. Sai Ram, K.S. (2015) "Design of steel structures", Pearson Education India.
3. Bhavikatti, S.S. (2014) "Design of steel structures by Limit State Method as per IS: 800-2007", IK International Publishing House.
4. IS 800 – 2007, "Indian Standard Code of Practise for General Construction in Steel" Bureau of Indian Standards.
5. Relevant NPTEL Courses.

REINFORCED CONCRETE STRUCTURES - II

CIV 324 **Credits : 3**

Instruction : 3 Lectures & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Prerequisites:

Reinforced Concrete Structures – I

Course Objectives:

From this course students will learn the following

1. To learn how to design various types of staircases.
2. To learn design of retaining walls.
3. To learn design of piles and pile caps
4. To learn the basic concepts of prestressed concrete.

Course Outcomes:

At the end of the course, the students will be able to

1. Design staircase.
2. Design cantilever retaining wall.
3. Design counterfort retaining wall.
4. Design pile and pile caps.
5. Analyse the prestressed concrete members and their losses in prestressing.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	3	3										3		
	2	2	3	3										3		
	3	2	3	3										3		
	4	2	3	3										3		
	5	2	3											3		

SYLLABUS

UNIT-I 12 Periods

Staircase: Introduction - Classification of staircase - Design of dog-legged staircase – designof open well staircase with quarter span landing

UNIT- II 12 Periods

Retaining Walls: Types of retaining walls - forces on retaining walls - active and passive earth pressure, stability requirements.

Cantilever Retaining Wall: Preliminary proportioning of cantilever retaining walls. Design of cantilever retaining wall - with horizontal back fill – with horizontal back fill and traffic load – with sloping back fill.

UNIT- III 12 Periods

Counterfort Retaining Wall: Preliminary proportioning of counter fort retaining walls. Design of counterfort retaining wall.

UNIT-IV 12 Periods

Piles and Pile caps: Classification of piles - Design of bored cast in situ piles, Pile Cap design for three or four piles.

UNIT-V 12 Periods

Prestressed Concrete: Introduction - Reinforced Concrete versus Prestressed Concrete -Use of high strength concrete and high tensile steel - Prestressing Systems (Freyssinet, Gifford Udall, Magnel Blaton) - Analysis of simple prestressed rectangular sections (Concentric tendon, Eccentric tendon, Parabolic tendon, Bent tendon) - Prestressing Losses

TEXT BOOKS

1. B.C.Punmia, Ashok Kumar Jain, Arun Kmar Jain (2016) "Limit State Design of Reinforced Concrete", Laxmi Publications, Revised edition, India.
2. Varghese P.C.(2008) **"**Limit State Design of Reinforced Concrete", Prentice Hall India Learning Private Limited", 2nd edition, India.

REFERENCES

1. S Unnikrishna, Devdas Menon (2017)"Reinforced concrete design", McGraw Hill Education, Third edition, India.
2. Ashok K Jain (2012)"Reinforced Concrete", New Chand & Brothers-Roorkee, Seventh edition, India
3. S Ramamrutham (2016)"Design of Reinforced Concrete Structures", Dhanpat Rai Publishing Company (P) Ltd.-New Delhi, 17th edition, India.
4. Indian Standard-456-2000, "Plain and Reinforced Concrete – Code of Practice", Fourth Revision, Tenth reprint April 2007
5. Other Relevant B.I.S. Codes
6. Relevant NPTEL Courses.

HIGHWAY ENGINEERING

CIV 325 **Credits : 3**

Instruction : 3 Lectures & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Prerequisites:

Surveying – I & II.

Course Objectives:

The objective of the course is to prepare the student to

1. To know about the history of highway development, surveys and classification of roads.
2. To study about the pavement materials and design the geometric elements of highways.
3. To know about the construction procedure of various types of pavements and study the pavement maintenance.
4. To study about the traffic characteristics and design of intersections.

Course Outcomes:

At the end of the course the student will be able to

1. Analyse the maximum utility road system by applying the highway planning surveys
2. Design cross section elements, sight distance, horizontal and vertical alignment of a highway
3. Design flexible and rigid pavements as per IRC
4. Identify various highway constructions techniques and highway maintenance
5. Design signal time and rotary intersection by analyzing traffic studies

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3												2	
	2	3	2	3					3						3	
	3	3	3	3					3						3	
	4	3							3						2	
	5	3	3	3					3						3	

SYLLABUS

UNIT – I 12 Periods

Highway development and planning – History of Roads - Classification of roads, necessity of highway planning surveys preparation of master plan highway planning in India. Classification of roads, Highway alignment - Factors controlling alignment, Engineering surveys, Drawing & report.

UNIT – II 12 Periods

Highway Geometric Design – Design of cross-sectional elements, Sight distance – Stopping Sight Distance & Overtaking Sight Distance, horizontal alignment – Super elevation & Transition Curves, vertical alignment – Summit Curves and Valley Curves.

UNIT – III 12 Periods

Pavement Design: Design of Highway Pavements Design factors; Design of flexible pavements – IRC method, Design of Rigid pavements - Westergaard's stress equation for wheel loads and temperatures stress.

UNIT – IV 12 Periods

Highway construction and maintenance: Highway materials and their properties and tests - Construction of water bound macadam roads, Bituminous pavements and cement concrete pavements; Construction of joints in cement concrete pavements; Maintenance of highways; Importance of highway drainage; Requirements; Surface drainage; Sub–surface drainage.

UNIT – V 12 Periods

Traffic engineering: Introduction - Traffic characteristics- Road user, vehicular & travel pattern; Traffic studies (Surveys); Traffic Control devices; Traffic operation- signal design; Types of intersections; Design of rotary intersection; Street lighting.

TEXT BOOKS

1. Khanna, S.K. and Justo C.E.G. (2018), "Highway Engineering", Nem Chand & Bros, ISBN-13: 978-8185240770, 10th Edition.
2. Kadiyali, L.R., (2011), "Traffic engineering and Transport planning", Khanna Publishers, ISBN-13: 978-8174092205.

REFERENCES

1. Chakroborty, P. and Das, A. (2003), "Principles of Transportation Engineering" Prentice Hall of India, New Delhi, 6th Edition.
2. Sharma, R.C. and Sharma, R.K. (2012), "Principles, Practice and Design of Highway Engineering" S Chand & Company, ISBN-10: 8121901316.
3. Relevant NPTEL Courses

IRRIGATION ENGINEERING

CIV 326 **Credits : 3**

Instruction : 3 Lectures & 1 Tutorial / week Sessional Marks : 40

End Exam : 3 Hours End Exam Marks : 60

Prerequisites:

Engineering Geology; Fluid Mechanics – II

Course Objective:

The objective of the course is to enable the student

To provide the necessary background for understanding the occurrence and movement of water in the hydrosphere and to enable the student to understand Irrigation Engineering Principles and practices.

Course Outcomes:

At the end of the course, the student will be able to

1. Evaluate the various hydrologic parameters by analysing the factors affecting them and applying these principles to develop unit hydrograph.
2. Identify the hydraulic properties of an aquifer & solve for specific capacity, efficiency and yield of a well
3. Analyze the reservoir conditions and design the capacity of the reservoir and its operating schedules
4. Analyze the conditions of crops and design the canal capacities for different crop patterns by calculating the quantity of water required
5. Design of Canal by using Laceys and Kennedys theory.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3		3											2
	2	3	3													2
	3	3	3	3			2									3
	4	3	3	3			3					2				3
	5	3	3	3			3									3

SYLLABUS

UNIT – I 12 Periods

Surface Water Hydrology: Water Resources in India, Hydrology in water Resources Planning– Precipitation – Types, Measurement of rainfall, Average depth of rainfall over an area, Mean annual rainfall, consistency of rainfall record – Double mass curve, Infiltration – Factors affecting and its determination, Evaporation and Evapotranspiration. Runoff – factors affecting runoff, methods of determination of runoff, stream gauging, hydrograph analysis, base flow separation,

unit hydrograph – Hydrograph of different durations, applications of unit hydrograph, S-hydrograph.

UNIT – II 12 Periods

Ground Water Hydrology: Definitions, subsurface distribution of water, ground water movement, Darcy's law–permeability. Well hydraulics – steady flow in different types of aquifers and wells – determination of hydraulic properties of aquifer, well losses, specific capacity of well, and well efficiency, pumping test and recovery test methods for determination of well yield, Data acquisition by using piezometers.

UNIT – III 12 Periods

Reservoir Planning: Types of reservoir investigations for reservoir planning, selection of site for a reservoir, zones of storage in a reservoir, purpose of reservoir, reservoir yield, mass curve and demand curve, determination of reservoir capacity, yield from a reservoir of given capacity, operating schedules, guide curve for reservoir operation, apportionment of total cost of a multipurpose project. Reservoir sedimentation, control of reservoir sedimentation, life of reservoir.

UNIT – IV 12 Periods

Irrigation: Definition of irrigation, types of irrigation systems – direct and indirect, lift and inundation irrigation system, methods of irrigation – surface and sprinkler methods, drip irrigation, Soil moisture constants, depth of water held by soil in root – zone. Water requirements of crops, duty, delta and base period, their relationship, crops – seasons, factors affecting duty and methods of improving duty, consumptive use of water – determination of canal capacities for cropping patterns.

UNIT – V 12 Periods

Canal Systems: Classification of irrigation canals – canal alignment, design of unlined canals, regime theories – Kennedy's and Lacey's theories, tractive force method, design problems – balancing depth.

TEXT BOOKS

1. Punmia B.C. and Lal Pande B.B. (2021), "Irrigation and Water Power Engineering", Laxmi Publications Pvt. Ltd., New Delhi, 17th Edition.
2. Garg S.K. (2006), "Irrigation Engineering and Hydrology Structures", Khanna Publishers, New Delhi, 35th Edition.

REFERENCES

1. Modi P.N. (2020), "Irrigation, Water Resources and Water Power Engineering", Standard Book House, New Delhi, 11th Edition.
2. Jayarami Reddy P. (2011), "A Textbook of Hydrology", Laxmi Publication, New Delhi, 3rd Edition.
3. Subramanya K. (2008), Engineering Hydrology, Tata-Mc Graw Hill Publishing, New Delhi, 3rdEdition.
4. Relevant NPTEL Courses.

STRUCTURAL ANALYSIS USING STAAD PRO

CIV 327 **Credits : 1.5**

Instruction : 3 Practicals / week Sessional Marks : 50

End Exam : 3 Hours End Exam Marks : 50

Prerequisites:

Reinforced Concrete Structures, Steel Structures

Course Objective:

1. To develop skill to use software to create 2D and 3D models
2. To acquire hands on experience in design and preparation of reinforcement details for concrete / steel structures normally encountered in Civil Engineering practice

Course Outcomes:

1. Analyse & Design various types of Beams
2. Analyse & Design various types of Trusses & Frames
3. Draw the Plan,Section & Elevation of a Building using AutoCAD
4. Develop Models in 2D & 3D using 3D Home Architect.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	2	3		3	3				3	3			3		
	2	2	3		3	3				3	3			3		
	3	3	2		3	3				3	3			3		
	4	3	2		3	3				3	3			3		

LIST OF EXPERIMENTS

STAAD PRO:

1. Analysis and design of beams (simply support, cantilever and continuous beams)
2. Analysis and design of single storey frame
3. Analysis and design of multi storey frame
4. Analysis and design of 3D portal frame
5. Analysis and design of truss
6. Analysis and design of 2D Gable frame

AUTOCAD

1. Drawing of reinforcement detailing of basic RC structural elements (Beams, Column, Slab, Footing and Staircase)
2. Drawing of isometric projections of standard rolled steel sections

REFERENCES

1. Krishnamoorthy, C.S. and Rajeev, S., Computer Aided Design and Analytical Tools, Narosa, 1993
2. Relevant NPTEL Courses.

TRANSPORTATION ENGINEERING LAB

CIV 328 **Credits: 1.5**
Instruction: 3 Practicals / week Sessional Marks: 50
End Exam: 3 Hours End Exam Marks: 50

Prerequisite:

Transportation Engineering – I, Geotechnical Engineering - II

Course Objective:

1. To perform tests on road aggregates.
2. To demonstrate the Marshall Stability test.
3. To perform tests on bitumen.
4. To perform tests on soil.

Course Outcomes:

At the end of the course the student will be able to

1. Investigate the properties of the aggregates and bitumen using IS code and comprehend and write a report
2. Design of bituminous mix by Marshall Stability test using IRC guidelines
3. Interprete the test results as per IRC and Morth guidelines and apply this knowledge to material selection and engineering design processes.

Mapping of course outcomes with program outcomes:

		PO												PSO		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO	**1**	3	3		3		3		3	3	3				3	
	2	3	3	3	3		3		3	3	3				3	
	3	3	3		3		3		3	3	3				3	

LIST OF EXPERIMENTS

1. **Testing of Aggregates**: Specific gravity – Sieve Analysis – Shape test – Flakiness Index – Elongation Index – Angularity Number – Aggregate Crushing value – Impact value – Abrasion value – Stripping value & Soundness.
2. **Testing of Bituminous material**: Specific gravity – Penetration value – Viscosity value – Softening point – Ductility value – Flash and Fire point.
3. **Design of bituminous mix by** Marshall Stability Test.

REFERENCES

1. Khanna S. K. & Justo, C. E. G. (2018), "Highway Engineering" Nemchand & Brothers, Roorkee, (3rd Edition).
2. Relevant NPTEL Courses.

QUANTITATIVE – II & SOFT SKILLS

CIV 329 **Credits: 1.5**

Instruction: 3 Practicals / week Sessional Marks: 100

End Exam: 3 Hours End Exam Marks: -

Course Objectives:

Quantitative aptitude-II

1. To categorize, apply and use thought process to distinguish between concepts of reasoning
2. To prepare and explain the fundamentals related to various possibilities and probabilities related to quantitative aptitude.
3. To critically evaluate numerous possibilities related to puzzles.

Soft Skills

1. To inculcate effective communication skills with appropriate body language.
2. To produce potent leaders, productive team players and effective individuals with proper professional ethics.
3. To enable students to make successful oral presentations using relevant content.
4. To train students for Group discussions and job Interviews which improves their employability skills.
5. To facilitate students the importance of setting realistic goals and achieving them using time management techniques.

Course Outcomes:

Quantitative Aptitude-II

The student will be able to

1. Use their logical thinking and analytical abilities to solve reasoning questions from company specific and other competitive tests.
2. Solve questions related to permutation & combinations and probabilities from company specific and other competitive tests.
3. Understand and solve puzzle related questions from specific and other competitive tests.

Soft Skills

At the end of the course, students will be able to:

1. Comprehend the core engineering subjects using effective communication skills.
2. Present accurate and relevant information efficiently, using suitable material aids.
3. Work effectively as an individual as well in teams and emerge as responsible leaders.
4. Participate in group discussions and interviews using analytical and problem solving abilities, which enhance their employability skills.
5. Set time bound goals and realize them through strategic plans for successful career.

Mapping of Course Outcomes with Program outcomes:

CO		PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
QA	1	2	1							2	2					
	2	3	1							2	2					
	3	2	2							2	2					
Soft Skills	1										3		3			
	2				2	2					3		2			
	3				3				3	3	3		2			
	4				3					3	3		2			
	5				2								2			

SYLLABUS

Section –A (Quantitative Aptitude –II)

UNIT I **8 Periods**

Numerical Reasoning:

Problems related to Number series, Analogy of numbers, Classification of numbers, Letter series, Seating arrangements, Directions, blood relations and puzzle test.

UNIT II **4 Periods**

Combinatorics:

Counting techniques, Permutations, Combinations and Probability

UNIT III **4 Periods**

Data sufficiency

Syllogisms

UNIT IV **4 Periods**

Application of Base system:

Clocks (Base 24), Calendars (Base7), Cutting of Cubes and cuboids

UNIT V **4 Periods**

Puzzle Solving & Time Management using various problems solving tools and techniques:

Selective puzzles from previous year placement papers

Selective puzzles from book Puzzles to puzzle you by shakunataladevi

Selective puzzles from book more puzzles by shakunataladevi

Selective puzzles from book puzzles by George summers

Books for practice

1. Quantitative aptitude by RS Agarwal, S Chand Publications-Latest Edition-2021 - Revised
2. Verbal and non verbal Reasoning by RS Agarwal from S Chand publications-2018 publications -Revised Edition
3. More puzzles by shakunatala devi orient paper back publication-Old Edition -1976

References:

1. Barron's by Sharon Welner Green and Ira K Wolf - Galgotia Publications pvt. Ltd.)-28th Edition-2017
2. A new Approach to Reasoning Verbal & Non-Verbal by BS Sijwali Arihant publications -2017 Edition Revised
3. Logical Reasoning for CAT Arun Sharma McGraw hill publications -4TH Edition-2017 Edition

Websites:

1. www.m4maths.com
2. www.Indiabix.com
3. 800score
4. Official GRE site
5. Official GMAT site

Note: The concepts learnt in Semester I will be tested in the Mid-term and Semester end exams during the II Semester as well.

Reading/ Listening material:

1. Newspapers like 'The Hindu', 'Times of India', 'Economic Times'.
2. Magazines like Frontline, Outlook and Business India.
3. News channels NDTV, National News, CNN

References:

1. Books written by Stephen Covey and Dale Carnegie-Seven Habits of Highly Effective People etc-Simon & Schuster, Running Press book publishers
2. Books written by Bertrand Russell-Oxford University Press

Suggested General Reading

1. Who Moved My Cheese? By Spencer Johnson-GP Putnam's Sons
2. The art of War-Sun Tzu by Nabla, Barnes & Noble
3. The Monk Who Sold Ferrari-Robin Sharma by Harper Collins, Jaico Publishers
4. The Hobbit and other books by JRR Tolkein-Harper Collins

Suggested Authors

1. William Dalrymple
2. V.S.Naipaul
3. Kushwanth Singh
4. Ernest Hemingway
5. Charles Dickens
6. Leo Tolstoy
7. R.K. Narayan
8. Amitav Ghosh
9. Vikram Seth
10. Oscar Wilde

SYLLABUS

Section – B (Soft Skills)

UNIT – I 9 Periods

Art of communication

1. Definition of Communication
2. Types of Communication
3. Non-verbal Communication
4. Listening skills
5. Feed back

D.A. - Practice of proper hand shake, practice of different postures and gestures and activity on giving feedback

UNIT – II 6 Periods

Presentation Skills

1. Purpose
2. Effective presentation strategies
3. Analysis of audience
4. Preparing an outline of the presentation,
5. Audio –visual aids
6. Body language**.**

D.A. -Group presentation by each team

UNIT – III 9 Periods

Group Discussions

1. Introduction- as a part of selection process-guidelines for GD
2. Types of GD
3. Nature of topics of G.D
4. Roles to be played by participants in a GD
5. Evaluation process

D.A–Group discussions

UNIT – IV 6 Periods

Team Building and Leadership

1. Importance of team work
2. Different stages of team formation
3. Good team vs. effective team
4. Team player and Team leader
5. Types of leadership
6. Decision making and negotiating skills

D.A-Decision making for a given situation

UNIT – V 3 Periods

Time- Management

1. Importance of time-management
2. Time-Management models
3. Prioritization
4. The art of saying 'No'
5. Identifying Time Wasters

D.A -Time- Bound activities devised by the facilitator

UNIT – VI 3 Periods

Goal-Setting

1. Different type of Goals (Immediate and Short term)
2. 'SMART' Goals
3. Strategies to achieve goals

D.A - Prepare a chart of immediate, short term and long term goals

UNIT – VII 9 Periods

Job- Interviews

1. Preparing Resumes and C.V's
2. Preparing for the interview
3. FAQ's (Integrity, Stress management, Close- Ask questions)

D.A –Mock interviews

REFERENCES

1. Sanjay Kumar and Pushpalata, *Communication Skills* ,Oxford University Press , 2011.
2. Allan Pease, Body Language, Sheldon Press,1997.
3. John A. Kline and BhavnaBhalla, *Speaking Effectively; Achieving Excellence in Presentations*, Pearson publication, 2013.
4. Marc Mancini, *Time Management*, Tata McGraw Hill publishing Comp.Ltd.,2003.
5. Peter Veruki, *The 250 Job Interview Questions,*Adams Media Corporation Avon, Massachusetts,1999.