Bapatla Engineering College

(*Autonomous*)

BAPATLA

B.Tech

Civil Engineering

Curriculum Effective from A.Y. 2018-19 (R18 Regulations)

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA - 522102 Guntur District, A.P., India

www.becbapatla.ac.in

BAPATLA ENGINEERING COLLEGE: BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA001	Linear Algebra and ODE	4	0	0	4	50	50	100	3
18PH002	Advanced Optics and Material Testing	4	1	0	5	50	50	100	4
18CE103	Introduction to civil Engineering	4	0	0	4	50	50	100	3
18EL001	Communicative English	3	0	0	3	50	50	100	2
18CE002	Biology for Engineers	3	0	0	3	50	50	100	2
18PHL01	Physics Lab	0	0	3	3	50	50	100	1
18ELL01	Communication Lab	0	0	3	3	50	50	100	1
18CSL01	Computer Programming Lab	2	0	3	5	50	50	100	2
	NCC/NSS/Internship/MOOCs								
	TOTAL	20	1	9	30	400	400	800	18

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE: BAPATLA

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA002	Numerical Methods and Advanced Calculus	4	0	0	4	50	50	100	3
18CY001	Engineering Chemistry	4	0	0	4	50	50	100	3
18CE203	Engineering Mechanics	4	1	0	5	50	50	100	4
18CE001	Environmental Studies	3	0	0	3	50	50	100	2
18CE205	Electrical Technology& Mechanical Technology	4	0	0	4	50	50	100	3
18MEL01	Engineering Graphics	1	0	4	5	50	50	100	4
18CYL01	Chemistry Lab	0	0	3	3	50	50	100	1
18MEL02	Work Shop	0	0	3	3	50	50	100	1
	NCC/NSS/Internship/MOOCs								
	TOTAL	20	1	10	31	400	400	800	21

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE: BAPATLA

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech(SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA003	Probability and Statistics	4	0	0	4	50	50	100	3
18CE302	Surveying	4	1	0	5	50	50	100	4
18CE303	Solid Mechanics	3	1	0	4	50	50	100	3
18CE304	Building Materials, Planning and Construction	4	0	0	4	50	50	100	3
18CE305	Fluid Mechanics	3	1	0	4	50	50	100	3
18HU001	Indian Constitution	2	0	0	2	50	50	100	0
18CEL31	Building Drawing Lab	0	0	3	3	50	50	100	1
18CEL32	Engineering Geology Lab	2	0	3	5	50	50	100	2
18CEL33	Surveying Lab	0	0	3	3	50	50	100	1
	TOTAL	22	3	9	34	450	450	900	20

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CE401	Professional Practice, Law & Ethics	4	0	0	4	50	50	100	3
18CE402	Environmental Engineering	4	0	0	4	50	50	100	3
18CE403	Mechanics of Materials	3	1	0	4	50	50	100	3
18CE404	Hydraulics & Hydraulic Machines	3	1	0	4	50	50	100	3
18CE405	Concrete Technology	4	0	0	4	50	50	100	3
18EL002	Technical English	3	0	0	3	50	50	100	2
18CEII1	**Internship***	0	0	0	0	-	-	-	2
18CEL41	H & HM Lab	0	0	3	3	50	50	100	1
18CEL42	Environmental Engineering Lab	0	0	3	3	50	50	100	1
18CEL43	Materials Testing Laboratory	0	0	3	3	50	50	100	1
	TOTAL	21	2	9	32	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

*** Students will go to the Industry to identify the problem and survey the literature for a feasible solution. The work will be carried out during summer vacation after IV Semester.**

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

Third Year B.Tech (SEMESTER – V)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CE501	Structural Analysis	4	1	0	5	50	50	100	4
18CE502	Remote Sensing &GIS	4	0	0	4	50	50	100	3
18CE503	Design of Concrete Structures	4	1	0	5	50	50	100	4
18CE504	Design of Steel Structures	4	1	0	5	50	50	100	4
18CE505	Water Resources Engineering	4	0	0	4	50	50	100	3
18CE506	Soil Mechanics	4	0	0	4	50	50	100	3
18CEM01	**Self Learning Elective Course)* (MOOCS)**	0	0	0	0	50	50	100	2
18CEL51	Geographical Information System Laboratory	0	0	3	3	50	50	100	1
18CEL52	Soft Skills Laboratory	0	0	3	3	50	50	100	1
	TOTAL	24	3	6	33	450	450	900	25

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

- Students can opt any one of the self-learning courses prescribed by the Department. Students register and complete the opted course in approved MOOCS platform on or before the Last Instruction Day of V semester. They have to submit the certificate before Last Instruction Day of VI semester

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Effective From the Academic Year2018-2019 (R18 Regulations)

Third Year B.Tech (SEMESTER – VI)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CE601	Estimation & Quantity Surveying	4	0	0	4	50	50	100	3
18CE602	Irrigation Structures	4	0	0	4	50	50	100	3
18CE603	Foundation Engineering	4	0	0	4	50	50	100	3
18CE604	Highway Engineering	4	0	0	4	50	50	100	3
18CED11…14	Elective-I	4	0	0	4	50	50	100	3
18CED21…24	Elective-II	4	0	0	4	50	50	100	3
18CEL61	Advanced Surveying Laboratory	0	0	3	3	50	50	100	1
18CEL62	Structural Analysis Design and Detailing Laboratory	0	0	3	3	50	50	100	1
18CEL63	Geo technical Engineering Laboratory	0	0	3	3	50	50	100	1
	TOTAL	24	0	9	33	450	450	900	21

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year 2018-2019 (R18 Regulations)

Final Year B.Tech (SEMESTER – VII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CE701	Construction Management	4	0	0	4	50	50	100	3
18CED31…34	Elective-III	4	0	0	4	50	50	100	3
18CED41…44	Elective-IV	4	0	0	4	50	50	100	3
18—I--	Institution Elective-I	4	0	0	4	50	50	100	3
18CEP01	Project-I	0	0	5	5				2
18CEL71	Design and Detailing of Irrigation Structures Laboratory	0	0	3	3	50	50	100	1
18CEL72	Transportation Engineering Laboratory	0	0	3	3	50	50	100	1
18CEL73	Quantity Estimation & Project Management Laboratory	0	0	3	3	50	50	100	1
	TOTAL	16	0	14	30	350	350	700	17

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

Effective From the Academic Year2018-2019 (R18 Regulations)

Final Year B.Tech (SEMESTER – VIII)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18CE801	Engineering Economics & Management	4	0	0	4	50	50	100	3
18—I--	Institution Elective-II	4	0	0	4	50	50	100	3
18CED51…54	Elective - V	4	0	0	4	50	50	100	3
18CED61…64	Elective – VI	4	0	0	4	50	50	100	3
18CELP02	Project -II	0	0	24	24	75	75	150	10
	TOTAL	16	0	24	40	275	275	550	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Elective-I :

18CED11	Advanced Structural Analysis
18CED12	Instrumentation and Sensor technology in Civil Engineering
18CED13	Sustainable Engineering & Technology
18CED14	Advanced Fluid Mechanics

Elective-II:

18CED21	Advanced Design of Structures
18CED22	Offshore Engineering
18CED23	Disaster preparedness and planning management
18CED24	Construction Engineering Materials

Elective-III:

18CED31	Pre stressed Concrete
18CED32	Environmental Geotechnics
18CED33	Low cost Housing Techniques
18CED34	Repair & Rehabilitation of Structures

Elective-IV

18CED41	Railway and Air Port Engineering
18CED42	Ground Water Development and Management
18CED43	Finite Element Analysis
18CED44	Solid and Hazardous Management

Elective-V :

18CED51	Advanced Environmental Engineering
18CED52	Bridge Engineering
18CED53	Water Resources Field Methods
18CED54	Ground Improvement Techniques

Elective-VI :

18CED61	Earthquake Resistant Design of Structures
18CED62	Environmental Impact Assessment and Management
18CED63	Pavement Analysis and Design
18CED64	Town planning and Architecture

Open Elective-I & II:

The students of CE will choose an Inter department Elective offered by other Departments.

Open Electives offered by Civil Engineering Department

Open Elective-I: 1) Air Pollution & Control 2) Rural Water Supply and Environment Sanitation
Open Elective-II: 1) Disaster Management 2) Remote Sensing & GIS

Institutional Elective-I (in VII semester – position as 6th theory subject)

18CEI01	Air Pollution & Control
18CEI02	Rural Water Supply and Environment Sanitation
18CSI01	Java Programming
18CSI02	Database Management Systems
18ECI01	Consumer Electronics
18ECI02	Embedded Systems
18EEI01	Application of Wavelets to Engineering Problems
18EEI02	Industrial Electrical Systems
18EII01	Principles & Applications of MEMS
18EII02	Power System Instrumentation
18ITI01	Data Analytics
18ITI02	Cyber Security
18MEI01	Fluid Power and Control Systems
18MEI02	Project Management
18MAI01	Linear Algebra
18PHI01	Nano - Materials and Technology
18PHI02	Fiber Optic Communication
18HUI01	System Thinking
18ELI01	English for Competitive Examinations
18ELI02	Professional Communication

Institutional Elective-II (in VIII semester – position as 3rd theory subject)

18CEI03	Disaster Management
18CEI04	Remote sensing & GIS
18CSI03	Python Programming
18CSI04	Computer Networks
18ECI03	Artificial Neural Network
18ECI04	Internet of Things (IoT)
18EEI03	High Voltage Engineering
18EEI04	Energy Auditing and Conservation
18EII03	Robotics and Automation
18EII04	Advanced Computer Control Systems
18ITI03	Mobile Application Developments
18ITI04	Web Technology
18MEI03	Non-Conventional Energy Sources
18MEI04	Automobile Engineering
18MAI02	Graph Theory
18PHI03	Advanced Materials
18PHI04	Optical Electronics
18HUI02	Organizational Psychology
18HUI03	Telugu Modern Literature
18ELI03	English Through Media

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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LINEAR ALGEBRA AND ODE
I B.Tech –I Semester (Code: 18MA001)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives:

1. To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.
2. Identify the type of a given differential equation and select and apply the appropriate Analytical technique for finding the solution of first order and higher order ordinary Differential equations.
3. Create and analyze mathematical models using first and second order differential equations to solve application problems that arises in engineering.
4. To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to

1. Apply elementary row operations to find the rank of a matrix, to solve a system of linear Equations and to find the inverse of a matrix.
2. Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher powers of the given matrix.
3. Solve separable, linear, exact differential equations with and without initial conditions.
4. Distinguish between linear and non-linear differential equation.
5. Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.
6. Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

UNIT - I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

[12 Hours]

UNIT - II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

[12 Hours]

UNIT – III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]

[12 Hours]

UNIT – IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

[12 Hours]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ADVANCED OPTICS AND MATERIAL TESTING
I B.Tech – I Semester (Code: 18PH002)
(Common for CE & MECH)

Lectures	4	Tutorial	1		Practical	0	Credits	4
Continuous Internal Assessment			:	50	Semester End Examination (3Hours)		:	50

Course Objectives:

1. To circulate the knowledge about the advanced optics and know its Engineering applications.
2. To familiarize the basis of quantum theory and to make students to solve the physical problems.
3. To classify solids and to have a basic idea about the structural determination of crystals.
4. To make aware of some of the analytical techniques for material testing.

Course Outcomes:

1. Student's ability to understand the principles in the production and application of lasers and their effective utilization in optical communications.
2. Students demonstrate appropriate competence and working knowledge of laws of modern physics in understanding advanced technical engineering courses.
3. Students demonstrate the ability to apply knowledge of band theory of solids and to make understand the concept of energy band gap and hole.
4. Ability to understand the crystal geometrics and estimation of crystal structure by X-ray diffraction technique.
5. Student's ability to understand the principle in the production and applications of ultrasonic and extend it for material testing using various nuclear techniques.

UNIT I

Advanced Optics

Lasers: Interaction of radiation with matter. Einstein co-efficients, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, Types of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.

Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibres based on modes and refractive index, V-number, losses associated with optical fibres, fibre optical communication, advantages of optical fibres

UNIT II

Quantum Mechanics: Dual nature of light, de-Brogli's concept of matter waves, Davisson-Germer electron diffraction experiment, Heisenberg Uncertainty principle and applications (non-existence of electron in a nucleus and finite width of spectral lines), one dimensional time-independent and dependent Schrödinger wave equations, physical significance of wave function, applications of time-independent Schrödinger wave equation to particle in a box(one dimensional), tunneling, the scanning tunneling microscope.

UNIT III

Band theory of solids and Structure determination

Band theory of Solids: Failures of classical free electron theory, success and failures of quantum free electron theory, Bloch theorem statement, Kronig-Penny model (without derivation), effective mass of electron, concepts of energy band gap and hole.

Structure determination: Crystal lattices (Bravias), Crystal systems and structures, planes, Miller indices, Bragg's law, structural analysis of crystals using X-Ray powder diffraction method (XRD).

UNIT IV

Ultrasonics and Nuclear Techniques

Ultrasonics: Properties of ultrasonics, General applications of ultrasonics.

Applications of Ultrasonic Testing: Weld inspection, Material analysis, corrosion testing, concrete under water measurements, Ultrasonic testing in the foundry industry.

NDT: Production of Ultrasonic waves, Pulse echo technique, time of flight diffraction technique, A –scan presentation, B- scan presentation, C –scan presentation.

Nuclear Techniques: Nuclear radio isotopes, Applications of radio isotopes (medical and industry) Properties of α,β,γ-rays and radiographic testing (NDT).

TEXT BOOKS:

1. A Text Book of Engineering Physics, M.N.Avadhanulu& P. Kshirsagar, S.Chand& Co., (Edition – 2013).
2. Engineering physics by S.O.Pillai

REFERENCE BOOKS:

1. Engineering physics by R.K.Gour and S.L.Gupta. Dhanpatrai publications.
2. Engineering physics by M.R.Sreenivasan. New age international publications.
3. Engineering physics by Palaniswamy. Scitech publications.
4. Basic Engineering physics by Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalayapublication
5. Applied physics by Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalaya publication
6. Engineering physics by Dr. D.Thirupathi Naidu, M. Veeranjaneyulu.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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INTRODUCTION TO CIVIL ENGINEERING
I B.Tech – I Semester (Code: 18CE103)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3Hours)			:	50

Course Objectives:

1. To provide a comprehensive overview of the component fields within civil engineering.
2. Expose students to current Civil Engineering projects and their societal implications.
3. Introduce students to professionalism through interaction with practicing professionals.
4. To give the students an illustration of the use and properties of various building materials and case studies of the construction materials.
5. To provide a sound foundation for the further study of measurement techniques and building surveying case study.

Course Outcomes: Students will be able to

1. Importance of Civil Engineering in the infrastructural development of the society.
2. Illustrate the types, uses, and properties of various building materials.
3. Explain the method of construction of different components of the building.
4. To impart the knowledge of the basic principles of section of site for building and building materials and their applications.
5. To impart the knowledge on the case studies on surveying aspect.

UNIT I

History of Civil Engineering, Relevance of Civil Engineering in the overall infrastructural development of the country.Various domains of Civil Engineering and courses of Civil Engineering.Roles and responsibilities of Civil Engineer in the society, Responsibilities of civil engineer in the protection of environment and preservation of natural resources. Opportunities in Civil Engineering and Recent Trends in Civil Engineering

UNIT II

Types and classification of structures – buildings, towers, chimneys, bridges, dams, retaining walls, soil, water tanks, roads, railways, runways and pipelines (Brief description only). Definition and types of buildings as per National Building Code of India (brief description only).

UNIT III

National Building Code (NBC) - Salient features, Site selection for buildings. Civil Engineering Materials- properties - uses– bricks, stones, cement Aggregates: Fine and coarse aggregate –

concrete –steel, roofing, flooring, plastering, Doors, Windows, Timber and Paints. Case studies on the materials employed for the aspect of construction.

UNIT IV

Surveying - Object and uses, Fundamental principles, Classification of surveying, Plans and maps, Scales, units of measure, Conventional symbols, measurement of distances angels levelling determination of areas. Case studies on surveying aspect.

Text Books:

1. Ramamrutham.S, Basic Civil Engineering, DhanapathiRai Publishing co.
2. Kandya.A.A., Elements of Civil Engineering.Charotar Publishing house.

Reference Books:

1. Rangwala S C and Ketki B Dalal, Building Construction, Charotar Publishing house.
2. McKay, W. B., and McKay, J. K., Building Construction Volumes 1 to 4, Person India Education Services.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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COMMUNICATIVE ENGLISH
I B.Tech – I Semester (Code: 18EL001)

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3Hours)			:	50

Course Objectives:

The course aims to upgrade the spoken and written English of the Civil Engineering students from an intermediate to advanced level, and to help them overcome their fear of public speech.

1. It will also focus on introducing the basic research skills and writing skills affiliated to research.
2. It also aims to inculcate confidence and to groom their personality so that they can aim at executive level jobs.
3. The career focus of this course is to build the combination of language and interpersonal skills needed to work independently, to lead teams effectively, and to become customer focused and result driven in their approach.
4. Special emphasis is also laid on developing individual and group effort through virtual and real life trainings, presentations, projects and research, especially towards developing their leadership qualities and the ability, to improve team functioning and team output.

Course Outcomes:

1. By the end of the course, students will be able to:
2. Use English language appropriately for functional skills like listening, reading, writing and speaking.
3. Demonstrate essential skills required for effective written and oral communication.
4. Construct grammatically correct sentences and the use of appropriate punctuation.
5. Use English idioms and phrasal verbs effectively.

UNIT-I

1.1 Vocabulary Development: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 Essential Grammar: Prepositions, Conjunctions, Articles
1.3 Basic Writing Skills: Punctuation in writing
1.4 Writing Practices: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 Vocabulary Development: Synonyms and Antonyms
2.2 Essential Grammar: Concord, Modal Verbs, Common Errors

2.3 Basic Writing Skills: Using Phrases and clauses
2.4 Writing Practices: Hint Development, Essay Writing

UNIT- III

3.1 Vocabulary Development: One word Substitutes
3.2 Essential Grammar: Tenses, Voices
3.3 Basic Writing Skills: Sentence structures (Simple, Complex, Compound)
3.4 Writing Practices: Note Making

UNIT- IV

4.1 Vocabulary Development: Words often confused
4.2 Essential Grammar: Reported speech, Common Errors
4.3 Basic Writing Skills: Coherence in Writing: Jumbled Sentences
4.4 Writing Practices: Paraphrasing & Summarizing

REFERENCE BOOKS

1. Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press:2011.
2. Practical English Usage, Michael Swan. Oxford University Press:1995.
3. Remedial English Grammar, F.T.Wood. Macmillan:2007.
4. Study Writing, Liz Hamplyons & Ben Heasley. Cambridge University Press:2006

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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BIOLOGY FOR ENGINEERS
I B.Tech – I Semester (Code: 18CE002)

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3Hours)			:	50

Course Objectives: To learn

1. To Describe the bio molecules present in living organisms
2. To Give awareness about the sterilization methods
3. It explains the importance of plants in the ecosystem
4. It gives an idea about the classifications of organisms
5. It explores the harmful and beneficial role of bacteria

Course Outcomes: Students will be able to

1. Explain the Morphology and chemical composition of the cell and function of each organelle present in the cell with the help of microscope.
2. Explain the process of human physiological system and its cell functioning.
3. Explain the importance of microbiology and immunological science to know the reactions of our body.
4. Discuss the biological science related to the different disciplinary areas.
5. Explain the importance of genetics and how bioscience is related to other technical areas.

UNIT-I

Introduction to biology; Classification of microorganisms- Two kingdom, Three kingdom & Five kingdom; Prokaryotic cell structure (Bacteria); Eukaryotic cell structure (Plant & Animal cells); Differences between Prokaryotes and Eukaryotes.

UNIT-II

Bacterial Growth Phases; Nutrition in Bacteria; Types of media; Bacteria - Binary Fission, Endospore Formation; Plant & Animal cell Division - Mitosis & Meiosis.

UNIT-III

Structure of DNA (Watson & Crick model); Types of DNA & Function of DNA; Structure of RNA & types of RNA; Differences between DNA & RNA.Types of proteins & structure of proteins.

UNIT-IV

Sterilization methods - Physical methods : Heat, Filtration, radiation; Chemical methods: Phenolics, alcohols, aldehydes, halogens, heavy metals, sterilizing gases, dyes. Economic importance of bacteria (Harmful & Beneficial aspects); Plants in Primary Health care - Tulasi, piper longum, Myrobalan, Aloe vera, Turmeric.

REFERENCES:

1. Prof. K.yadagiri., Dr. M. Manikya Lakshmi, "Botany" paper-I,II,III,IV (Telugu Akademi Coordinating Committee)
2. Presscott, "Microbiology"
3. Pelczar, "Microbiology"
4. Ananthanarayana, "Microbiology"

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

PHYSICS LABORATORY
I B.Tech– I Semester (Code:18PHL01)
(COMMON TO ALL BRANCHES)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment			50	Semester End Examination (3hours)			50

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si & Ge.
15. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual

TEXT BOOK:

1. Engineering physics laboratory manual P.Srinivasarao & K.Muralidhar, Himalaya publications.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

COMMUNICATION LAB
I B.Tech– I Semester (Code: 18ELL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment			50	Semester End Examination (3hours)			50

UNIT-I

1.1 Listening Skills; Importance – Purpose- Process- Types
1.2 Barriers to Listening
1.3 Strategies for Effective Listening

UNIT-II

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
2.2 Stress
2.3 Rhythm
2.4 Intonation

UNIT-III

3.1 Formal and Informal Situations
3.2 Expressions used in different situations
3.3 Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing- Convincing People- Complaining & Apologizing-Thanking Others- Shopping- Travelling- Conversational Gambits

UNIT-IV

4.1 JAM Session
4.2 Debates
4.3 Extempore

REFERENCE BOOKS:

1. Communication Skills, Sanjay Kumar and PushpaLata. Oxford University Press. 2011
2. Better English Pronunciation J.D. O' Connor. Cambridge University Press:1984
3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press:2015
4. English Conversation Practice, Grant Taylor. McGraw Hill:2001

SOFTWARE:

1. Buzzers for conversations, New Interchange series
2. English in Mind series, Telephoning in English
3. Speech Solutions, A Course in Listening and Speaking

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

COMPUTER PROGRAMMING LAB
(Civil Engineering)
I B.Tech – I Semester (Code: 18CSL01)

Lectures	2	Tutorial	0		Practical	3	Credits	2	
Continuous Internal Assessment			:	50	Semester End Lab Examination (3 Hours)			:	50

Prerequisites: Basic Mathematics

Course Objectives: To learn

1. Geometrical Approach to the mean value theorems and their application to the mathematical problems.
2. Concept of Sequence and Series
3. Evaluation of improper integrals using Beta and Gamma functions
4. Evaluation of multiple integrals and their applications
5. Basic properties of vector point function and their applications to line, surface and volume integrals

Course Outcomes: Students will be able to

1. Solve problems involving mean value theorems
2. Analyze the nature of convergence of sequence and series
3. Evaluate integrals using special functions and change of variables
4. Evaluate double and triple integrals
5. Transform line integral to surface and surface to volume integrals

UNIT – I

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O operations.

Programming Exercises for Unit I:C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, filling the blanks in a given program. Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, computation of electricity bill and conversion of lower case character to its upper case.

UNIT II

Decision Making and Branching, Decision Making and Looping

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence.

UNIT III

Data Structures: Arrays, Character Arrays and Strings

Programming Exercises for Unit III: Computation of statistical parameters of a given list of numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not. Transpose of a matrix, product and sum of matrices and sorting of names using arrays. Sorting a list of names using character array.

UNIT IV

User-defined Functions

Programming Exercises for Unit - IV: Functions - Insertion sort, Linear search. Recursive functions to find factorial & GCD (Greatest Common Divisor)

TEXT BOOK:

1. Programming in ANSI C by E. Balaguruswamy, Seventh Edition. TMH

REFERENCE BOOKS:

1. Kernighan BW and Dennis Ritchie M, “C programming language”, 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, “Let us C”, BPB Publications.
3. Herbert Schildt, “C: The Complete Reference”, 4th edition, Tata Mcgraw-Hill.
4. Ashok N.Kamthane, “Programming in C”, PEARSON 2nd Edition

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

NUMERICAL METHODS AND ADVANCED CALCULUS
I B.Tech –II Semester (Code: 18MA002)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives:

1. To learn about some advanced numerical techniques e.g. solving a nonlinear equation,
2. Linear system of equations, Interpolation and Approximation techniques.
3. To learn about evaluation of double and triple integrals and their applications.
4. To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

Course Outcomes: Students will be able to

1. Solve non-linear equations in one variable and system of linear equations using iteration methods.
2. Choose appropriate interpolation formulae based on the given data.
3. Compute the value of a definite integral using numerical integration techniques.
4. Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
5. Evaluate the double and triple integrals using change of variables.
6. Transform line integrals to surface and surface to volume integrals and evaluate them.

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi's iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1; 28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton's interpolation formulae: Newton's forward interpolation formula, Newton's backward interpolation formula; Interpolation with unequal intervals; Lagrange's interpolation formula; Divided differences; Newton's divided difference formula; Numerical integration; Trapezoidal rule; Simpson's one-third rule; Simpson's three-eighth rule; Numerical solution of ODE's: Introduction; Picard's method; Euler's method; Runge-Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem(without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. ErwinKreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

ENGINEERING CHEMISTRY
(Common to all branches)
I B.Tech – II Semester (Code: 18CY001)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives: The student should be conversant

1. With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.
2. To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.
3. With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics.
4. With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

Course Outcome: After studying this course, students will be able to

1. Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.
2. Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.
3. Have the capacity of applying energy sources efficiently and economically for various needs.
4. Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

UNIT I

Water Chemistry
Introduction: water quality parameters
Characteristics: Alkalinity, Hardness - Estimation & simple numerical problems,
Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;
Internal conditioning- Phosphate, calgon and carbonate methods.
External conditioning - Ion exchange process & Zeolite process
WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, Ozonization and UV treatment.
Salinity – Treatment of Brackish water by Reverse Osmosis and Electro dialysis.

UNIT II

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and freeenergies. Free energy and emf. Cell potentials, the Nernst equation and applications.

Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au)& electoless Ni plating.

UNIT III

Classification of fuels; Calorific value of fuels (lower, higher)

Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,

Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti-knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages

Gaseous fuels: CNG and LPG,

Flue gas analysis – Orsat apparatus.

UNIT IV

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules) , elimination (E_1& E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC.

Bio degradable polymers: types, examples-Polyhydroxybuterate (PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 17^{th} edition (2017).
2. Seshi Chawla, "Engineering Chemistry" DhanpatRai Pub, Co LTD, New Delhi 13 th edition, 2013.

REFERENCES:

1 Essential Of Physical Chemistry by Arun Bahl, B.S. Bahl, G.D.Tuli, by ArunBahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12^{th} Edition, 2012.

2 Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

3 Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

ENGINEERING MECHANICS
(CIVIL ENGINEERING)
I B.Tech – II Semester (Code: 18CE203)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: PHYSICS

Course Objectives: To learn

1. The concepts Force systems, free body diagrams, resultant of forces and equations of equilibrium, Supports and support reactions and calculation of Centroid
2. The Concept of moment of inertia of plane figures, Laws and applications of friction
3. The Analysis of the truss and determination of axial forces by Method of Joints
4. Motion of a body and their relationships and application of D Alembert's principle in rectilinear and curvilinear motions
5. About Mass moment of inertia of material bodies, Plane motion of a body about a fixed axis

Course Outcomes: Students will be able to

1. Construct free body diagrams and use appropriate equilibrium equations, Calculate unknown forces in a plane by resolution of force and equilibrium equations
2. Locate Centroid of composite figures and determine moment of plane figures
3. Analyze the systems with friction
4. Determine the axial forces in the members of determinate truss. Calculation of acceleration, velocity and displacement and forces
5. Determine moment of inertia of material bodies, Calculation of angular displacement, velocity and angular acceleration of rotational bodies.

UNIT – I

Concurrent Forces in a Plane

Principles of statics – composition and resolution of forces – equilibrium of concurrent forces in a plane –Method of moments.

Parallel Forces in a Plane

Two parallel forces – general case of parallel forces in a plane – center of parallel forces – Centroids of composite plane figures and curves-

UNIT – II

Moments of Inertia of Plane Figures

Moment of inertia of a plane figure with respect to an axis in its plane – Moment of Inertia with respect to an axis perpendicular to the plane of the figure – Parallel axis theorem.

Friction

Characteristics of friction – problems involving dry friction, ladder friction and wedge friction.

UNIT – III

Analysis of Plane Trusses

Trusses types – Axial forces finding in the members using method of joints.

Kinematics and Kinetics of a particle

Kinematics of rectilinear motion – principles of dynamics – Differential equations of rectilinear motion, D'Alemberts principle -Kinematics of curvilinear motion – Differential equations of curvilinear motion – D'Alembert's principle.

UNIT – IV

Moments of Inertia of Material Bodies

Moment of inertia of a rigid body – Moment of inertia of a lamina – Moments of inertia of three – dimensional bodies.

Rotation of a Rigid Body about a Fixed Axis

Kinematics of rotation – Equation of motion for a rigid body rotating about a fixed axis – D'Alembert's principle.

TEXT BOOK

1. Engineering mechanics by S. Timoshenko and D. H. Young – McGraw-Hill International edition (For concepts and symbolic problems)
2. Engineering mechanics statics and dynamics by R. C. Hibbeler and Ashok Gupta – Pearson (For numerical problems using S.I. system of units)

REFERENCE BOOKS

1. Vector mechanics for engineers statics and dynamics by Beer and Johnston, Tata McGraw-Hill publishing company, New Delhi
2. Engineering mechanics statics and dynamics by A. K. Tayal – Umesh publication, Delhi (For numerical problems using S.I. system of units

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

ENVIRONMENTAL STUDIES
I B.Tech – II Semester (Code: 18CE001)

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives: To learn

1. To develop an awareness, knowledge, and appreciation for the natural environment.
2. To understand different types of ecosystems exist in nature.
3. To know our biodiversity.
4. To understand different types of pollutants present in Environment.
5. To know the global environmental problems.

Course Outcomes: Students will be able to

1. Develop an appreciation for the local and natural history of the area.
2. Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
3. Know how to manage the harmful pollutants.
4. Gain the knowledge of Environment.
5. Create awareness among the youth on environmental concerns important in the long-term interest of the society

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries).

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. Chipko movement case study

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. Silent Valley Project and Narmada Bachao Andolan case studies

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Field work on Rain water harvesting and Watershed management.

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Chernobyl Nuclear Disaster case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermin composting.

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.

UNIT – IV

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment. Environmental Standards (ISO 14000, etc.)
Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare).

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.

TEXT BOOKS:

1. "Environmental Studies" by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. "Comprehensive environmental studies"- JP Sharma, Laxmi Publications.
3. Text Book of environmental Studies – ErachBharucha

REFERENCE BOOKS:

1. "Environmental studies", R.Rajagopalan, Oxford University Press.
2. "Introduction to Environmental Science", Anjaneyulu Y, B S Publications
3. "Environmental Science", 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ELECTRICAL TECHNOLOGY & MECHANICALTECHNOLOGY
I B.Tech – II Semester (Code: 18CE205)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives:

1. To introduce concepts of DC and AC circuits and electromagnetism.
2. To make the students understand the concepts and working of single-phase transformers, DC motor and generators.
3. To understand fundamentals of mechanical engineering related to civil engineering
4. To make the students understand the concepts and working of Thermal Prime Movers and Compressors

Course Outcomes: After the completion of the course the students will be able to

1. Apply networks laws and theorems to solve electric circuits & Analyze transient and steady state response of DC circuits.
2. Signify AC quantities through phasor and compute AC system behaviour during steady state, Explain and analyze the behaviour of transformer and elucidate the principle and characteristics of DC motor and DC generator.
3. To discuss specifications of mechanical engineering equipment used in civil engineering projects.
4. To sketch layout of mechanical engineering equipment for a simple civil engineering project.

Part- A: ELECTRICAL TECHNOLOGY

UNIT – I

Electrical circuit elements (R, L and C), Definitions of voltage and current, Power & Energy, Kirchhoff current and voltage laws, Direct Current; Alternating Current; Comparison between Half wave & Full wave Rectifiers, Advantages of Alternating Current. Have wave and Full wave Rectifiers.

Electrical Machines: Constructional details, Working Principle & Applications of DC Generators & Motors. Constructional details, working & Applications of Transformers.

UNIT – II

Electrical Machines (Contd.): Constructional details, Working Principle & Applications of Alternators, Three phase and single phase Induction Motors.

Transmission Lines: Necessity of Transmission Lines, Types of Towers; sad and stress in overhead conductors at level supports; sag span curves, effect of wing on sag.

Part- B: MECHANICAL TECHNOLOGY

UNIT – I

Transmission of Power: Belt drives: Velocity ratio, Slip, Ratio of tensions, Power transmitted, Creep.

Principles of Manufacturing Processes: Casting, Rolling, Drawing, Turning, Drilling, Milling, Welding & Soldering.

UNIT – II

Thermal Prime movers: Principle and operation of I.C Engines, Working of 2-S, 4-S, S.I and C.I engines, comparison of S.I & C.I, 2-S & 4-S engines, Brief introduction to civil construction equipment.

Compressors: Operation and application of single stage and multistage reciprocating air compressors.

TEXT BOOK: Engineering Basics by T.Thyagarajan, K.P. SendurChelvi and T.R. Rangaswamy, New Age International Ltd.

TEXT BOOK : Elements of Mechanical Engineering by Mathur, Mehta &Tewari, Jain Brothers, New Delhi.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

ENGINEERING GRAPHICS
I B.Tech – II Semester (Code: 18MEL01)

Lectures	1	Tutorial	0	Practical	4	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course Objectives: To learn

1. Clear picture about the importance of engineering graphics in the field of engineering
2. The drawing skills and impart students to follow Bureau of Indian Standards
3. To give an idea about Geometric constructions, Engineering curves, orthographic projections and pictorial projections
4. Imagination skills about orientation of points, lines, surfaces and solids
5. Basic drafting skills of AutoCAD

Course Outcomes: Students will be able to

1. Draw projections of points and projections of lines using Auto CAD
2. Plot projections of surfaces like circle, square and rhombus
3. Plot the Projections of solids like Prisms and pyramids
4. Convert the of Orthographic views into isometric views of simple objects
5. Generate the of pictorial views into orthographic views of simple castings

UNIT – I

Introduction: Introduction to Drawing instruments and their uses, geometrical construction procedures

Introduction To Autocad:

Basics of sheet selection, Draw tools, Modify tools, dimensioning

Method Of Projections: Principles of projection - First angle and third angle projectionof points. Projection of straight lines.Traces of lines.

UNIT II

Projections Of Planes: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon.

UNIT – III

Projections Of Solids: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones Inclined to one plane. .

UNIT –IV

Isometric Projections: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only).

UNIT –V

Orthographic Projections: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

TEXT BOOK:

1. Engineering Drawing with AutoCAD by Dhananjay M. Kulkarni (PHI publication)
2. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)

REFERENCE BOOKS:

1. Engineering Drawing by Dhananjay A Jolhe, Tata McGraw hill publishers
2. Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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CHEMISTRY LABORATORY
(Common to all branches)
I B.Tech – II Semester (Code: 18CYL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
    a. Estimation of Washing Soda.
    b. Estimation of Active Chlorine Content in Bleaching Powder
    c. Estimation of Mohr's salt by permanganometry.
    d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. **Analysis of Water:**
    a. Determination of Alkalinity of Tap water.
    b. Determination of Total Hardness of ground water sample by EDTA method
    c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
    a. Estimation of Acid Value
    b. Estimation of Saponification value
5. **Preparations:**
    a. Preparation of Soap
    b. Preparation of Urea-formaldehyde resin
    c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
    a. Determination of $p^H$of given sample.
    b. Determination of conductivity of given sample by conductometer.
    c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5^{th} edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

WORKSHOP
I B.Tech – II Semester (Code: 18MEL02)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Course Objectives:

1. To impart student knowledge on various hand tools for usage in engineering applications.
2. Be able to use analytical skills for the production of components.
3. Design and model different prototypes using carpentry, sheet metal and welding.
4. Make electrical connections for daily applications.
5. To make student aware of safety rules in working environments.

Course Outcomes: After completion of this course student should be able to:

1. Make half lap joint, Dovetail joint and Mortise &Tenon joint
2. Produce Lap joint, Tee joint and Butt joint using Gas welding
3. Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
4. Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring.

Syllabus:

1. Carpentry
   a. Half Lap joint
   b. Dovetail joint
   c. Mortise &Tenon joint
2. Welding using electric arc welding process/gas welding
   a. Lap joint
   b. Tee joint
   c. Butt joint
3. Sheet metal operations with hand tools
   a. Trapezoidal tray
   b. Funnel
   c. T-joint
4. House wiring
   a. To control one lamp by a single switch
   b. To control two lamps by a single switch
   c. Stair-case wiring

TEXT BOOKS:

1. P.Kannaiah and K.L.Narayana, Workshop Manual, SciTech Publishers, 2009.
2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PROBABILITY AND STATISTICS
II B.Tech – I Semester (Code: 18MA003)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To provide principles of statistical methods and probability concepts that serves the foundations for the applications of methods in engineering.
2. To educate the student on the applications of various ttests to various problems in the field of engineering.
3. To educate the student on the application of completely randomized designs (CRD) and randomized block designs (RBD) to different realistic problems in the field of engineering.
4. To motivate the student on the applications of single and multiple regression analysis to the regression model arising in the field of engineering.

Course Outcomes:

1. Understand the basic concept of Statistics probability and their need in engineering
2. Application of Probability and Statistics for understanding andanalysis of different engineering problems
3. Analyze the concepts of discrete and continuous random variables, probability distributions, expectation and variance.
4. Determine the binomial distribution to find mean and variance.

UNIT- I

Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Gamma Distribution and its applications, Beta Distribution and its applications, Joint Distributions (Discrete),Joint Distributions (Continuous).Populations and Samples, Law of large numbers, Central limit theorem and its applications, The sampling distribution of the mean (σ unknown),The sampling distribution of the variance.
(Sections 5.1, 5.2, 5.3, 5.5, 5.7, 5.8, 5.10, 6.1, 6.2, 6.3, 6.4 of Text Book [1])

UNIT – II

Point estimation, Interval estimation, Tests of Hypotheses, Null Hypothesis and Tests of hypotheses, Hypothesis concerning one mean, Comparisons-Two independent Large samples, Comparisons-Two independent small samples, Paired sample t test.
(Sections 7.1, 7.2, 7.4, 7.5, 7.6, 8.2, 8.3, 8.4 of Text Book [1])

UNIT-III

The estimation of variances, Hypotheses concerning one variance, Hypotheses concerning two variances, Estimation of proportions, Hypotheses concerning one proportion, Hypotheses concerning several proportions, Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- one way classification(Completely randomized designs), Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- two way classification(Randomized block designs).
(Sections 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 12.2, 12.3 of Text Book [1])

UNIT –IV

Multivariate Analysis: The concept of bivariate relationship, scatter diagram, Pearson's correlation and correlation matrix. Simple linear regression model and assumptions, Least Squares Estimation of the parameters of the model, Testing the significance of the model. Regression versus Correlation, Multiple linear regression model with k explanatory variables and assumptions of the model. Least Square Estimation of regression coefficients. Concept of the coefficient of determination R^2. Test for significance of the regression model and individual regression coefficients. Applications of multiple regression analysis.
(1^{st} and 2^{nd} Chapters of Text Book [2]).

TEXT BOOKS:

1. Miller & Freund's "Probability and Statistics for Engineers", Richard A. Johnson, 8^{th} Edition, PHI.
2. Introduction to Linear Regression Analysis, Douglas C. Montgomery, E.A. Peck and G.G. Vining, 3^{rd}edition, Wile

REFERENCE BOOKS:

1. R.E Walpole, R.H. Myers & S.L. Myers 'Probability & Statistics for Engineers and Scientists', 6^{th} Edition, PHI.
2. Fundamentals of Mathematical Statistics, S.C.Gupta and V.K.Kapoor,11^{th} Edition, Sultan Chand & Sons.
3. Murray R Spiegel, John J.Schiller, R. AluSrinivasa, 'Probability &Satistics', Schaum's outline series.
4. K.V.S.Sarma,'Statistics Made Simple – Do it yourself on PC',Prentice Hall India, Second Edition, 2015.

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SURVEYING
II B.Tech – I Semester (Code: 18CE302)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To study the basics of linear/angular measurement methods like chain surveying, compass surveying.
2. To study the basics of leveling and theodolite survey in elevation and angular measurements.
3. To determine the relative positions of the existing features on the ground.
4. To deal with various methods employed for the measurement of areas and volumes.
5. To study different methods of setting & design of simple circular curves.
6. To introduce about EDM, Digital theodolite and total station.

Course Outcomes: At the end of course student will able to:

1. To determine the relative positions of a point on the existing ground by conducting the survey.
2. To take the levels of existing ground and to determine the reduced levels.
3. To minimize the errors while taking measurements.
4. To gain knowledge about computation of areas, volumes and methods of traversing
5. To know about the latest Surveying Instruments.
6. To design and layout curves for a roads and railways.

UNIT –I

Chain survey-Terminology-Ranging-methods, Chain & tape corrections-problems, obstacles in chaining Errors in surveying- Types & sources of errors. Compass survey-Bearings-Types of compass-F.B-B.B-Local attraction-Problems on local attraction, Declination.

UNIT –II

Theodolite traverse- Types of traverse- Checks in closed & open traverse- Latitude and Departures-Error of closure-Problems on omitted measurements.
Levelling-Classification of levelling-Terminology-Types of levels-booking and reducing levels & Probelems.

Contouring: Methods-Characteristics, uses;

UNIT –III

Areas & Volumes- Area of tract with straight & irregular boundaries by various formulae- Volume of level & two level sections- Problems.
Triangulation –classification- Baseline – site selection for base line- Classification of Signals.Satellite station - reduction to Centre.

UNIT –IV

Setting out curves: Types, elements of simple circular, Compound & Reverse curves.
Principle of Electronic Distance Measurement, Types of EDM instruments, Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey,

TEXT BOOKS:

1. Arora, K.R. I, Surveying, Vol-I, II and II, Standard Book House, 2015.
2. Surveying Vol. I&II by B.C. Punmia ,Laxmi Publications,2005

REFERENCES:

1. Chandra A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
2. C. Venkatramaiah, Text Book of Surveying, Universities Press Pvt Ltd, Hyderabad. Revised Edition 2011.
3. Madhu N., Sathikumar, R. and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.

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SOLID MECHANICS
II B.Tech – I Semester (Code: 18CE303)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course objectives: The objective of this Course is

1. To explain fundamental concepts such as stress, strain, elastic constants, compatibility, thermal stresses etc.
2. To understand the stresses and strains in thin cylinders and spherical shells.
3. To draw the shear force and bending moment diagrams for beams.
4. To understand simple bending theory, flexural stresses and shear stresses.
5. To understand torsion and stresses developed by torsion on circular shafts and application of strain energy principles on springs.

Student Learning Outcomes: On completion of the course the student will be able to

1. Analyse solids subjected to forces both direct and indirect, and understand their behavior by interpreting stress, strain, elastic constants etc.
2. Analyse and design thin walled pressure vessels.
3. Draw shear force and bending moment diagrams for beams subjected to different forces.
4. Apply simple bending theory to analyse and design beams of various sections and apply shear stress formula for members subjected to flexure.
5. Apply torsion formula to analyse and design circular shafts and springs

UNIT-I

1. Simple Stress And Strain

Elasticity and plasticity - Types of stresses & strains - Hooke's law - stress - strain diagram for mild steel –Allowable stress-Factory of safety - Normal strain, Poisson's ratio & volumetric strain - Elastic moduli & the relationship between them - Bars of varying section – composite bars - Temperature stresses

2. Thin Walled Pressure Vessels

Thin cylinders - circumferential and longitudinal stresses and strains - Spherical pressure vessels.

UNIT-II

3. Internal Forces In Beams

Introduction – Diagrammatic conventions for supports and loads – Calculation of beam reactions – Application of method of sections – Shear force in beams – Bending moment in beams – Shear force and bending moment diagrams

UNIT-III

4. Bending Stresses in Beams

Introduction – Basic assumptions – the elastic flexure formula – application of flexure formula

5. Shear Stresses in Beams

Introduction – Shear flow –The shear stress formula for beams – Shear stress in beam flanges- Shear center

UNIT-IV

6. Torsion

Introduction - Application of the method of sections - Torsion of circular elastic bars - Basic assumptions - the torsion formula - Design of circular bars in torsion for strength - Angle of twist of circular bars –strain energy due to torsion

7. Strain Energy

Introduction-Elastic strain energy for uni-axial stress- Strain energy of beams in shear-Strain energy for multi-axial state of stress.

8. Springs

Types of springs - stresses in closely coiled helical springs-Deflection of closely coiled helical springs.

TEXT BOOKS:

1. Engineering mechanics of solids by E.P.Popov, Prentice Hall of India, 2005.
2. Strength of Materials by R. Subramanian., Oxford University Press, Third Edition, 2016.

REFERENCE BOOKS:

1. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd., 2005.
2. Strength of materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd., 1998.
3. Strength of materials by S. Ramamrutham, Dhanpat Rai Publishing Company Pvt. Ltd., 2011

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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BUILDING MATERIALS, PLANNING AND CONSTRUCTION
II B.Tech – I Semester (Code:18CE304)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course objectives

1. Develop knowledge of material science and behaviour of various building materials used in construction.
2. Identify the construction materials required for the assigned work.
3. Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc.
4. List the requirements and different types of stairs.

Course outcomes

1. Predict the properties of building stones and its classifications.
2. Understand the concept of various methods of manufacture of bricks.
3. Identify rock using basic geological classification systems.
4. Obtain differentiate the fine aggregates and coarse aggregates under various views.
5. Explain various types of cements and their applications in construction. Various field and laboratory tests on cement.
6. Analyse the importance of mineral and chemical admixtures, requirements of the concrete in construction.
7. Explain different types of lintel, arches and the materials which are commonly used for construction.
8. Explain the suitability of floors in buildings like mosaic flooring, terrazzo flooring, rubber flooring, asphalt flooring.
9. Understand the different types of trusses, RCC roofs, and madras terrace/shell roofs.
10. Explain the foundations and uses of different types of foundations.

UNIT – I

1. Stones

Qualities of a good building stone, Common building stones of India.

2. Bricks

General; Composition of good brick earth; Harmful ingredients in brick earth; Manufacture of bricks by clamp burning and kiln (only Hoffman's kiln) burning, Qualities of good bricks; Tests for bricks; Classification of bricks; Size and weight of bricks

3. Lime

General; Some definitions; Sources of lime; Constituents of limestones; Classification of limes; Properties of fat lime and hydraulic lime;

4. Timber

Definition; Structure of a tree; Qualities of good timber; Decay of timber; Preservation of timber; Advantages of timber construction; Uses of timber;

UNIT –II

5. Stone & Brick Masonry

Technical terms; Types of bonds in brickwork and their suitability. Classification of stone masonry

6. Walls

Classification of walls.

7. Floors

Technical terms; Types of ground floors

8. Roofs

Technical terms; Classification of roofs; Steel sloping roofs; Roof covering materials; Types of flat roofs;

UNIT –III

9. Staircases

Technical terms; Types of stair-cases, design considerations.

10. Dampness And Damp Proofing

Causes of dampness; Methods of preventing dampness; Damp proofing materials and their classification; Methods of providing DPC under different situations.

11. Scaffolding, Shoring, Under Pinning and Form Work

Types of scaffolding; Types of form work; Centering.

UNIT –IV

12. An Approach To Planning

Site planning; Space requirement–Establishing areas for different units, Furniture requirements, Roominess, Flexibility, Sanitation, Lighting, Ventilation, Space for equipment for air–conditioning, Space for machinery etc.; Flow diagram and line plan–Grouping, Circulation, Orientation, Aspect and prospect, Privacy, Elegance and economy; Climatic considerations; Architectural composition–Unity, Mass composition, Contrast, Proportion, Scale, Accentuation and rhythm.

13. Building Rules And Bye–Laws

Zoning regulations; Regulations regarding layouts or sub-divisions; Building regulations; Rules for special type of buildings; Calculation of plinth, floor and carpet area; Floor space index.

15. Building Elements

Conventional signs; Guidelines for staircase planning; Guidelines for selecting doors and windows; Terms used in the construction of door and window.

TEXT BOOKS

1. Engineering Materials by S. C. Rangwala; Charotar Publishing House, Anad.
2. Building construction by B. C. Punmia et all; Laxmi Publications, New Delhi.
3. Planning and Designing Buildings by Yashwant S. Sane, Allies Book Stall.

REFERENCE

1. Building Drawing by M.G. Shah, C.M. Kale and S.Y. Patki, Tata McGrqw-Hill, New Delhi.
2. Building Materials by SK Duggal

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FLUID MECHANICS
II B.Tech – I Semester (Code: 18CE305)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To familiarize with the properties of fluids and the applications of fluid mechanics.
2. To formulate and analyze problems related to calculation of forces in fluid structure interaction with the application of the energy equation.
3. Ability to understand types of flows and analyze fluid flow problems and Concept of Boundary Layer.
4. To determine the losses in a flow system and flow through pipes.

Course Outcomes: Students will be able to

1. Get knowledge of basic principles of fluid mechanics.
2. Analyze fluid flow problems with the application of the energy equation.
3. Know the concept of fluid measurement and aware of the concepts related to boundary layer theory.
4. Analyze and design simple pipe systems.

UNIT I

Properties of Fluids: Specific gravity, viscosity, surface tension and Capillarity.
Fluid Statics: Pascal's law, hydrostatic law, measurement of pressure-simple and differential manometers, Total pressure and centre of pressure on vertical, horizontal and Inclined surfaces.
Buoyancy: Meta-centre and meta-centric height**,** Stability of submerged bodies and floating bodies.

UNIT II

FluidKinematics: Classification of flows: Steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; Streamline; Path line; Streak line; Continuity equation; Velocity potential and stream function.
Fluid Dynamics: Euler's equation of motion; Bernoulli's equation.
Flow Measurement in Pipes: Discharge through a venturimeter and orificemeter; Measurement of velocity by pitot tube.

UNIT III

Orifice and Mouthpiece: Introduction to orifices (Small and large) and mouth pieces.

Notches: Discharge over a Rectangular and Triangular notch.

Boundary Layer Theory: Boundary layer concepts, Characteristics of boundary layer along a thin flat plate, laminar and turbulent Boundary layers, separation of Boundary layers.

UNIT IV

Flow Through Pipes: Momentum equation, Force exerted by flowing fluid on pipe-bend, major and minor energy losses, hydraulic gradient and total energy line, pipes in series and parallel; Reynolds's experiments of pipe flow.

TEXT BOOKS:

1. Hydraulics and Fluid Mechanics by P. N. Modi & S. N. Seth; Standard book house; New Delhi
2. Fluid Mechanics and Hydraulic Machines by R. K. Bansal; Laxmi Publications; New Delhi.

REFERENCE BOOKS:

2. Fluid Mechanics by A. K. Jain; Khanna Publishers, Delhi, 2008
3. Fluid Mechanics by Streeter and wyile, Mc Grawhil Publications.
4. Fluid Mechanics by S K Som & G Biswas (TMH)

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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INDIAN CONSTITUTION
II B.Tech – I Semester (Code :18HU001)

Lectures	2	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To provide basic information about fundamental law of the country.
2. To educate the student about fundamental Rights and fundamental duties of citizens.
3. To educate the students about Government organs, methods of functioning
4. To motivate students to leave narrow selfish outlook and inculcate broad national, human outlook.

Learning out Comes: Upon the successful completion of the course the student will be able to

1. Able to understand the importance of the constitution in a Democratic Society.
2. Understand the Fundamental Rights and make the best use of them.
3. Understand the duties of a citizen and discharge his duties and became a good citizen.
4. Know about Judicial supremacy and Independence of judiciary and fight for his legitimate Rights through court of law.
5. As a citizen he can participate in the democratic process of governance.
6. Participate in nation building activities and be away from destructive outfits.

UNIT-I

1. Meaning of the constitutional law and constitutionalism.

2. Historical perceptive of the constitution of India

3. Salient features and characteristics of the constitution of India.

4. Preamble, union and its territory and citizenship.

UNIT – II

5. Fundamental rights principles.

6. Directive principles of state policy.

7. Fundamental Duties.

8. The government of the union, the president, The Prime Minister, and the council of ministers, The parliament of India, The supreme court, the union judiciary

UNIT – III

9. The Machinery of Government in the states, The Governor, The Chief Minister and council of Ministers, The State legislature, High court, Judiciary in the states

10. Union territories.

11. The Federal System, Division of powers between centre and states, Legislative Administration and financial relation.
12. Emergency Provisions, President Rule, National Emergency, Financial Emerging
13. Local self Government, Panchayat Raj, Municipalities and municipal Corporation.

UNIT IV

13. Local self Government, Panchayat Raj, Municipalities and municipal Corporation

14. Miscellaneous Provisions, The comptroller and Auditor general of India, The Public Service Commission, Special Provisions relating to certain classes, Elections – Political parties.

15. Amendment of the Constitution.

REFERENCE BOOKS:

1. Constitutional Government in India - M V Pylee – Asia Publishing House
2. Indian Government and Politics – D C Dasgupta. Vikas Publishing house
3. The Oxford Hand Book of the Indian Constitution, Sujit Chowdary, Madhav Khosla Pratapabhem Mehla.
4. Constitutional question in India ; The President , Parliament and the States – Noorani A G – Oxford.
5. Indian Constitution and its features – Astoush Kumar, Anmol Publishers
6. The Constitution of India – Bakshi P M – Universal Law Publishers
7. Legelect's the constitution of India – Ramnarain Yadav, K K Legelest Publication

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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BUILDING DRAWING LABORATORY
II B.Tech – I Semester (Code :18CEL31)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To learn basic commands of Auto CAD software.
2. To draw conventional signs, symbols of materials used in a building drawing.
3. To draw the building elements like door, window, foundation and staircase etc
4. To draw plan, section and elevations of buildings and various building components.

Course Outcomes:

1. Basic Auto CAD commands.
2. Various conventional signs, symbols of materials and building elements like door, window and foundation etc.
3. An ability to understand principles of planning, principles of building bye-laws and ability to draw the line diagrams as per National Building Code.
4. Drawing plan, section and elevations of buildings and various building components.

PART A: Basics and introduction to building drawing:

Introduction to building drawing, Importance of building drawing, scale , legend, direction, units limits, definition-plan, section, elevation, plotting, Learning basic commands of AUTO CAD software.

PART B: Using drawing tools and Auto cad software:

(1) Drawing conventional signs.
(2) Drawing and guidelines for door, window,
(3) Drawing and guidelines for staircase and foundation.
(4) Draw Plan, sections and Elevation of a single room building.
(5) Drawing plan, sections and Elevation of single storey residential building.
(6) Drawing plan, sections and Elevation of two storied residential building.

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ENGINEERING GEOLOGY LABORATORY
II B.Tech – I Semester (Code :18CEL32)

Lectures	2	Tutorial	0	Practical	3	Credits	2
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To Identify the Formation of Minerals.
2. To Understand the Megascopic Identification of Rocks and Minerals.
3. To Understand Geological Maps.
4. To inspire the students to think clearly and critically the solution of the civil engineering problems in the context of geological knowledge

Course Outcomes: Students will be able to

1. Ability to categorize rocks and minerals by their origin and engineering properties.
2. Ability to apply geological principles to rock masses and discontinuities for use in engineering design e.g. rock slopes, foundation.
3. Measure strike and dip of the bedding planes
4. Interpret geological maps
5. To inspire the students to think clearly and critically the solution of the civil engineering
6. Problems in the context of geological knowledge.

Theory:

1. Fundamentals of Photogrammetry, Study of Satellite imageries and SOI Toposheets.
2. Branches of Geology& Weathering.
3. Brief View on Mineralogy, Petrology, Structural Geology.
4. Geophysical Investigations

List of Experiments:

1. Fundamentals of Photogrammetry and Photo interpretation – types of photographs; Vertical photographs
2. Study of Survey of India Topographical Maps
3. Interpretation of Contour maps
4. Study of Satellite Imageries
5. Megascopic identification of minerals
6. Identification of Igneous rocks
7. Identification of Sedimentary rocks
8. Identification of Metamorphic rocks
9. Structural Geology-Problem on strike, Dip.
10. Study and Observation of folds, faults and joints.
11. Structural Geology-Completion of outcrops maps, order of superposition.

Demo & Calculation only:

12. Seismic Hammer Sounding Method
13. Electrical Resistivity Method (Vertical Electrical Sounding)

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SURVEYING LABORATORY
II B.Tech – I Semester (Code: 18CEL33)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To measure chainage of a line using tape and chain and recording of details along the chain line.
2. To find the included angles and local attraction of traverse by using compass.
3. To determine the elevation difference between two points & eliminate errors due to curvature of earth and refraction.
4. To plot a building by using plane table surveying.
5. To measure the horizontal and vertical angles of various points by theodolite.

Learning Outcomes: By the end of the course the students will be able

1. To perform basic field surveys.
2. To prepare a plan of residential building by making use of a chain and compass.
3. To gain excellence in using Auto level, theodolite instruments.
4. To take the levels of existing ground
5. To prepare the plan or map showing the ground features from the data obtained by surveying.

EXPERIMENTS

1. Measurement of area of the plot using Cross staff survey.
2. Traversing by compass and its adjustment.
3. Determination of inaccessible distance using compass survey.
4. Measurement of Horizontal angle by using theodolite.
5. Measurement of Vertical angle by using theodolite.
6. Determination of inaccessible distance using theodolite survey.
7. Determination of difference between two points by simple leveling.
8. Determination of difference between no. of points which are at diff distances by differential levelling.
9. Determination of approximate elevations for reconnaissance survey by Fly leveling.
10. Determination of difference between two points which are separated by some obstruction by reciprocal leveling.
11. Plotting of the longitudinal section of any route by profile leveling.

TEXT BOOKS AND REFERENCES:

1. Surveying Vol-I by Dr K.R. Arora.
2. Surveying Vol-I by Dr B. C. Punmia.
3. Plane surveying by A M Chandra

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PROFESSIONAL PRACTICE, LAW & ETHICS
II B.Tech – II Semester (Code :18CE401)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To create awareness on professional ethics and Human Values
2. To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.
3. To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards
4. To inculcate knowledge and exposure on Safety and Risk, Risk Benefit Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights
5. To have an adequate knowledge about MNC's, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.

Course Outcomes

1. Students understand the core values that shape the ethical behaviour of an engineer and Exposed awareness on professional ethics and human values.
2. The students will understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
3. The students will understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
4. The students will be aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
5. The students will acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

UNIT – I

1. Human Values

What is engineering – who is an engineer- Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue- Respect for Others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-Operation –Commitment – Empathy – Self-Confidence – Character - Spirituality.

UNIT – II

2. Engineering Ethics

Senses of Engineering Ethics – Variety of Moral Issued – Types of Inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Gilligan's Theory – Consensus and Controversy – Professions and Professionalism- Professional Ideals and Virtues -Theories About Right Action –Self-Interest – Customs and Religion – Uses of Ethical Theories.

UNIT – III

3. Engineering as Social Experimentation

Engineering as Experimentation – Engineers as Responsible Experimenters – Codes of Ethics – Balanced Outlook on Law.

4. Safety, Responsibilities and Rights

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk. Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights –

Intellectual Property Rights (IPR) – Discrimination.

UNIT – IV

5. Global Issues

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development– Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors –Moral Leadership

Sample Code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India),Indian Institute of Materials Management, Institution of Electronics and Telecommunication Engineers (IETE), India Etc.,

TEXT BOOK

1. Mike martin and Ronald Schinzinger, "Ethics in Engineering" McGraw-Hill, New York 1996
2. Govindarajan M, Natarajan S, Senthil Kumar V.S., "Engineering Ethics", PHI, New Delhi, 2004

REFERENCE BOOKS

1. Charles D,Fleddermann, "Engineering Ethics", Pearson / PHI, New Jersey 2004 (Indian Reprint)
2. Charles E Harris, Michael S.Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases" Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the conduct of business" Pearson, New Delhi, 2003.
4. Edmund G.Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers" Oxford University Press, Oxford, 2001.

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ENVIRONMENTAL ENGINEERING
II B.Tech – II Semester (Code: 18CE402)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To estimate the quantity of drinking water and domestic wastewater generated
2. To explain the various types of water and wastewater characteristics
3. To demonstrate the common physical, chemical and biological unit operations encountered in treatment processed
4. To identify and design various methods available for the treatment of water and wastewater

Course Outcomes

1. Able to assess the water quantity requirement for the supply water scheme.
2. Able to design various units in water treatment plant and understood about distribution system
3. Studied about the various components of sewage system and capable to design sewers
4. Able to design preliminary, primary and secondary treatment unit of sewage treatment plant

UNIT-I

Water Supply: Objectives of water supply scheme, Estimating requirements; Design period; Per capita consumption; Factors affecting per capita consumption; Fire demand; Fluctuations in demand; Population forecasting methods.

UNIT-II

Water treatment and Distribution: Design of water treatment units such as sedimentation, Coagulation, filtration and disinfection; Methods of Distribution, Layout of Distribution system; Analysis of Distribution by Hardy Cross method and practice for simple networks.

UNIT-III

Introduction to Sanitary Engineering: Conservancy and water carriage system; Sewerage systems; Relative merits and Demerits; Design of sewers; Characteristics of sewage, Expression for BOD.

Sewer Appurtenances Man holes, Drop man holes, Flushing tanks, Street inlets; Catch basins; Storm water regulators;

UNIT-IV

Preliminary and Primary Treatment of Sewage

Preliminary and Primary Treatment Operations: Screens, Grit Chambers, Skimming Tank and Sedimentation Tank

Secondary Treatment:

Trickling filters; Principles of action; Filter types; Recirculation; Final settling tanks; Operational problems and remedies;

Activated sludge process; Features of operation; Organic loading parameters; Methods of aeration; Sludge bulking; Sludge volume index.

TEXT BOOKS:

1. Elements of public health engineering by K.N. Duggal; S.Chand & Company Ltd., New Delhi.
2. Environmental Engineering Vol.I – Water supply engineering by S.K. Garg; Khanna Publishers, Delhi
3. Environmental Engineering Vol.II– Sewage disposal and air pollution engineering by S.K.Garg; Khanna Publishers, Delhi
4. Water Supply and Sanitary Engineering by G.S. Bride; Dhanpat rai and sons, Delhi
5. Manual on Water Supply & Treatment; CPH and EEO, Ministry of Urban Development; Govt. of India, New Delhi.

REFERENCE BOOKS:

1. Metcalf and Eddy, Waste water Engineering Collection, Treatment, Disposal and Reuse, McGraw Hill Pub. Co.,1995.
2. H.MRaghunath, Hydrology Principles, Analysis and Design, New Age International Publishers,1996.
3. Michael, A.M,'Irrigation Theory & Practice, Vikas Publishing House,NewDelhi,1978
4. Benefield L.D. and Randall C.D. Biological Process Designs for Wastewater Treatment, Prentice Hall Pub. Co.,1980.

BAPATLA ENGINEERING COLLEGE::BAPATLA
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MECHANICS OF MATERIALS
II B.Tech – II Semester (Code: 18CE403)

Lectures	4	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The objectives of this Course are

1. To understand multi-axial stresses and principal stresses and principal strains;
2. To analyse structural members under compound stresses;
3. To derive expression for critical load carrying capacity of columns under different load Conditions and apply various failure criteria for general stress states at points;
4. To determine deflections of beams using energy theorems;
5. To determine deflections of beams using geometrical methods.

Course Outcomes: On completion of the course the student will be able to

1. Understand multi-axial stresses and principal stresses and principal strains;
2. Analyse structural members under compound stresses;
3. Derive expression for critical load carrying capacity of columns under different load conditions and apply various failure criteria for general stress states at points;
4. Determine deflections of beams using energy theorems;
5. Determine deflections of beams using geometrical methods.

UNIT-I

1. Analysis of Plane Stress

Introduction-The basic problem-Equations for transformation of plane-stress-Principal planes and Principal stresses -Maximum shear stresses-Mohr's circle of stress-Construction of Mohr's circle.

2. Compound Stresses

Introduction- principal of Superposition and its limitation- Superposition of normal stresses-Eccentrically loaded short columns- Core or kernel of a section- Superposition of shear stresses.

UNIT-II

3. Buckling Of Columns

Introduction-Examples of instability- Criteria for stable equilibrium- Euler load for column with pinned ends- Euler loads for columns with different end restraints-Limitations of the Euler's formulae- Generalized Euler buckling load formulae- Eccentric loads and the secant formula.

4. Failure Theories

Introduction- maximum normal stress theory- maximum shearing stress theory- maximum strain energy theory- maximum distortion energy theory - comparison of theories.

UNIT-III

6. Deflections of Statically Determinate Structures (Energy Mehods)

Strain energy due to bending - Maxwell's reciprocal theorem- Maxwell–Betti's generalised reciprocal theorem- Castigliano's theorems- Application of Castigliano's theorem for calculating deflection of beams, frames and trusses- Virtual work method for deflections

UNIT-IV

7. Deflections of Statically Determinate Beams (Geometrical Methods)

Introduction- strain-curvature and Moment-Curvature relation- Governing differential equation for deflection of elastic beams- Alternative differential equations of elastic beams- solution of beam deflection problem by Direct integration and Macaulay's- Introduction to moment area method- Derivation of Moment area theorems- conjugate-beam method- slope and deflection of beams using moment area method and conjugate-beam method.

TEXT BOOKS:

1. Engineering mechanics of solids by E.P.Popov, Prentice Hall of India, 2005.
2. Strength of Materials by R. Subramanian., Oxford University Press, Third Edition, 2016.

REFERENCES:

1. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd., 2005.
2. Strength of materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd., 1998.
3. Strength of materials by R. K. Bansal, Lakshmi Publications (P) Ltd., 2007

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HYDRAULICS & HYDRAULIC MACHINES
II B.Tech – II Semester (Code: 18CE404)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Design of open channels for most economical sections like rectangular, trapezoidal and circular sections
2. Understand Gradually Varied flow and Rapidly Varied Flow though the channels and its applications
3. Understand the mechanics of impact of jet on various types of vanes and design of Impulse and Reaction Turbines
4. To understand concept of centrifugal pump and dimensional analysis of a given set of variables using Buckingham's π theorem and relate the model and prototype.

Course Outcomes: Students will be able to

1. Know the different types of channels and design of channels.
2. Get the skills to solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
3. In a position to evaluate the performance characteristics of hydraulic turbines.
4. Get knowledge of centrifugal pump and to solve dimensional analysis

UNIT I

Open Channel Flow (Uniform Flow): Comparison between open channel flow and pipe flow, Types of channels, Chezy's and Manning's equation, Flow through a Rectangular, Trapezoidal and Circular channels. Most efficient channel section of Rectangular, Trapezoidal and Circular.

Open Channel Flow (Non uniform Flow): Specific energy, Specific energy diagram, Critical flow, critical flow in rectangular channel, Channel transitions.

UNIT II

Gradually Varied Flow (GVF): Gradually varied flow in rectangular channel, Classification of channel slopes, classification of surface profiles.

Rapidly Varied Flow (RVF): Hydraulic jump, elements and characteristics of hydraulic jump, Types of hydraulic jump, Location and applications of hydraulic jump, Energy loss in a hydraulic jump and Backwater curve length.

UNIT III

Impact of Jets: Force exerted by the jet on a stationary and moving plates – vertical, inclined and curved, force exerted by jet on flat plates series of vanes.

Turbines: Classification of turbines and working principles of turbines, draft tube-types, draft tube theory, specific speed and unit quantities.

UNIT IV

Centrifugal Pumps: Manometric head; losses and efficiencies; work done, working principle; priming; velocity triangles; performance and characteristics curves; multistage pumps and cavitation effects.

Dimensional analysis & Model similitude: Introduction, Rayleigh's method and Buckinghamπ theorem, Types of similarities, Dimensionless numbers.

TEXT BOOKS:

1. Hydraulics and Fluid Mechanics by P. N. Modi & S. N. Seth; Standard book house; New Delhi
2. Fluid Mechanics by R. K. Rajput; S.Chand Publishers.

REFERENCE BOOKS:

1. Fluid Mechanics by Streeter and wyile, Mc Grawhill Publications.
2. Flow in Open Channel by K.Subramanya, Tata Mc Grawhill Publications.
3. Fluid Mechanics and Hydraulic Machines by R. K. Bansal; Laxmi Publications.

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CONCRETE TECHNOLOGY
II B.Tech – II Semester (Code :18CE405)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives: The course should enable the students to

1. Discuss the physical and chemical properties of cement and admixtures.
2. Understand the workability of concrete, manufacturing processes of concrete and the behavior of the hardened concrete.
3. Identify, formulate and solve problems in concrete mix design.
4. Enrich the practical knowledge on mix design principles, concepts and methods.

Course Outcomes:

1. Understand the basic physical and chemical properties of cement, admixtures and aggregates.
2. Describe the properties and factors influencing the workability of fresh concrete.
3. Determine the effect of water/cement ratio on the strength of hardened concrete and also the strength of concrete by using NDT testing methods.
4. Analyze the mix design of concrete.
5. Understand the basic concepts and applications of special concretes at various situations

UNIT-I

1. Cement

General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC, Bogue's compounds, heat liberation from a setting cement, structure of hydrated cement, water requirements for hydration.

2. Types Of Cements

Ordinary Portland cement, Rapid hardening cement, Sulphate resisting cement, Slag cement, Quick setting cement, Super sulphated cement, Portland pozzolana cement, air entraining cement, coloured cement, expansive cement, High alumina cement.

3. Testing, Handling and Uses of Cement

Fineness of cement using sieve test and air-permeability method, Normal consistency and setting times using vicat apparatus, soundness test using Le-chatlier apparatus, Grades of cement as per IS specifications, physical and chemical requirements of OPC for different grades of cement.

4. Aggregates

Classification, source, size and shape texture and influence of texture on strength, specific gravity of aggregates, moisture in aggregates, bulking of fine aggregate, methods used for

determination of moisture content of aggregates, grading of aggregates, sieve analysis, standard grading curve, grading limits of fine aggregates as per IS.

UNIT-II

5. Water

Quality of water for mixing concrete, Tolerable concentrations of some impurities in mixing water, permissible limit for solids as per IS456-2000.

6. Admixtures and Construction Chemicals

General, plasticizers and super plasticizers – Dosage, mixing procedure, equipment, effect of super plasticizes on the properties of hardened concrete, Retardors, accelerators. Air-entraining admixtures, fly ash, effect of fly ash on fresh and hardened concrete, high volume fly ash concrete, silica fume, available forms, effect of silica fume on compressive strength of concrete.

7. Fresh Concrete

Workability, factors affecting workability, slump test, Kelly ball test, V-B test, compaction factor test, segregation, bleeding, volume batching and weigh batching, hand mixing, machine mixing, mixing time, compaction of concrete, hand compaction, compaction by vibration.

UNIT-III

8. Hardened Concrete

General; water-cement ratio; gel/space ratio; gain of strength with age; maturity concept of concrete; effect of maximum size of aggregate on strength.

9. Test on Hardened Concrete

Compression test; moulds and compacting; curing; failure of compression specimen; effect of height/diameter ration strength; flexural strength of concrete; tensile strength of concrete; non-destructive testing methods (R.H Test and U V Test)

10. Durability of Concrete

Factors contributing to cracks in concrete, sulphate attack and methods of controlling sulphate attack, chloride attack, corrosion of steel and its control.

UNIT-IV

11. Introduction To Special Concretes And Concreting Methods

a) Fibre reinforced concrete; Fibers used, factors effecting properties, aspect ratio of fibers, orientation of fibers, workability, mixing, applications, current development in FRC.

b) Light-weight concrete: Natural and artificial light-weight aggregates, properties of common light-weight concretes

c) High performance concrete.

12. Proportioning Of Concrete Mixes

Concept of mix design, variables in proportioning, different methods of mix design, nominal mix and design mix, Indian standard method of mix design (IS 10262-2019).

TEXT BOOK

1. Concrete technology by M.S.Shetty, S.Chand & Company Pvt. Ltd., New Delhi

REFERENCE BOOKS

1. Properties of concrete by A.M.Neville, Longman Publishers

2. Concrete technology by M.L.Gambhir, Tata McGraw-Hill Publishing company Ltd., New Delhi

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TECHNICAL ENGLISH
II B.Tech – II Semester (Code :18EL002)

Lectures	3	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The course aims to upgrade the spoken and written English of the Civil Engineering students from an intermediate to advanced level, and to help them overcome their fear of public speech.

1. It will also focus on introducing the basic research skills and writing skills affiliated to research.
2. It also aims to inculcate confidence and to groom their personality so that they can aim at executive level jobs.
3. The career focus of this course is to build the combination of language and interpersonal skills needed to work independently, to lead teams effectively, and to become customer focused and result driven in their approach.
4. Special emphasis is also laid on developing individual and group effort through virtual and real life trainings, presentations, projects and research, especially towards developing their leadership qualities and the ability, to improve team functioning and team output.

Course Outcomes: By the end of the course, students will be able to

1. Use English language appropriately for functional skills like listening, reading, writing and speaking.
2. Demonstrate essential skills required for effective written and oral communication.
3. Construct grammatically correct sentences and the use of appropriate punctuation.
4. Use English idioms and phrasal verbs effectively.

UNIT-I

1.1 Vocabulary Development: Familiarising Idioms & Phrases
1.2 Grammar for Academic Writing: Making Requests
1.3 Language Development: Using Transition & Link words
1.4 Technical Writing: Letter Writing & Email Writing

UNIT-II

2.1 Vocabulary Development: Analogous words, Gender Sensitive language
2.2 Grammar for Academic Writing: Tenses: Simple Past /Present Perfect, The Future: Predicting & Proposing
2.3 Language Development: Cloze tests
2.4 Technical Writing: Technical Reports

UNIT-III

3.1 Vocabulary Development: Abbreviations& Acronyms
3.2 Grammar for Academic Writing: Describing(People/Things/Circumstances) : Adjectival & Adverbial groups
3.3 Language Development: Transcoding (Channel conversion from chart to text)
3.4 Technical Writing: Circular, Memos, Minutes of Meeting

UNIT-IV

4.1 Vocabulary Development: Corporate vocabulary
4.2 Grammar for Academic Writing: Inversions & Emphasis
4.3 Language Development: Reading Comprehension
4.4 Technical Writing: Resume Preparation

REFERENCE BOOKS

1. Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011.
2. Technical Communication Principles and Practice. Oxford University Press: 2014.
3. Advanced Language Practice, Michael Vince. MacMilan Publishers: 2003.
4. Objective English (Third Edition), Edgar Thorpe & Showick. Pearson Education: 2009
5. English Grammar: A University Course (Second Edition), Angela Downing & Philip Locke, Routledge Taylor & Francis Group: 2016

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HYDRAULICS &HYDRAULIC MACHINES LABORATORY
II B.Tech – II Semester (Code: 18CEL41)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To understand the flow measurement in a pipe flow.
2. Characterization of laminar and turbulent flow.
3. To determine the energy loss in pipe flow.
4. To study the characteristics of turbines.
5. To study the characteristics of pumps.
6. To measure the discharge in a open channel flow.

Course Outcomes: On completion of the course, the students will be able to:

1. Measure discharge in pipes and identification of type of flow.
2. Determine the energy loss in conduits.
3. Demonstrate the characteristics curves of pumps.
4. Demonstrate the characteristics curves of turbines.
5. Carry out discharge measurements in open channel.

EXPERIMENTS

1. Verification of Bernoulli's theorem.
2. Venturimeter: Determination of Coefficient of discharge.
3. Orificemeter: Determination of Coefficient of discharge.
4. Orifices: Determination of Coefficient of discharge.
5. Mouthpieces: Determination of Coefficient of discharge.
6. Characterization of laminar and turbulent flows by Reynold's apparatus.
7. Determination of friction factor of Pipes.
8. Determination of loss of head in pipes due to bends, sudden contractions and sudden expansion.
9. Determination of Coefficient of discharge for Rectangular and V – notches.
10. Determination of Manning's and Chezy's coefficients in open channel.
11. Measurement of force due to impact of jets on vanes of different types.
12. Performance studies on Pelton turbine.
13. Performance studies on Francis turbine/Kaplan turbine.
14. Performance studies on single stage Centrifugal pump.
15. Performance studies on Reciprocating pump.

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ENVIRONMENTAL ENGINEERING LABORATORY
II B.Tech – II Semester (Code: 18CEL42)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To determine the physical characteristics of drinking water/sewage – turbidity.
2. To determine chemical characteristics of drinking water/sewage – pH, various types of solids, acidity, alkalinity, D.O etc.
3. To estimate optimum dosage of coagulant (Alum)
4. To determine the chlorine dosage and residual chlorine in treated water sample.
5. To determine the Bio-chemical and Chemical Oxygen Demands of sewage.
6. To train the student for checking the suitability of water for construction and drinking purposes.

Course Outcomes: At the end of the course the student will be able to:

1. Make use of various equipment/methods available for examining water and wastewater
2. Identify the practical significance of the characteristics, the relevant codes of practice for examination and permissible limits for the characteristics of water and wastewater
3. Conduct tests for physical, chemical, biological quality of water/sewage.
4. Conduct jar test to determine the exact quantity of alum needed at treatment plant based on the turbidity of the given sample.
5. Conclude whether the given water is fit for drinking or not by comparing the quality parameters with BIS standards (IS 10500 – 1991)

EXPERIMENTS

1. Determination of total suspended and dissolved solids in water / sewage sample.
2. Determination of fixed and volatile solids in water / sewage sample.
3. Determination of Settleable Solids.
4. Determination of turbidity of water / sewage sample.
5. Determination of pH value of water / sewage sample.
6. Determination of optimum dosage of coagulant.
7. Determination of residual chlorine.
8. Determination of temporary and permanent hardness of water sample.
9. Determination of chloride concentration of water / sewage sample.
10. Determination of acidity of water sample.
11. Determination of alkalinity of water sample.
12. Determination of fluorides in water sample.
13. Determination of Dissolved Oxygen of water / sewage sample.
14. Determination of Biochemical Oxygen Demand (BOD) of waste water.

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MATERIALS TESTING LABORATORY

II B.Tech – II Semester (Code: 18CEL43)

Lectures	0	Tutorial	0		Practical	3	Credits	1
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. The main objective of this laboratory is to make the students to know the basic tests on materials used for construction.

Course Outcomes:

1. The students are able to know properties of cement.
2. The students are able to know properties of fine aggregate.
3. The students are able to know properties of coarse aggregate.
4. The students are able to know how to design the concrete mix.
5. The students are able to know properties of concrete.
6. The students are able to know to find the strength of concrete using rebound hammer.
7. The students are able to find out the Stress-Strain characteristics of mild steel bar.
8. The students are able to find out the shear strength of mild steel bar.
9. The students are able to find out the Hardness of steel and brass specimen.
10. The students are able to find out the E for steel and wood by simply supported beam setup.

Experiments

1. **Cement tests**
   a. Fineness of cement
   b. Specific gravity of cement
   c. Normal consistency of cement
   d. Initial setting time of cement
   e. Compressive strength of cement.
2. **Fine aggregate tests**
   a) Specific gravity of fine aggregate
   b) Sieve analysis of fine aggregate
   c) Bulking of sand.
3. **Coarse aggregate tests**
   a) Specific gravity of coarse aggregate
   b) Sieve analysis of coarse aggregate.
4. **Mix design as per IS 10262:2019.**
5. **Concrete tests**
   a) Workability tests (Slump & Compaction factor)
   b) Compressive strength of concrete.
   c) Split tensile test.
   d) Modulus of rupture
6. NDT – Rebound hammer testing & UPV
7. Stress-Strain characteristics of mild steel bar.& HYSD
8. Determining shear strength of mild steel bar & HYSD Bar
9. Hardness test of Steel & Brass
10. Determining Young's Modulus of Steel and Wood (using simply supported beam)

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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STRUCTURAL ANALYSIS

III B.Tech – I Semester (Code:18CE501)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. Provide an analysis for three hinged arches and suspension bridges for different type of loads and their supports are at different levels.
2. To analyze the statically indeterminate beams by using method of Consistent deformation.
3. To analyze the statically indeterminate beams and frames by using displacement methods (Slope deflection method and Moment distribution method)
4. The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads rolling on simply supported and continuous girders and Pratt and Warren trusses.

Course Outcomes: Upon successful completion of this course the student will be able to

1. Analyze the arches and Cables
2. Analyze the Indeterminate beams using method of Consistent deformation
3. Analyze the Indeterminate beams using Slope deflection method and Moment distribution method.
4. Draw the influence lines for the determinate beams and trusses and also determine the maximum quantities using ILDs.

UNIT-I

1. Arches: Types, Eddy's Theorem; Analysis of three hinged Parabolic and Circular arches for Static loads. Affect of temperature change in arches.

2. Cables: Analysis of cables under uniformly distributed and concentrated loads; Shape of the cable under self weight; Effect of temperature changes in suspension cables; Anchor cables.

UNIT-II

3. Analysis of indeterminate structures: Introduction to Force methods:

Statically indeterminate structures (method of consistent deformations): Applications for

i. Propped Cantilevers Analysis of propped cantilever by method of consistent deformations.
ii. Fixed Beams Fixed moments for a fixed beam of uniform section for different types of loading; Effect of sinking of support; Effect of rotation of a support; Bending moment diagram for fixed beams.
iii. Clapeyron's Theorem of Three Moments Analysis of continuous beams (Two span continuous beams).

UNIT-III

4. **Analysis of indeterminate structures:** Introduction to Displacement methods:

Kinematically indeterminate structures (slope-deflection method; moment distribution method),

i) Continuous beams for two spans only and

ii) Portal frames (Single bay, single storey with vertical legs only) without and with side sway.

UNIT-IV

5.**Influence Lines:** For Statically Determinate Structures Moving loads and influence lines; Influence lines for beam reactions; Influence lines for shearing force; Influence lines for bending moment; Calculation of maximum shear force and bending moment at a section for rolling loads; Calculation of absolute maximum bending moment; Influence lines for simple trusses.

TEXT BOOKS:

1. S.B,Junnarkar and H.J.Shah,' Mechanics of Structures,Vol. I & Vol. II' Charotar Publications, Anand, India
2. R. Vaidyanathan and P. Perumal, Structural Analysis Volume I & II, Laxmi Publications (P) Ltd., 2017 .
3. Reddy . C.S., Basic Structural Analysis, Tata McGraw Hill, 3e, 2011
4. B.C.Punmia, Ashok Jain, ArunJain , Theory of structures SMTS-2, Laxmi Publications (P) Ltd., 2017 .
5. V. N. Vazirani& M. M. Ratwani ,Structural Analysis, Vol. II , Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. Hibbeler, RC, Structural analysis, Pearson Education, 2012
2. Negi L. S. and Jangid R. S, Structural Analysis, Tata McGraw Hill, 1997
3. Rajasekaran S. and Sankara subramanian G., Computational Structural Mechanics, PHI, 2008
4. S.S. Bhavikatti, Structural Analysis II, Vikas Publication Houses (P) Ltd, 2016
5. Timoshenko S. P. and Young D. H., Theory of Structures, McGraw Hill, 2e, 1965
6. Wang C. K., Intermediate Structural Analysis, Tata McGraw Hill, 1989

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REMOTE SENSING & GIS
III B.Tech – I Semester (Code : 18CE502)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Learn basic concepts of Aerial Photographs.
2. Learn basic concepts of remote sensing and its characteristics, satellite sensors and platforms.
3. Know about satellite digital image processing and classification techniques.
4. Understand the basic concepts GIS, spatial data and analysis.
5. Applications of GPS in surveying.
6. Know various remote sensing and GIS applications in civil engineering.

Course Outcomes:

1. Interpret Information from Aerial Photographs.
2. Exposure on Basics of Remote Sensing, Satellite Sensors and Platforms, Practical Knowledge on Satellite Image Classification.
3. Know Basics of GIS And Map Making. Exposure About Spatial Analysis Using Overlay Tools.
4. Geo-Tag Assets Using GPS And Add Attribute & Meta-Data.
5. Get the Knowledge on Various Remote Sensing and GIS Applications in Civil Engineering.

UNIT- I

Photogrammetry

Fundamentals of Photogrammetry and Photo interpretation – types of photographs; Vertical photographs – principal point; scale; Stereoscopy; Vertical exaggeration –factors involved and determination; Overlap, side lap and flight planning.

UNIT – II

Remote Sensing

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere and target –

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, Space-borne remote sensing. Visual Interpretation Techniques.

Overview of Indian Remote sensing satellites and sensors, satellite definition and types, characteristics of satellite, characteristics of satellite orbit, characteristics of Indian satellites - IRS1A, IRS1B, IRS1C, IRS1D, CARTOSAT satellites.

UNIT – III

Geographic Information System (Gis)

Introduction, key components, map projections, data entry &preparation – Spatial data input, Raster Data Model, Vector Data Model, Raster Vs Vector.advantages and dis advantages of Raster & Vector, Basic Overlay operations. network analysis - concept and types, Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis.

UNIT - IV

Global Positioning System (GPS)&RS And Gisapplications:

GPS definition, components of GPS, GPS receivers. Space, Control and User segments of GPS. Advantages and disadvantages of GPS, Limitations and applications of GPS Indian Systems (IRNSS, GAGAN)Development of GPS surveying techniques, Navigation with GPS, Applications of GPS

Applications: Land use and Land cover, Watershed management for sustainable development, Agriculture, Forestry, Geology, Geomorphology, Urban Applications, Hydrology

TEXT BOOKS:

1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
2. Chang, K. T. (2006). Introduction to Geographic Information Systems. The McGraw-Hill.
3. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
4. Schowenger, R. A (2006) 'Remote Sensing' Elsevier publishers.
5. Parkinson,B. W., Spilker, J. J. (Jr.) (1996). Global Positioning System: Theory & Applications (Volume-I). AIAA, USA

REFERENCE BOOKS:

1. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013.
2. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt.Ltd, 2013.
3. Jensen John R. Introduction to Digital Image Processing: A Remote Sensing Perspective Prentice hall, New Jersey
4. Paul Wolf, Elements of Photogrammetry, McGraw Hill.
5. Leick Alfred, 1995: GPS Satellite Surveying, Wiley Interscience
6. Burrough, P. P. &McDonnel, R. A. (1998). Principles of GIS. Oxford University Press.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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DESIGN OF CONCRETE STRUCTURES
III B.Tech – I Semester (Code : 18CE503)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The student will study and understand

1. Objectives of structural design, strength and serviceability concepts, and design singly reinforced beams using WSM and LSM.
2. Shear effect and design for shear in beam, calculation of development length and complete design of beam using LSM.
3. Design of one-way slab, Two-way slab and dog-legged stair case by applying LSM.
4. Design of short and slender columns for axial, uniaxial and biaxial bending using LSM.
5. Design of isolated and combined footings using LSM.

Course Outcomes: Students will be able to

1. Understand the various design methodologies for the design of RC elements.
2. Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
3. Design various types of slabs and dog-legged staircase by limit state method.
4. Design both short and slender columns for axial, uniaxial and biaxial eccentric loadings.
5. Design of Isolated and combined footings by limit state method.

** IS 456-2000 and IS SP-16 Charts are to be referred*

UNIT I

Introduction to Design of Beams

Objective of structural design, Type of Loads on RCC Structures and Load combinations, Code of practices and Specifications, Design philosophies

Analysis and Design of Singly reinforced Rectangular beams by working stress method,

Analysis and Design of singly and doubly reinforced rectangular beams by Limit State Method.

UNIT II

Design of Beams

Design of Flanged beams for Flexure, Behavior of RC members in Shear, Torsion, Bondand

Anchorage, Check for development length by limit state method, Design of rectangular beam.

UNIT III

Design of Slabs and Staircase

Analysis and design of one-way simply supported slab, Design and Detailing of Two-way slabs, Design of Dog-legged Staircase.

UNIT IV

Design of Columns

Types of columns, Axially Loaded columns, Design of short Rectangular Square and circular columns, Design of Slender columns, Design for Uniaxial and Biaxial bending using SP16 charts.

UNIT V

Design of Footings

Types of footings, foundations based on soil properties, Design of axially and eccentrically loaded footings.

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TEXT BOOKS:

1. Limit State Design of Reinforced Concrete by P. C. Varghese, Prentice Hall of India.
2. For Limit State Method: Reinforced Concrete (limit state design) by Ashok K. Jain; Nem Chand & Bros.,Roorkee
3. For Working Stress Method: Reinforced concrete by H. J. Shah, charotar publishinghouse
4. Reinforced Concrete Structures by N. Subramanian, Oxford University Press.

REFERENCE BOOKS:

1. Reinforced concrete design by Pillai and Menon, Tata McGraw-Hill
2. Limit state theory & Design of reinforced concrete by Dr. S. R. Karve and Dr.V.L.Shah; Pune VidyarthiGrihaPrakashan,Pune.
3. Reinforced concrete design: Principles and Practice by N. Krishna Raju., R. N. Pranesh, New Age International Publishers.
4. Reinforced Concrete Structure by R. Park., T. Paulay, Wiley India Publishers

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)

DESIGN OF STEEL STRUCTURES
III B.Tech – I Semester (Code :18CE504)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

(Using Limit State Method)

Course Objective:

1. To understand the behavior and design of simple connections.
2. To design Tension and compression members efficiently and economically.
3. To design column bases along with connections.
4. To design beams efficiently and economically.
5. To understand the behavior and design of eccentric connections.

Course Outcomes:

1. The students are able to understand the behavior and design of simple connections efficiently and economically.
2. The students are able to design Tension and compression members efficiently and economically.
3. The students are able to design column bases along with connections.
4. The students are able to design flexural members (Laterally supported and unsupported) efficiently and economically.
5. The students are able to understand the behavior and design of eccentric connections.

UNIT – I

1.Introduction

Types of steels; Constructional steels; Mechanical properties; Design concepts; Fatigue behavior; Brittle fracture; Corrosion; Hot rolled sections;

2. Simple Connections

Advantages of welding; Welds; Types of welded joints; Weld specifications; Allowable stresses;Bolts; Black bolts; Failure modes of a joint; Pitch requirements of bolts; Allowable stresses;Efficiency of joint; High strength bolts; Lap andbutt joints, Truss joint connections;

UNIT – II

3. Tension Members

Introduction; Types of sections; Net area; Net effective area for angles and Tees; Design of tension members;

4. Compression Members

Introduction; Angle Struts; Effective length of a column; Allowable stresses; Types of sections; Built-up columns(using welding); Column splice (using welding)

UNIT – III

5. Column Bases

Slab base; Gusseted base; Eccentric bases;

UNIT – IV

6. Beams

Introduction; Laterally supported beams; Built-up beams (using welding); lateral buckling ofbeams; Design of laterally supported beams; Secondary design considerations; Grillagebeams;
Design of laterally unsupported beams;

UNIT – V

7. Eccentric Connections

Simple beam end connections – Seat connections; Bracket connections;

TEXT BOOKS

1. Limit state design of steel structures by S.K.Duggal, Tata McGrawhill,Publishing company Ltd.
2. Design of Steel structures by N.Subramanian, Oxford University press,2009
3. Limit state design of steel structures by Ramachandra, VeerendraGehlot, Scientific Publications.
4. Design of Steel Structures by Limit state method as per IS800-2007 by K.S. Sairam, Pearson
   Education India

REFERENCE BOOKS

1. Design of Steel Structures by Limit state method as per IS800-2007 by S.S.Bhavakatti, IK International Publishing Housing Pvt.Ltd.
2. Analysis and Design Practice of Steel Structures by Karuna Moy Ghosh, Prentice Hall of India Publishers.
3. Structural steel design by M.L.Gambhir , Tata McGraw-Hill Education

Codes

1. IS 800-2007

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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WATER RESOURCES ENGINEERING
III B.Tech – I Semester (Code: 18CE505)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Prerequisites: Fluid Mechanics [18CE305]
Hydraulics & Hydraulic Machines [18CE404]

Course Objectives:

1. To explain components of hydrology and use of hydrographs in measuring rain fall& runoff
2. To determine various parameters in ground water hydrology and design of channels
3. To explain design of lined canal, water logging and canal regulation works
4. To explain various methods and requirements of irrigation water

Course Outcomes: Student will be able to

1. Determine flows from hydrology concepts and evaluate runoff from hydrographs
2. Differentiate various parameters in ground water engineering and to develop design of irrigation channels
3. Design a lined canal and to differentiate various canal regulation works
4. Asses various water needs of the crops

UNIT – I

1. Hydrology

Hydrologic cycle; Precipitation types; Rain gauges; Computation of average rain fall over a basin; factors affecting evaporation, infiltration and Run off; Computation of runoff.

2. Hydrographs

Hydrograph analysis; Unit hydrograph; Application of Unit hydrograph to the construction of a flood hydrograph resulting from rainfall of unit duration; Application of Unit hydrograph to construction of a flood hydrograph resulting from two or more periods of rainfall; Construction of unit hydrograph of different unit duration from a unit hydrograph of some given unit duration by superposition method and S-curve method.

UNIT – II

3. Ground Water – Well Irrigation

Introduction; Aquifer; Aquiclude; Aquifuge; Specific yield; Specific retention; Divisions of sub– surface water; Water table; Types of aquifers; Well hydraulics; Steady radial flow to a well–Dupuit's theory for confined and unconfined aquifers; Yield of an open well– Constant level pumping test, Recuperation test.

4. Channels – Silt Theories & Design Procedure

Cross section of a channel; Balancing depth; Silt theories–Kennedy's theory, Lacey's regime theory; Kennedy's method of channel design; Lacey's theory applied to channel design.

UNIT – III

5. Water logging&Canal Lining

Effects of water logging; Causes of water logging; Remedial measures; Lining of irrigation channels – necessity, advantages and disadvantages; Design of lined canal.

6. Canal outlets and regulation works

Types of outlets; Canal falls - necessity and location of falls, classification of falls; Types of regulators and functions of cross and head regulators.

UNIT – IV

7. Introduction to Irrigation: Types and Methods of irrigation, Benefits of irrigation; Ill-effects of irrigation;

8. Water Requirement of Crops: Functions of irrigation water; Classes and availability of soil water; Saturation capacity; Field capacity; Wilting point; Available moisture and readily available moisture; Moisture equivalent; Soil moisture deficiency; Limiting soil moisture conditions; Depth and frequency of irrigation; Duty and Delta; Base period; Relation between Duty and Delta; Factors affecting duty; Methods of improving duty; Gross command area; Culturable command area; Culturable cultivated and uncultivated area; kor depth and kor period; Determination of irrigation requirements of crops; crop rotation.

TEXT BOOKS:

1. Irrigation and water power Engineering by Dr. B.C. Punmia& Dr. Pande B.B. Lal; Laxmi Publications Pvt. Ltd., New Delhi.
2. Irrigation Engineering and Hydraulic structures by S. K. Garg; Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. Irrigation, Water Resources & Water Power Engineering by Dr. P.N. Modi; Standard Book House, New Delhi.
2. Irrigation, water power and water resources Engineering by K R Arora, Standard Publishers, New Delhi.
3. Engineering Hydrology by K. Subramanya, TMH Publishers.
4. Engineering Hydrology by P. Jayarami Reddy, Laxmi Publications.
5. Irrigation Engineering and Hydraulic Structures by S.R. SahasraBudhe; Katson Publishing House, Ludhiana.

BAPATLA ENGINEERING COLLEGE: : BAPATLA
(Autonomous)
SOIL MECHANICS
III B.Tech – I Semester (Code:18CE506)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To enable the student to understand the concept of soil formation, determine index properties of soils and identify the type of soils.
2. To enable the student to understand the concept of soil structure and various soil classification systems, various laboratory and field tests to determine coefficient of permeability
3. To impart the concept of seepage of water through soils and effective stress principle, determine discharge of water through soils, principles and methods of compaction.
4. To enable the student to understand the principles of consolidation , determine magnitude and rate of consolidation settlement, the concept of shear strength of soils, determine shear parameters and shear strength of soil using various laboratory tests.

Course Outcomes: Student will be able to

1. Know the concept of origin and formation of soils, determination of index properties related to soil mechanics and establish their interrelation ships.
2. Classify soils, determine coefficient of permeability using laboratory and field tests
3. Know the concept of seepage of water through soils and determine effective stress and total stress at any point in soils, determination of dry densities and degree of compaction for cohesive and granular soils.
4. Recognize the importance of consolidation on settlement of footings, importance of shear strength in determining load carrying capacity of soil using shear parameters.

UNIT – 1

1. Introduction
Soil formation and soil types; Regional soil deposits of India
2. Basic Definitions and Relations
Phase diagrams; Simple definitions; some important relationships;
Index Properties; Grain size distribution; Atterberg Limits; Significance of other Soil Aggregate properties

UNIT – II

3. Soil Classification
Clay Mineralogy: Introduction to soil classification; Particle size classification as per IS-code; Unified soil classification system; Indian standard soil classification system
4. Permeability
Capillary rise; Darcy's law and its Validity; Determination of coefficient of permeability - constant and Variable head methods, indirect methods, Factors affecting permeability;

Permeability of stratified soil deposits;

UNIT – III

5. Seepage through Soils

Principle of effective stress; physical meaning of effective stress; Types of head, seepage forces and quicksand condition

6. Compaction of Soils

Introduction; Laboratory tests; Factors affecting compaction; Structure and engineering behavior of Compacted cohesive soils; Compaction in the field; Compaction specifications and field control.

UNIT – IV

7. Compressibility of Soil and Consolidation

Introduction; Compressibility; Time-rate of consolidation; Consolidation test; Computation of Settlement; extrapolation of field consolidation curve; Settlement analysis.

8. Shear Strength of Soils

Introduction; Stress at a point- Mohr Circle of stress; Mohr–coulomb Failure Criterion; Measurement of Shear Strength; Shear strength of Clayey soils; Shear Strength of Sands; Drainage conditions and Strength parameters.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics – Gopal Ranjan and A.S.R.Rao, New Age International Publishers

2. Foundation Analysis & Design by Bowles, J.E., McGraw- Hill Book Co.

3. A Text book of Soil Mechanics and Foundation Engineering – B.C.PunmiaLaxmi Publications

4. A Text book of Soil Mechanics and Foundation Engineering – K.R.Arora, Standard Publishers &Distributors, New Delhi

5. A Text book of Soil Mechanics and Foundation Engineering – P.Purushotthama Raj, Pearson Education

6 . Introduction to Soil Mechanics- Braja M Das

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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GEOGRAPHICAL INFORMATION SYSTEM LABORATORY
III B.Tech – I Semester (Code:18CEL51)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Laboratory Objectives:

1. Understand the process of Digitization of maps
2. creation of various features thematically
3. Develop the DEM
4. Learn external data linkages to internal features
5. Learn GIS analysis.
6. Learn GIS data base quarries

Laboratory Outcomes:

1: Exposure of Geospatial data base creation and Map features
2: Thematic maps Preparation
3: Assess the various digitized features
4: Exposure of creating features from external data.
5: Know how to make a query's in GIS environment.
6: Know the overlay use ages in GIS.

List of Experiments:

1. Digitization of Topo sheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Developing Digital Elevation Model (DEM)
5. Linking external data base (.CSV, or. EXCEL, or .Txt) to internal features
6. Buffers creation around (Point, line, and polygon) Features
7. Create point features using excel data
8. Querying on attribute data
9. Overlay Operations (Identity, or Intersect or Union or erase)any two
10. Vector to raster creation (Features conversion, Point, polyline and polygon)
11. Raster to vector conversion (Line or polygon options)
12. Preparation of Flow Accumulation, Flow direction maps (using DEM)

BAPATLA ENGINEERING COLLEGE:: BAPATLA

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SOFT SKILLS LABORATORY

III B.Tech – I Semester (Code:18CEL52)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To understand facial expressions, gestures and postures for effective communication
2. To understand the importance of interpersonal and intrapersonal skills in an employability setting
3. To understand the process of thinking and analytical skills ethically
4. To understand team skills and its effectiveness in inculcating leadership qualities

UNIT-I

1. Body Language & Identity Management

a. Facial Expressions – Kinesics - Occulesics
b. Haptics - Proxemics
c. Para Linguistics
d. Appearance
e. Identity Management Communication

2. Emotional Intelligence & Life Skills

a. Self Awareness through Johari Window and SWOC analysis
b. Self Motivation
c. Empathy
d. Assertiveness & Managing Stress
e. Positive Attitude
f. Time Management
g. Goal Setting: Short term, Long Term, Vision, Mission.

3. Business Presentations

a. Preparing effective Presentations Power Point Presentations
b. Power Point Presentations
c. Using Visual Aids
d. Mock Presentations

4. Employability Skills

a. Group Discussion
b. Team Building and Leadership Qualities
c. Interview Skills

Reference Books:

1. Personality Development and Soft skills (Second Edition), Barun K. Mithra. Oxford University Press: 2016
2. The Definitive Book of Body Language, Allan & Barbara. Pease International:2004
3. Working with Emotional Intelligence, Daniel Goleman. Bloomsbury:1998
4. English for Jobseekers, Lina Mukhopadhyay. Cambridge University Press:2013
5. The 7 Habits of Highly Effective People, Stephen R.Covey. St. Martin's Press:2014

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ESTIMATION & QUANTITY SURVEYING
III B.Tech – II Semester (Code:18CE601)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Pre-requisite: Building Planning and Drawing

Course Objectives:

1 To Estimate the various types of Buildings.
2 To Prepare the Detailed Estimation for RCC, Road.
3 To Construct the Specifications for a Building and Evaluate the Rate per unit item of different works.
4 To discuss the PWD accounts and Procedures of works.

Course Outcomes: At the end of the course student will be able to

1 Acquire the knowledge of the drawings, procedures and different estimating methods of buildings.
2 Estimate Quantities of RCC and Road works.
3 Recognise the importance of specifications and estimate the unit Rate for different engineering works.
4 Gain knowledge on PWD accounts and Procedure of works like tendering.

UNIT – I

1. Procedure of Estimation

Methods of estimating; Main items of work; Deduction for openings; Degree of accuracy; Units of measurement.

2. Methods of building estimates

Individual wall method; Centre line method; Arch masonry calculation; Estimate of steps.

3. Estimate of Buildings

Estimate of residential building; Estimate of a building from line plan.

UNIT – II

4. Estimate of RCC works

Standard hooks and cranks; Estimate of RCC slab; RCC beam; RCC T–beam slab and RCC column with foundation.

5. Road Estimating

Estimate of earthwork; Estimate of pitching of slopes; Estimate of earthwork of road from longitudinal sections; Estimate of earthwork in hill roads.

UNIT – III

7. Specifications

Purpose and method of writing specifications; General specifications. Detailed Specifications for Brick work; R.C.C; Plastering; Mosaic Flooring, R.R.Stone Masonry.

8. Analysis of Rates

Task or out – turn work; Labour and materials required for different works; Rates of materials andlabour; Preparing analysis of rates for the following items of work:
i) Concrete ii) RCC Works iii) Brick work in foundation and super structure
iv) Plastering v) CC flooring vi) White washing.

UNIT – IV

9. PWD Accounts and Procedure of Works

Organization of Engineering department; Work charged establishment; Contract; Tender; Tender notice; Tender Schedule; Earnest money; Security money; Measurement book; Administrative approval; Technical sanction; Plinth area; Floor Area; Carpet area; Approximate Estimate; Plinth area estimate; Revised Estimate; Supplementary estimate.

10. Tender- Preparation of tender documents, importance of inviting tenders, contract types, relative merits, pre bid qualification. General and special conditions, termination of contracts, extra work and Changes, penalty and liquidated charges, Settlement of disputes.Arbitration.

11. Miscellaneous:

Gross income; Net income; Scrap value; Salvage value; Obsolescence; Annuity; Capitalized value; Years purchase; Life of structures; Sinking fund; Standard rent; Process of fixing standard rent; Mortgage, brief outlines of valuation process.

TEXT BOOKS

1. Estimating & Costing in Civil Engineering by B.N. Dutta; U. B. S. Publishers & Distributors, New Delhi.
2. Valuation of Real properties by S. C. Rangwala; Charotar Publishing House, Anand
3. FIDIC Contract Conditions.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)
IRRIGATION STRUCTURES
III B.Tech – II Semester (Code: 18CE602)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Prerequisites: Fluid Mechanics [18CE305]
Hydraulics & Hydraulic Machines [18CE404]
Water Resources Engineering [18CE505]

Course Objectives:

1. To study various methods measurement of water and Reservoir planning
2. To design a Gravity dam
3. To understand various types of earth dams and spillways
4. To describe various types of cross drainage works and head works

Course Outcomes: Student will be able to

1. Identify various methods of stream gauging and Reservoir Planning
2. Design and analyze gravity dam
3. Differentiate various types of earth dams and spillways
4. Know various types of cross drainage works and head works

UNIT – I

1.Stream gauging - Discharge measurement- Area-Velocity method; Slope Area method; Measurement of velocity- Surface floats, Sub–surface float, Velocity rod; Pitot tube; Current meter.Stream depth measurements.

2. Reservoir Planning: Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curve and demand curve; Calculation of reservoir capacity for a specified yield from the mass inflow curve; Determination of safe yield from a reservoir of a given capacity; Sediment flow in streams; Reservoir sedimentation; Life of reservoir; Reservoir sediment control; flood routing.

UNIT – II

3. Dams in General: Introduction; Classification; Physical factors governing selection of type of dam.

4.Gravity Dams - Introduction; Forces acting on a gravity dam; Modes of failure and criteria for stability requirements; Stability analysis; Elementary Profile of a gravity dam; Practical profile of a gravity dam; Limiting height of a gravity dam; High and low gravity dams.

UNIT – III

5. Earth dams: Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams.

6. Spillways: Introduction; Types of spillways; Energy dissipation below spillways.

UNIT – IV

7. Diversion Head Works- Component parts of a Diversion Head work; Weirs and barrages- Types of weirs; Causes of failure of weirs and their remedies; Design of weirs on permeable foundations –Bligh's creep theory.

8. **Cross Drainage Works -**Introduction; Types of cross drainage works; Selection of suitable type of cross - drainage work; Classification of Aqueducts and Syphon Aqueducts.

TEXT BOOKS:

1. Irrigation and water power engineering by Dr. B.C. Punmia& Dr. Pande B.B. Lal; Laxmi Publications Pvt. Ltd., New Delhi.
2. Irrigation Engineering and Hydraulic structures by S. K. Garg; Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. Irrigation, Water Resources & Water Power Engineering by Dr. P.N. Modi; Standard Book House, New Delhi.
2. Irrigation, water power and water resources Engineering by K R Arora, Standard Publishers, New Delhi
3. Irrigation Engineering and Hydraulic Structures by S.R. SahasraBudhe; Katson Publishing House, Ludhiana

(Autonomous)

FOUNDATION ENGINEERING

III B.Tech – II Semester (Code : 18CE603)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To enable the students to acquire proper knowledge about soil exploration and various principles of important field tests such as SPT, plate bearing test etc., acquire knowledge of various earth pressure theories and determination of resultant thrust acting on earth retaining walls
2. To impart the students in depth knowledge about various types of slopes and methods for their stability analysis, analyzing the stress at any point below the ground surface due to self weight and externally applied load.
3. To impart the students knowledge of types of shallow foundations and theories required for determination of bearing capacity of soils, principle of consolidation, to compute immediate and consolidation settlements of shallow foundations and determining bearing capacity of soils based on settlement criteria.
4. To enable the students to imbibe the concepts of pile foundations and determine their Load carrying capacity based on suitability of soils, well foundations and analysis of forces acting on caissons, acquire knowledge of expansive soils

Course Outcomes: Student will be able to

1. Know various methods of soil exploration and field tests such as penetration tests, geophysical methods, various earth pressure theories applicable to analysis and design of earth retaining walls
2. Understand different methods of slope stability analysis , determination of vertical stress at any point below ground surface.
3. Know various types of shallow foundations and decide their location based on soil characteristics, determination of bearing capacity of soils based on shear criteria and settlement criteria, size of the foundation.
4. Apply the principles of bearing capacity of piles and design them accordingly, analyze and design well foundations and under reamed pile foundations

UNIT – I

1. Sub–Soil Investigation and Sampling

Introduction; Methods of exploration; Methods of Boring; Soil Samples; Soil samplers and Sampling; Number and disposition of trial pits and borings; Depth of exploration; Ground water observations; Field tests vis-à-vis Laboratory tests; Plate load test; Penetrometer tests; Geophysical methods; Borehole logs; Site investigation report;

2. Lateral Earth Pressure & Retaining Walls

Introduction; Effect of wall movement on Earth Pressure; Earth Pressure at rest; Rankine's theory of Earth pressure; Coulomb's theory of earth pressure; Culmann's graphical method for active earth pressure; Design considerations for retaining walls;

UNIT - II

3. Stability of Slopes

Introduction; Infinite slopes and translational slides; Definitions of factor of safety; Finite slopes -forms of slip surface; Total stress and Effective stress methods of analysis; ϕ_u=0 Analysis (Total Stress Analysis) ; C-ϕ Analysis- Method of slices; Location of most Critical Circle; Stability of Earth
Dam Slopes; Friction Circle Method; Taylor's Stability Number;

4. Vertical Stresses below Applied Loads

Introduction; Boussinesq's equation; vertical stress distribution diagrams; vertical stress beneath loaded areas; Newark's influence chart; Approximate stress distribution methods for loaded areas; Westergaard's equation

UNIT -III

5. Bearing Capacity Of Shallow Foundation

Concept of foundations; Types of foundations and their applicability; General requirements of foundations; Location and Depth of foundation. Terminology relating to bearing capacity; Bearing Capacity of Shallow Foundations – Terzaghi's Bearing Capacity theory; Skempton'sBearing
Capacity Analysis for Clay soils; IS-Code Recommendations for Bearing Capacity; Influence of water table on bearing capacity;

6. Settlement Analysis

Settlement of Shallow foundation – types; Methods to reduce differential settlements; Allowable Bearing Pressure; Immediate settlemtent –Terzaghi's Method; Allowable Bearing pressure of Granular Soils based on Standard Penetration Test Value – Terzaghi and IS methods;

UNIT – IV

7. Pile Foundations

Introduction; Uses of Piles; Types of Piles; Cast- in-situ Pile construction; Selection of Pile type; Pile driving; Pile load carrying capacity in compression – Static Pile Load formula, Load tests, Dynamic Pile formulae; Correlations with Penetration test data; Group action of Piles – load carrying capacity and settlement; Negative skin friction;

8. Well Foundations

Types of wells; Components of well foundation; Shapes of wells; Forces acting on well foundation; Construction and Sinking of wells;

9. Foundations In Expansive Soils

Identification of expansive soil; Field conditions that favour swelling; consequences of swelling; Different alternative foundation practices in swelling soils; Construction practice of UR piles in swelling soils

TEXT BOOKS:

1. Basic and Applied Soil Mechanics – GopalRanjan and A.S.R.Rao, New Age International Publishers
2. Foundation Engineering by B. J. Kasmalkar; Pune VidyarthiGrihaPrakashan, Pune
3. Foundation Analysis & Design by Bowles, J.E., McGraw- Hill Book Company.
4. Foundations of Expansive Soils, F.H. Chen. Elsevier Publications.
5. Geotechnical Engineering by SK Gulati&ManojDatta, Tata McGraw- Hill Publishing Company Limited.
6. Principles of Foundation Engineering(1999), B.M. Das., PWS Publishing Company, 4th edition, Singapore
7. Geotechnical Engineering, - Codutu, Pearson Education

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)
HIGHWAY ENGINEERING
III B.Tech – II Semester (Code:18CE604)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To discuss the principles of planning and geometric design of highways.
2. To discuss the traffic flow characteristics.
3. To assess the properties of highway construction materials and design the flexible and rigid pavements.
4. To explain the construction and maintenance techniques used in the different pavement layers.

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Course Outcomes: Student will be able to

1. Design various road geometric elements.
2. Asses the traffic flow characteristics and traffic operations.
3. Evaluate suitability of pavement materials and determine the crust thickness of the pavement.
4. Identify the causes for distresses in the pavement layers.

UNIT-I

1. Highway Network Planning and Alignment

Introduction to Transportation Systems and Different Modes of Transportation, Road Classification, Road Patterns, 20 Year Road Development plans. Current road projects in India; Highway Alignment: Requirements, factors controlling, Engineering Surveys.

2. Highway Geometric Design

Geometric Design: Highway Cross Section Elements - Friction, Unevenness, Camber, Carriageway Width, Kerbs, road margins, formation width, right of way, Sight Distance- Stopping Sight Distance, Overtaking Sight Distance, Intermediate Sight Distance, Design of Horizontal Alignment- Super elevation, transition curves, extra widening, set back distance, Design of Vertical Alignment-Grades and Grade Compensation, Types of Vertical curves and design.

UNIT-II

3. Traffic Studies

Introduction, Road User Characteristics, Vehicle Characteristics, Traffic Volume Studies,
Speed Studies, Origin and Destination Studies, Traffic Flow Characteristics, Traffic Capacity and Level of Service.

4. Design Of Traffic Control Devices

Traffic Operations-Traffic Regulation, Traffic Control Devices- Markings, Signs, Signals, Rotary Intersection.

UNIT-III

5. Pavement Materials

Pavement types and components of a pavement structure; characterization of different pavement materials including: sub-grade soil, aggregates, bitumen, modified bitumen, cutback bitumen, and emulsion; Different grading systems for bitumen; Marshall method of bituminous mix design.

6. Design of Pavements

Design of pavements- Introduction; flexible pavements, factors affecting design and performance; design of flexible pavements as per IRC-37; rigid pavement components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC-58.

UNIT-IV

7. Highway Construction and Maintenance

Construction Steps of Embankment, Sub Grade, Granular Sub Base (GSB), Wet Mix Macadam (WMM), Dense Bituminous Macadam (DBM), Bituminous Concrete (BC), Dry Lean Concrete (DLC), Pavement Quality Concrete (PQC), failures in flexible pavement, failures in rigid pavements, maintenance of Bituminous pavements and concrete pavements.

TEXT BOOKS

1. Khanna, S. K., C. E. G. Justo, A.Veeraragavan"Text book on Highway Engineering." Nem Chand Bros, Roorkee (2014).10th Edition.
2. Principles and practices of Highway Engineering (2013), L R Kadiyali; N B Lal,Khanna Publishers, NaiSarak, Delhi

REFERENCE BOOKS

1. Principles of Transportation Engineering by Partha Chakroborthy & Animesh Das; Prentice Hall of India, New Delhi.
2. Ministry of Road Transport and Highways- Specifications for Roads and Bridge Works, Fifth Revision, IRC, New Delhi, India-2013
3. IRC 37:2018- Guidelines For The Design of Flexible Pavements(Third Revision)
4. IRC58-2015 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways

NPTEL :

http://nptel.ac.in/courses/105101087/
http://nptel.ac.in/courses/105105107/

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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Elective - I

ADVANCED STRUCTURAL ANALYSIS
III B.Tech – II Semester (Code : 18CED11)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To understand the analysis of indeterminate structures using strain energy concept
2. To understand the plastic behavior of beams and rigid jointed frames. .
3. To analyze the multi-storey frames by approximate methods and analysis of indeterminate structures by kani's Method.
4. To study the analysis of continues beams using matrix approach

Course Outcomes: At the end of the course, the student will be able to:

1. Analyze the indeterminate structures using strain energy method.
2. Analyze the continuous beams, Frames carrying ultimate loads using plastic analysis.
3. Analyze the indeterminate beams and framed by Kani's method and analyze the multi-storey frames by approximate methods.
4. Analyze the continuous beams, Frames and trusses using matrix methods.

UNIT-I

1. **Strain Energy Method:** Strain energy method for analysis of continuous beams and rigid joined plane frames (DOF: 2) and two hinged arches up to single degree redundancy. (Castigliano's theorem-II).

2. **Redundant Pin Jointed Frames:** Analysis of pin jointed frames (one degree redundancy); Forces in indeterminate pin jointed frames due to temperature variation and lack of fit;

UNIT-II

3. Plastic Behavior of Structures
Idealized stress - strain curve for mild steel; Ultimate load carrying capacity of members carrying axial forces; Moment - Curvature relationship for flexural members; Evaluation of fully plastic moment; Shape factor; Collapse load factor; Upper and lower bound theorems; Collapse load analysis of indeterminate beams and single bay, single storied portal frames.

UNIT – III

4. Multi Storey Frames (Approximate Methods) Substitute frame method for gravity loads; Portal method and cantilever method for lateral loads.

5. **Kani's Method** Principles of the method; Application to continuous beams and portal frames (single bay, single storey with vertical legs only) without and with side-sway.

UNIT – IV

6. Introduction to Matrix Methods

Flexibility and stiffness; Flexibility matrix; Stiffness matrix; Relationship between flexibility matrix and stiffness matrix.

7. Analysis of Continues beams

Analysis of continuous beams by Flexibility method and stiffness matrix method, (up to 2 DOF).

TEXT BOOKS :

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1. V. N. Vazirani& M. M. Ratwani ,Structural Analysis, Vol. II , Khanna Publishers,Delhi.
2. Structural Analysis – A matrix approach by G. S. Pandit & S. P. Gupta; Tata Mc. Graw – Hill Publishing Co. Ltd., New Delhi.
3. Limit Analysis of Structures by Manicka & Selvam , DhanpatRai Publications,2012.

REFERENCES:

1. Matrix analysis of framed structures by Weaver &Ger
2. Basic Structural Analysis by C. S. Reddy, Tata McGraw-Hill

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - I

INSTRUMENTATION AND SENSOR TECHNOLOGY IN CIVIL ENGINEERING
III B.Tech – II Semester (Code:18CED12)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To introduce the basics of measurements. To elucidate sensors and signal conditioning circuits.
2. To introduce different error analysis methods. To familiarize with different sensors and transducers & To explain signal conditioning circuits.
3. To understand concepts of acquiring the data from transducers/input devices, their interfacing and instrumentation system design.
4. To familiarize with different data transfer techniques.

Course Outcomes:

After the completion of the course student will be able to:

1. Illustrate the different methods for the measurement of length and angle
2. Elucidate construction & working of various industrial devices used to measure pressure, sound & flow
3. Explicate the construction and working of various industrial devices used to measure temperature, level, vibration, viscosity and humidity
4. To analyse, formulate and select suitable sensor for the given industrial applications & summarize different methods for level measurement

UNIT – I

Introduction: Basic definitions related to measurements/ Instrumentation, Block diagram ofgeneralized measurement / Instrumentation system.

Static characteristics of instruments: Introduction, static characteristics: accuracy, precision, resolution, static sensitivity, Linearity,Threshold, Hysteresis, Dead Zone, span, Range Loading effect.

Dynamic characteristics: Generalised Mathematical model of measurement system,operational & sinusoidal transfer functions zero, first and second order instruments & their response o step, ramp, and impulse inputs.

UNIT – II

Errors in Measurements: Static error, Types of errors, estimation of static errors: limiting errors &their combinations, error estimates from the normal distribution, probable errors& theircombinations statistical analysis of measurement data uncertainty analysis curve fitting: Method ofleast squares.

Introduction: Definition of Transducer, Classification of transducers.
Resistive Transducers: Potentiometers, straingauges & their types, RTD's, thermistors, Hotwireanemometers.

Inductive Transducers: Transducers type, electromagnetic type, Magnetostrictivetype, Variable reluctance type, (or) Variable permeability type.
Capacitive Transducers: Variabledielectric, Variable gap, Variable area type Capacitive devices, Differential type.

UNIT – III

Piezo-electric Transducers: Piezo-electric effect, Piezo-electric Materials, Piezo-electric transducer &its characteristics.
Radiation Transducers: Radiation Pyrometry, Radiation fundamentals Radiation Pyrometer, Total radiation pyrometer, selective radiation pyrometer, Two-color radiation pyrometers.

UNIT-IV

Signal and System Analysis: Introduction, Analog Filters and frequency analysers, Frequency analysis for various input signals, digital frequency analysers, system analysis by Harmonic testing, system analysis by Transient testing

Condition Monitoring and Signature Analysis Applications: Introduction, Vibration and Noise Monitoring, Temperature Monitoring, Wear Behaviour Monitoring, Corrosion Monitoring, Performance Trend Monitoring, Selection of Condition Monitoring Techniques.

TEXT BOOKS:

1. BC Nakra&KKChaudhry, Instrumentation, Measurement and Analysis 2nd Edition,TMH
2. AK Ghosh, Introduction to Instrumentation and Control (PHI)

REFERENCE BOOKS:

1. Allan s Morris, Principles of Measurement systems (PHI)
2. A.K.Sawheny, Electrical & Electronic Measurements and InstrumentationDhanpathRai
3. JB Guptha, Electrical & Electronic Measurements and Instrumentation, S.K.Kataria
4. E.O.Doeblin, Measurement systems: Applications and Design,TMH
5. D.V.S Murthy, Transducers & Instrumentation, PHI
6. D.S.Kumar, Mechanical Measurements, Metro Politan

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Elective - I

SUSTAINABLE ENGINEERING & TECHNOLOGY

III B.Tech – II Semester (Code : 18CED13)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To develop an awareness on issues in areas of sustainability.
2. To establish the role and impact of engineering activities and engineering decisions on environmental, societal, and economic well-being.
3. To give familiarity with the methods and tools used for sustainable product-service system development
4. To understand the role of engineering and technology within sustainable development.

Course Outcomes:

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

1. Increased awareness on issues in the area of sustainability
2. Gain an understanding of the role and impact of engineering activities and engineering decisions on the environment, society, and economics
3. Gain familiarity with the methods and tools employed for sustainable product-service system development.
4. Understand the role of engineering and technology within sustainable development.

UNIT-I

1.Anintroduction to sustainability -Introduction -The Magnitude of the Sustainability ChallengeEnergy

2. Materials Use- Minerals, Metals, and Organics Water -

3.Environmental Emissions - Ozone Depletion in the Stratosphere- Global Warming-Regional and Local Air Quality -Summary ofAir Quality - Water Quality - Wastes

UNIT-II

4. Risk and life-cycle frameworks for sustainability - Introduction- Risk -Definitions- Risk Assessment -Risk-Based Environmental Law

5.Life-Cycle Frameworks- Defining Life Cycles- Life-Cycle Assessment- Life-Cycle-Based Environmental Law;

6. Life-Cycle Assessment Tools- Process-Based Life-Cycle Assessments Input-Output LCA - Hybrid Approaches

UNIT-III

7. Green, sustainable materials- Introduction- Environmental and Natural Resource Use Footprints of Material Extraction and Refining Tracking Material Flows in Engineered Systems

8.Introduction - Sustainable Engineering Design Principle; Economic Performance Indicators-Definitions -Estimates of Environmental Costs- A Frameworkfor Evaluating Environmental Costs; Environmental Performance Indicators- Life-Cycle Impact Assessment

UNIT-IV

9.CASE STUDIES -Introduction;Biofuels for Transportation-The Carbon Cycle and Biofuels-Feedstocks for Biofuels - Processing Routes for Biomass to Biofuels- Biofuel Life Cycles-Cautionary Tales and Biofuels- Summary ofSustainability ofBiofuels

10.Sustainable Built Environments- Energy Consumed for Building Operation, Materials Usefor Building Construction and Maintenance, Design of Buildings for Sustainability, Conclusions on Sustainability of Buildings

TEXT BOOK:

1. SustainableengineeringConcepts, Design, and Case Studies by DAVID T. ALLENDAVID R. SHONNARD

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Elective - I

ADVANCED FLUID MECHANICS
III B.Tech – II Semester (Code : 18CED14)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The main objectives of this course are to

1. To undertake sustained learning in fluid mechanics to advance their knowledge in this field.
2. To enhance the understanding of fluid mechanics, including the equations of motion in differential form and turbulence.
3. To understand an idea about stilling basin types.
4. To understand hydraulic mechanics.

Course Outcomes: The students will be able to

1. Recognize the particular flow regime present in typical engineering system.
2. Demonstrate the concept of stream function and potential function.
3. Choose the appropriate fluid mechanics principles needed to analyze the fluid-flow situations.
4. To identify the types of stilling basins.

UNIT – I

1. **Basic Concepts and Fundamentals:** Fluid statics, Cartesian tensors, fluid kinematics, description of fluid motion, types of motion of fluid elements, vorticity and circulation, equation of motion of forced and free vortex flow.

2. **Stream function and velocity potential function:** stream function and its relation with velocity field, relation between stream lines and lines of constant potential, Lagrangian and Eulerian approaches, Reynold's transport theorem.

UNIT – II

3. **Potential flow:**Uniform flow, sink flow, source flow, plane source in a uniform flow, source and sink pair in a uniform flow, pressure distribution on the surface of cylinder. Potential flow between two parallel plates.

4. **Incompressible viscous flow:** Concept of laminar and turbulent flows, derivation of Hazen poissuille's equation for velocity and discharge through a pipe, derivation for friction factor for laminar flow, Navierstokes's equation and its significance.

UNIT – III

5. **Turbulent flow:** Introduction of turbulent flow, governing equation of turbulent flow, fully developed turbulent pipe flow for moderate Reynold's number, Prandtl's mixing length theory, turbulence modeling.

6. **Introduction to Computation of Fluid Dynamics (CFD):**Boundary conditions, basic discretization – Finite difference method, Finite volume method and Finite element method.

UNIT – IV

7. **Channel Transition:** Reduction in width of the channels, hump, surge in open channel, significance of jump, Indian type of stilling basins and USBR stilling basins.

8. **Reciprocating Pump:** Introduction, main components, slip, working producer, classification, indicator diagram, maximum speed of reciprocating pump.

TEXT BOOKS

1. Bansal R. K., A Text Book of Fluid Mechanics and Machines, Laxmi Publications, 2010.
2. Douglas J. F., Fluid Mechanics, Pearson Education, 2005.
3. Kumar D. S., Fluid Mechanics and Fluid Power Engineering, S. K. Kataria& Sons, 1987.
4. Muralidhar K., G. Biswas, Advanced Engineering Fluid Mechanics, Alpha Science International limited, 2005.
5. Rama D. D., Fluid Mechanics and Machines, New Age International, 2009.

REFERENCE BOOKS

1. Schlichting H., K. Gersten , Boundary Layer Theory, 8/e, Springer 2000.
2. Shames I. H., Mechanics of Fluids, 4/e, McGraw-Hill, 2002.
3. Streeter V. L. and E. B. Wylie, Fluid Mechanics, McGraw-Hill, 1979.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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Elective - II

ADVANCED DESIGN OF STRUCTURES
III B.Tech – II Semester (Code : 18CED21)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The student will study and understand:

1. Stability requirements and design of cantilever type retainingwall and design of pile foundation
2. Design of raft foundation and elevated water tank.
3. Design of Gantry Girder and its connections using LSM
4. Design of plate girder
5. Understand and design of roof truss and purlins

Course Outcomes: Students will be able to

1. Design cantilever type retaining wall and pile foundation using LSM.
2. Design Raft foundation and elevated water tank
3. Design of Gantry Girder efficiently and economically
4. Design of plate girder efficiently and economically
5. Determine loads on roof trusses and able to design of purlins

UNIT I

Retaining Walls and Pile Foundations

Types of Retaining walls, Forces on retaining walls, Stability requirements, Design and detailing of Cantilever type retaining wall.

Introduction to Pile foundation, Design of Pile and Pile cap.

UNIT II

Design of Raft Foundation

Introduction to Raft foundation, Design of raft Foundation.

Design of Rectangular Water Tank

Introduction, Design of Rectangular Elevated Water Tank.

UNIT III

Gantry Girder

Introduction; Loads on Gantry girders; Fatigue effects; Design of gantry girder;

UNIT IV

Plate Girder

Introduction, Design of flanges and web, stiffeners and their connections

UNIT V

ROOF TRUSSES

Type of trusses for different spans; Components of a roof trusses; Live loads and wind loads on trusses as per I.S Codes; Design of Purlins including tubular sections.

TEXT BOOKS:

1. For Working Stress Method: Reinforced concrete by H. J. Shah, charotarpublishinghouse
2. For Limit State Method: Reinforced Concrete (limit state design) by Ashok K. Jain; Nem Chand & Bros., Roorkee.
3. Limit state design of steel structures by S.K.Duggal, Tata McGrawhill,Publishingcompany Ltd.
4. Design of Steel structures by N.Subramanian, Oxford University press,2009

REFERENCE BOOKS:

1. Reinforced concrete design by Pillai and Menon, Tata McGraw-Hill
2. Limit state theory & Design of reinforced concrete by Dr. S. R. Karve andDr.V.L.Shah;
3. Pune VidyarthiGrihaPrakashan,Pune.
4. Design of reinforced concrete structures by S. Ramamrutham; DhanpatRai&Sons.
5. Design of Steel Structures by Limit state method as per IS800-2007 by S.S.Bhavakatti, IKInternational Publishing Housing Pvt.Ltd.
6. Design of Steel Structures by Limit state method as per IS800-2007 by K.LSairam, PearsonEducation India
7. Structural steel design by M.L.Gambhir , Tata McGraw-Hill Education

Code Books:

1. IS 456-2000, IS 3370 (Part-II and Part-IV),
2. IS 800-2007, IS 875 Part-III

BAPATLA ENGINEERING COLLEGE : : BAPATLA

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Elective - II

OFFSHORE ENGINEERING

III B.Tech – II Semester (Code : 18CED22)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives: To enable the students to

1. Learn the concepts of petroleum site exploration, analysis of offshore structure
2. Understand the offshore soil mechanics.

Course Outcome:

1. Students will learn the basics of offshore operations.
2. They will learn the Laboratory testing methods, In situ testing methods and geophysical methods and able to design the offshore structures.

UNIT I

Introduction to offshore oil and gas operations. Sea States and Weather, Offshore Fixed and mobile Units, Offshore Drilling, Difference in drilling from land, from fixed platform, jack up, ships and semi submersibles. Offshore Well Completion, Offshore Production systems, Deep-water technology, Divers and Safety, Offshore Environment, classification & properties of marine sediments. Consolidation and shear strength characteristics of marine sediments. Planning and site exploration.

UNIT II

Drilling. Samplingtechniques. Laboratory testing, In situ testing methods and geophysical methods. Current design practices of pile supported and gravity offshore structures.

UNIT III

Dynamic analysis of offshore structures. Centrifugal modelling. Anchor design. Break out resistance analysis and geotechnical aspects of offshore pipeline and cable design. Field instrumentation and performance observation.

UNIT IV

Offshore soil mechanics; Offshore pile foundations and caissons; Design of breakwaters; Buoy design and mooring systems; Offshore drilling systems and types of platforms.

TEXT BOOKS:

1. Standard Hand Book of Petroleum & Natural Gas Engineering" – 2nd Edition 2005-William C.Lyons& Gary Gulf-Gulf professional publishing comp (Elsevier).
2. Wellsite Geological Techniques for petroleum Exploration by Sahay.B et al.

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Elective - II

DISASTER PREPAREDNESS AND PLANNING MANAGEMENT
III B.Tech – II Semester (Code : 18CED23)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

COURSE OBJECTIVES: The subject provides

1. Knowledge of disaster and its classifications.
2. Exposure to Institutional Framework
3. Good knowledge on Prevention and Mitigation
4. Explanation on Preparedness and Response and Disaster Planning

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

1. Know the disaster and its classifications.
2. Understand the importance of Institutional Framework
3. Gain the good exposure on Prevention and Mitigation
4. Have knowledge on Preparedness & Response and Disaster Planning

UNIT-I

Introduction; Disaster, classification of disaster- Based on Time Duration to Occur, Based on Inducing Parameters, Natural Disasters- Volcanic Eruption, Natural Disasters Induced by Human Interventions, Exclusive Human-made Disasters.

UNIT-II

Institutional Framework - Evolution of Disaster Management in India, Disaster Management during British Administration and Post-Independence, Emergence of Institutional Arrangement in India, Organisation and Structure of Disaster Management, Disaster Management Framework, Present Structure for Disaster Management in India, Disaster Management Act, 2005 National Disaster Management Authority (NDMA), National Level Institutions, State level Institutions, District level Institutions, National Institute of Disaster Management (NIDM), National Disaster Response Force (NDRF), State Disaster Response Force (SDRF), Civil Defense, Fire Services, Home Guard, Interface between the Ministries for disaster Management,

UNIT-III

Prevention and Mitigation; Introduction, Mainstreaming of Disaster Risk Reduction in Developmental Strategy, National Disaster Mitigation Fund, Measures taken for Prevention and Mitigation of Hazards, Earthquakes, Cyclones, Floods, Study of Land Contour by GSI, Landslides, Tsunami, Droughts, Fire, Forest Fire Management, Oil Industry, Chemical Disasters, Prevention of Disasters in Mines, Epidemics, Measures taken for Rail Safety, Road, Civil Aviation,

UNIT-IV

Preparedness and Response; Introduction, Institutional Arrangements, India Meteorological Department (IMD), Forecast of Rainfall, Forecasting System – Background, Forecasting and Warning of Cyclones, Flood Forecasting – Central Water Commission, Tsunami warning – Indian National Centre for Oceanic Information System(INCOIS), Warning about Landslide hazard – Geological Survey of India (GSI), Avalanche warning – Defense Research & Development Organization (DRDO), Disaster Management Support (DMS) – Indian Space Research Organization, Radiological and Nuclear Emergencies, Installation of Radiological Detection Equipment, Director General of Mines Safety, Epidemic, Preparedness, Role and Responsibility of Central and State Governments, Role of the State Government, Role of District Administration, Role of Sub-district Administration, National Disaster Response Force (NDRF),

Disaster Planning; Principal causes of Disaster, Some Major Effects of Disasters, Disaster Plan.

TEXT BOOKS:

1. K.Palanivel, J.Saravanavel, S.GunasekaranRobbins, Disaster Management, Allied Publishers Pvt. Ltd. 2015.
2. Manual on Disaster Management in India, Ministry of Home Affairs, Government of India, 2011.

REFERENCE BOOK:

1. Mullins, J. Laurie, Management and Organizational Behavior, Oxford Publishers, 2007.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - II

CONSTRUCTION ENGINEERING MATERIALS
III B.Tech – II Semester (Code : 18CED24)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

The student will study and understand about

1. Ferrous and non-ferrous materials.
2. Ceramic materials.
3. Polymeric materials.
4. Paints, Enamels &Varnishes and Gypsum.
5. Miscellaneous Materials and Geosynthetics, smart materials &Composite Materials

Course Outcomes:

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

1. Difference between Ferrous and non-ferrous materials which are used in construction.
2. Ceramic materials and its polymorphism, properties and classification.
3. Polymeric materialsand mechanism of polymerization and its applications.
4. Paints, Enamels &Varnishes along its composition and characteristics.
5. Gypsumand its properties.
6. Miscellaneous Materials used in construction and about Geosynthetics, smart materials &Composite Materials.

UNIT-I

1.Introduction to ferrous metals- iron- Pig Iron - Cast Iron - wrought Iron- rolled steel sections- Reinforcing steel bars- tensile testing of steel sections - alloy steel

2. Introduction to non -ferrous metals- aluminium- copper - zinc- lead- tin- nickel

UNIT-II

3. Introduction to ceramic materials - Polymorphism in ceramic materials- Mechanical, Thermal, Electrical properties of ceramic phases- Classification of ceramics- Refractories- Glass- Commercial forms of Glasses- Glass wool

4. Introduction to polymeric materials- polymerisation Mechanism- Depolymerisation- Resins - Plastics- Constituents of Plastics- Properties of Plastics- Application of plastics- rubbers- Classification of Rubbers- Uses of Rubber

UNIT-III

5. Introduction to Paints, Enamels and Varnishes- Composition of oil paints- characteristics of oil paints- preparation of paints-pigment volume concentration- water paints -enamel paints - Varnish- french polish-wax polish- defects of painted surfaces- Texture paints

6. Introduction to Gypsum- effects of heat and Moisture on Gypsum- setting and Hardening of Gypsum- Classification of Gypsum- Manufacture of Gypsum- Plaster of Paris- Gypsum wall plasters- gypsum plaster boards- pyrocell

UNIT-IV

7. Introduction to Miscellaneous Materials- Adhesives- Asbestos- Linoleum- Thermocol- Fibres- Decorative GRC materials-- Concrete Paver Blocks - Heat , Sound, Water insulating materials
8. Introduction to Geosynthetics, smart materials. Composite Materials

TEXT BOOKS:

1.Building Materials by S.K. Duggal
2. Engineering Materials by R.K. Rajput

REFERENCES:

1. Building Materials, Construction and Planning by S.MahaboobBasha

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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ADVANCED SURVEYING LABORATORY
III B.Tech – II Semester (Code : 18CEL61)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To determine distances and relative positions using trigonometric leveling
2. To deal with various methods employed for the measurement of areas and volumes.
3. To build the knowledge on different methods of setting & design of simple circular curves.
4. To develop the concepts on usage of EDM, Digital Theodolite and total station.

Course Outcomes:

By the end of the course, the students will be able

1. To determine the reduced level of different structures when base is inaccessible and accessible.
2. To design and layout curves for a roads and railways.
3. To prepare contour maps for the given area

To do applications related to the instruments EDM and Total station.

Experiments

1. To determine the elevation of the top of the object when the base is accessible
2. To determine the elevation of the top of the object when the base is inaccessible when the instruments are in same vertical plane.
3. To determine the elevation of the top of the object when the base is inaccessible when the instruments are in not in the same vertical plane.
4. To set Simple circular curve by using offsets from Long Chord method.
5. To set Simple circular curve by using radial, perpendicular offsets from tangents.
6. To set Simple circular curve by Rankine's method or Tape and theodolite method.
7. To set Simple circular curve by Two theodolite method.
8. To Prepare Contour maps for given area by grid method using leveling Instrument.
9. To develop the knowledge on usage of Total station.
10. To perform RDM application and find the distance between inaccessible points by Total station.
11. To perform REM application to find the elevation by Total station.
12. To Calculate area for given plot by Total station.

TEXT BOOKS AND REFERENCES:

1. Surveying Vol-I by Dr K.R. Arora.
2. Surveying Vol-I by Dr B. C. Punmia.
3. Plane surveying by A M Chandra.

Note: Survey Camp is to be conducted for a minimum period of seven days Using Total Station to train in one of the following areas:

i. Preparation of a contour Plan/ Map.
ii. Earth work Computations for a high way / canal projects
iii. Marking of a Sewer line/ Water supply line.
iv. Any type of Execution works.

BAPATLA ENGINEERING COLLEGE : : BAPATLA

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STRUCTURAL ANALYSIS, DESIGN AND DETAILING LABORATORY

III B.Tech – II Semester (Code : 18CEL62)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Students are required to analyze and design the following structures using software package like STAAD/ETABS/GTSTRUDL/STRAP etc. and detailing of structures using SP-34 & AUTO CAD.

Course Objectives:

1. To understand the modeling and analysis of indeterminate structures like continuous beams and frames using STAAD and ETABS.
2. To learn the basic concepts in analysis and design of slabs, footing and truss using different software's like STAAD and ETABS.
3. To know the detailing concepts and usage of SP-34
4. To learn the commands to draw the detailing of indeterminate beams, slabs, footings, retaining walls and plate girder using AUTO CAD

COURSE OUTCOMES

Upon successful completion of this course, student will be able to

1. Compare the manual results and software results
2. Analyse and design the different structural elements using software's like STAAD and ETABS
3. Draw the detailing of different structural elements using SP34 and AUTO CAD
4. Design and detailing the steel structural elements like truss , column bases and plate girder using STAAD and AUTOCAD

1. Indeterminate beams.
2. Plane roof truss.
3. Plane frame subjected to gravity loads and lateral load (wind load).
4. SPACE(3D) frame analysis for gravity and lateral loading.
5. One-way slab.
6. Two way slab.
7. Isolated footing.
8. Pile foundation.
9. Combined footing.
10. Cantilever Retaining wall.

11. Plate girder.
12. Column base.

TEXT BOOKS:

1. Limit State Design of Reinforced Concrete by P. C. Varghese, Prentice Hall of India.
2. For Limit State Method: Reinforced Concrete (limit state design) by Ashok K. Jain; Nem Chand &Bros.,Roorkee
3. For Working Stress Method: Reinforced concrete by H. J. Shah, charotar publishing house
4. Reinforced Concrete Structures by N. Subramanian, Oxford University Press.

REFERENCE BOOKS:

1. Reinforced concrete design by Pillai and Menon, Tata McGraw-Hill
2. Limit state theory & Design of reinforced concrete by Dr. S. R. Karve and Dr.V.L.Shah; Pune VidyarthiGrihaPrakashan, Pune.
3. Reinforced concrete design: Principles and Practice by N. Krishna Raju., R. N. Pranesh, New Age International Publishers.
4. Reinforced Concrete Structure by R. Park., T. Paulay, Wiley India Publishers

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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GEO TECHNICAL ENGINEERING LABORATORY
III B.Tech – II Semester (Code : 18CEL63)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

The objective of this course is:

1. To impart knowledge of determination of index properties required for classification of soils.
2. To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests;
3. To determine permeability of soils.
4. To teach how to determine shear parameters of soil through different laboratory tests.

Course Outcomes

Upon successful completion of this course, student will be able to

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction and Consolidation characteristics of soils
4. Determine shear characteristics of soils

List of Experiments:

1. Determination of water content by oven drying method.
2. Determination of specific gravity by (a) Density bottle method (b) Pycnometer method.
3. Gradation analysis a) Mechanical Sieve analysis b) Hydrometer analysis.
4. Determination of Atterberg limits
5. Determination of free swell index
6. Determination of field unit weight by a) Core cutter method. b) Sand replacement method.
7. Determination of permeability by a)Constant head permeameter. b) Variable head permeameter.
8. Direct shear test.
9. Vane shear test.
10. Unconfined compression test
11. IS - Light compaction test
12. IS - Heavy compaction test
13. Triaxial shear test (Demonstration only)
14. Consolidation test.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
(Autonomous)
CONSTRUCTION MANAGEMENT
IV B.Tech – I Semester (Code : 18CE701)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives: The subject provides

1. To provide a knowledge on project failures, planning and scheduling of a project.
2. Knowledge on network techniques like PERT, CPM and Cost Control.
3. Exposure to the different types of Resources in Construction.
4. Will provide importance of Quality control and Safety Management.

Course Outcomes: At the end of the course student will be able to

1. Acquire knowledge on project failures and basic concepts in planning like Bar Chart and Milestone charts.
2. Prepare the network diagrams by using different techniques like PERT, CPM and can able to do cost management in the construction using cost control techniques.
3. Get clear idea on different types of resources required for a project and their specifications.
4. Express the importance of Quality and Safety in construction projects and good exposure to ISO standards.

UNIT – I

1. Introduction

Construction projects; Project management; Main causes of project failure.

2. Planning and Scheduling

Steps involved in planning; Objectives; Principles; Advantages; Limitations; Stages of planning; Scheduling, Preparation of construction schedules; Methods of scheduling; Bar charts; Mile stone charts; Controlling; Job layout; Factors affecting job layout; Project work break down; Activities involved; Assessing activity duration.

UNIT – II

3. Project Management Through Networks

Objectives of network techniques; Fundamentals of network analysis; Events; Activities; Dummies; Types of networks; Choice of network type; Advantages of network techniques over conventional techniques.

4. Program Evaluation and Review Technique (PERT)

Introduction; Time estimates; Earliest expected time; Latest allowable occurrence time; Slack; Critical path; Probability of completion time for a project.

5. Critical Path Method (CPM)

Introduction; Difference between CPM and PERT; Earliest event time; Latest event time; Activity time; Float; Critical activities and critical path.

6. Cost Control

Direct cost; Indirect cost; Total project cost; Optimization of cost through networks; Steps involved in optimization of cost.

UNIT – III

7. Resource Management (Manpower)

Introduction; Resource smoothing; Resource levelling; Establishingworkers productivity.

8. Resource Management (Materials)

Objectives of material management; Costs; Functions of material management department; ABC classification of materials; Inventory of materials; Material procurement; Stores management.

9. Resource Management (Machinery)

Classification of construction equipment; Earth moving equipment; Excavation equipment; Hauling equipment, Earth compaction equipment; Hoisting equipment; Concreting plant and equipment; Time and motion study; Selection of equipment– Task consideration, Cost consideration; Factors affecting the selection; Factors affecting cost owning and operating the equipment; Equipment maintenance.

UNIT – IV

10. Quality Control

Importance of quality; Elements of quality; Organization for quality control; Quality assurance techniques; Documentation; Quality control circles; Total quality management; ISO – 9000.

11. Safety Management

Accident prevention programme; immediate attention in case of accident; Approaches to improve safety in construction; Safety benefits to employers, employees and customers; Prevention of fires in construction industries; Fault free analysis; Safety information system; Safety budgeting.

TEXT BOOKS:

1. Construction Engineering and Management by Dr. S. Seetharaman; Umesh Publications, Nai Sarark, Delhi.
2. Fundamentals of PERT/CPM and Project Management by S. K. Bhattacharjee; Khanna Publishers, NaiSarak; Delhi.

REFERENCE BOOKS:

1. Construction Management & Planning by B. Sengupta& H. Guha; Tata McGraw – Hill Publishing Co. Ltd., New Delhi.
2. Construction Planning, Equipment & Methods by Peurifoy R. L.; McGraw – Hill International Book Company.
3. PERT & CPM Principles and applications by L. S. Srinath; Affiliated East West Press.

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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Elective - III

PRE STRESSED CONCRETE
IV B.Tech – I Semester (Code : 18CED31)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To highlight the concepts of pre-stressing in concrete and materials used for pre-stressing.

2. To analyze the general mechanical behavior of pre-stressed concrete members on comparison with those of RCC members.

3. To understand various losses of pre-stress and estimate the deflection in pre-stressed concrete members.

4. To design pre-stressed concrete beams.

5. To analyze and design of end anchorages for pre-stressed concrete members.

Course Outcomes:

1. Understand the concepts of pre-stressing in concrete and state the necessity for high strength steel and concrete in PSC and explanation of the various types of pre-stressing systems.

2.Understand the difference in the analysis of general mechanical behavior of PSC and RCC members.

3.Evaluate the total losses allowed for design of PSC members and estimating the deflection in PSC members.

4.Design pre-stressed concrete beams using IS1343.

5.Analyzing and designing the end anchorages for pre-stressed concrete members.

UNIT – I

1. Introduction Basic concepts of prestressing; Need for High strength steel and High strength concrete; Advantages of prestressed concrete.
2. Materials For Prestressed Concrete High strength concrete; High tensile steel.
3. Prestressing Systems Tensioning devices; Hoyer's long line system of pretensioning; Post tensioning systems; Detailed study of Freyssinetsystem, Lee-McCall System and Gifford – Udall system;
4. Analysis Of Prestress And Bending Stresses Basic assumptions; Analysis of prestress; Resultant stresses at a section; Pressure (Thrust) line and internal resisting couple; Concept of

Load balancing; Stresses in tendons; Cracking moment.

UNIT – II

5. Losses of Prestress Nature of losses of prestress; Loss due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip; Total losses allowed for in design.
6. Deflections of Prestressed Concrete Members; Importance of control of deflections; Factors influencing deflections; Short term deflections of uncracked members

UNIT – III

7. Elastic Design of Prestressed Concrete Sections for Flexure Permissible compressive stresses in concrete as per IS 1343; Design of rectangular and I – sections of TYPE 1, TYPE 2 (Elastic Design only).

UNIT – IV

8. Shear Resistance Shear and Principal Stresses; Ultimate shear resistance of prestressedconcrete members; Design of shear reinforcement.
9. Transfer of Prestress in Pre–Tensioned Members & Flexural Bond Stresses Transmission of prestressing force by bond; Transmission length; Bond stresses; Transverse tensile stresses; End zone reinforcement; Flexural bond stresses in pre –tensioned and post – tensioned grouted beams.
10. Anchorage Zone Stresses in Post-Tensioned Members Stress distribution in end block; Anchorage zone reinforcements; Design of anchorage and end block as per IS 1343.

TEXT BOOKS:
Prestressed Concrete by N. Krishna Raju; Tata McGraw - Hill Publishing Company Limited, NewDelhi.

REFERENCE BOOKS:
1. Design of Prestressed Concrete Structures by T.Y. Lin & Ned H. Burns; John Wiley & Sons.
2. Prestressed Concrete by P.Dayaratnam. Oxford & IBH
3. Prestressed Concrete by N.RajaGopalan. PH

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - III

ENVIRONMENTAL GEOTECHNICS
IV B.Tech – I Semester (Code : 18CED32)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To introduce soil structure and clay minerals.
2. To know characteristics and classification of wastes
3. Introducing hydrology of contaminants.
4. Introducing methods of disposal and site remediation

Course Outcomes:

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

1. Understand soil structure and clay minerals
2. Understand characteristics and classification of wastes
3. Understand characteristics and classification of wastes
4. Understand methods of disposal and site remediation

UNIT-I

CLAY MINERALOGY AND SOIL STRUCTURE

Clay mineralogy and soil structure: Gravitational and surface forces-inter sheet and inter layer bonding in the clay minerals- Basic structural units of clay minerals- isomorphous substitution – kaolinite mineral- montmorillonite mineral- illite mineral- electric charges on clay minerals – base exchange capacity- diffused double layer- adsorbed water- soil structure- methods for the identification of minerals (introduction only).

UNIT-II

CHARACTERISTICS AND CLASSIFICATION OF WASTES

Wastes and Contaminants (introduction only): sources of wastes-types of wastes-composition of different wastes- characteristics and classification of hazardous wastes- generation rates- Soil water environment interaction relating to geotechnical problems-Effect of pollution on soil water behaviour-Case studies of foundation failures by ground contamination.

UNIT-III

HYDROLOGY OF CONTAMINANTS

Transport phenomena in saturated and partially saturated porous media-contaminant migration and contaminant hydrology- Ground water-pollution downstream for landfills due to Leachate

migration-Passive containment systems – Containment control systems- liners and covers for waste disposal- rigid liners- flexible liners.

UNIT-IV

METHODS OF DISPOSAL AND SITE REMEADIATION

Criteria for selection of sites for waste disposal – Surface and subsurface waste disposal techniques-Ground modification techniques in waste management – Physical modification-Thermal modification-chemical modification-Bioremediation-Geotechnical properties of wastes-Bearing capacity of landfill sites-foundation for waste fill ground.

TEXT BOOKS

1.Mitchell, J (1976), "Fundamentals of soil behaviour", John Wiley and sons, New York

2. Daniel,B.E., " Geotechnical Practice for Waste disposal ", Chapman and Hall, London, 1993.

3. Iqbal,H.Khan "Text book of Geotechnical Engineering" Second Edition

REFERENCES

1. Lambe, T. W & Whitman, R. V (1979), "Soil Mechanics ", John Wiley and Sons, New York.

2. GopalRanjan& A.S.R Rao (1991), "Basic and Applied Soil Mechanics, Wiley Eastern Ltd., New Delhi.

3. Wilson, M. J (1987), "A Hand book of Determinative methods in Clay Mineralogy", Chapman and Hall, New York.

4. Robert M. Koerner (1984), "Construction and Geotechnical methods in FoundationEngineering", McGraw Hill Book Co., New York.

5. Yong R. N. (1992), "Principles of contaminant Transport in Soils, "Elsevier, New York. RamanathaIyer T. S (2000), "Soil Engineering Related to Environment", LBS centre.

6.Lagrega, M.D., Buckingham, P.L. and Evans, J.B., " Hazardous Waste Management McGraw Hill, Inc., Singapore, 1994.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - III

LOW COST HOUSING TECHNIQUES
IV B.Tech – I Semester (Code : 18CED33)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To examine the present housing scenario in India.
2. To introduce the economic issues related to housing especially in developing countries like India.
3. To know Building by-laws for housing and housing for urban poor.
4. Introducing low-cost housing techniques
5. Introducing building materials for low-cost housing
6. Introducing traditional practices for low-cost housing
7. To give an introduction on design concepts of seismic resistant structures and to understand earth quake resistant design.

Course Outcomes:

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

1. Understand Housing Scenario and Housing Finance
2. Apply Building by-laws for urban planning and Housing for Poor
3. Apply Low Cost Housing Techniques
4. Use Building Materials for low cost Housing
5. Apply concepts of Traditional practices of Rural Housing Technology and design concepts of seismic resistant structures.

UNIT-I

1. Housing Scenario Introducing- Status of urban housing- Status of Rural Housing-

2. Housing Finance: Introducing- Existing finance system in India- Government role as facilitator- Status at Rural Housing Finance- Impedimental in housing finance and related issues

UNIT-II

3. Land use and physical planning for housing: Introduction- Planning of urban land- Urban land ceiling and regulation act- Effectincey of building bye laws- Residential Densities

4. Housing the urban poor: Introduction- Living conditions in slums- Approaches and strategies for housing urban poor

UNIT-III

5. Development and adopt on of low cost housing technology: Introduction- Adoption of innovative cost effective construction techniques- Adoption of precast elements in partial prefabrication- Adopting of total prefabrication of mass housing in India- General remarks on pre-cast rooting/flooring systems- Economical wall system- Single Brick thick loading bearing wall- 19cm thick load bearing masonry walls- Half brick thick load bearing wall- Flyashgrypsym thick for masonry- Stone Block masonry- Adoption of precast R.C. plank and join system for roof/floor in the building.

UNIT-IV

6. Alternative building materials for low-cost housing: Introduction- Substitute for scarce materials- Ferro cement- Gypsum boards- Timber substitutions- Industrial wastes- Agricultural wastes

7. Low-cost Infrastructure services: Introducing- Present status- Technological options- Low-cost sanitation's- Domestic wall- Water supply- energy

UNIT-V

8. Rural Housing: Introduction- traditional practice of rural housing continuous - Mud Housing technology- Mud roofs- Characteristics of mud- Fire resistant treatment for Thatched roof- Soil stabilization- Rural Housing programs

9. Housing in Disaster Prone areas: Introduction- Earthquake- Damages to houses- Traditional Houses in disaster prone areas Type of Damages and Railways of non-engineered buildings- Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions - Requirements of structural safety of thin precast roofing units against - Earthquake forces- Status of R& D in earthquake strengthening measures- Floods- cyclone- future safety

TEXT BOOKS AND REFERENCE BOOKS:

1. Building materials for low –income houses – International council for building research studies and documentations.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Properties of Concrete – Neville A.M. Pitman publishing Limited- London.
4. Light weight concrete- Academic kiado- Rudhai .G – Publishing home of Hungarian Academy of Sciences 1963.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective – III

REPAIR & REHABILITATION OF STRUCTURES
IV B.Tech – I Semester (Code : 18CED34)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To learn various distress and damages to concrete and masonry structures and to understand the importance of maintenance of structures
2. To apply Non-Destructive Testing techniques to field problems and to learn the importance of methods of substrate preparation
3. To study the various types and properties of repair materials
4. To apply cost effective retrofitting strategies for repairs in buildings.

Course Outcomes:

1. Understand the need for rehabilitation of structures and their maintenance and evaluation of the damages in R C Buildings and masonry structures.
2. Equip student with concepts of NDT and evaluation and to understand the importance of methods of substrate preparation.
3. Knowing the various types of repair materials available and to understand their behavior and properties of repair materials.
4. Knowing various methods of crack repair and application of the cost-effective retrofitting strategies for repairs in buildings.

UNIT-I

Introduction Maintenance, rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures. Cracks in R.C. buildings Various cracks in R.C. buildings, causes and effects Maintenance importance of maintenance, routine and preventive maintenance. Damages to masonry structures Various damages to masonry structures and causes.

UNIT-II

Damage diagnosis and assessment Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test,Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement Substrate preparation Importance of substrate/surface preparation, General surface preparation methods and procedure, Reinforcing steel cleaning.

UNIT-III

Repair materials Various repair materials, Criteria for material selection, Methodology of selection, Health and safety precautions for handling and applications of repair materials Special mortars and concretes Polymer Concrete and Mortar, Quick setting compounds Grouting

materials Gas forming grouts, Salfoalumate grouts, Polymer grouts, Acrylate and Urethane grouts. Bonding agents Latex emulsions, Epoxy bonding agents. Protective coatings Protective coatings for Concrete and Steel FRP sheets .

UNIT-IV

Crack repair Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks. Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair of various corrosion damaged of structural elements (slab, beam and columns) Jacketing Jacketing, Column jacketing, Beam jacketing, Beam Column joint jacketing, reinforced concrete jacketing, Steel jacketing, FRP jacketing. Strengthening, Beam shear strengthening, Flexural strengthening.

TEXT BOOKS

1. “Repair and protection of concrete structures” by Noel P.Mailvaganam, CRC press London.

2. “Concrete repair and maintenance Illustrated” by Peter.H.Emmons, Galgotia publishers.

3. “Earthquake resistant design of structures” by Pankajagarwal, Manish shrikande, PHI.

REFERENCE BOOKS

1. “Failures and repair of concrete structures” by S.Champion, John wiley and sons.

2. “Diagnosis and treatment of structures in distress” by R.N.Raikar Published by R & D centre of structural designers and consultants pvt.ltd, Mumbai.

3. “Handbook on repair and rehabilitation of RCC buildings”, CPWD, Government of India.

4. “Handbook on seismic retrofit of buildings”, CPWD, Indian buildings congress, IIT Madras, Narosa Publishing House.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - IV

RAILWAY AND AIRPORT ENGINEERING
IV B.Tech – I Semester (Code : 18CED41)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Prerequisites: Surveying (18CE302) Highway Engineering (18CE604)

Course Objectives:
1. To discuss various components of railway track and their requirements.
2. To design the geometrics of railway track.
3. To design the runway geometric.
4. To design the runway pavement and discuss various facilities of a harbor and port.

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Course Outcomes: Student will be able to
1. Choose various components for laying a railway track.
2. Design the various geometrical elements of a railway track.
3. Plan and design runway geometrics and airfield pavements.
4. Determine the crust thickness of the runway pavement and describe the harbor components.

UNIT-I

1. INTRODUCTION TO RAILWAYS
Comparison of railway and highways transportation; Classification of Indian railways.

2. COMPONENTS OF RAILWAY TRACK
Gauges in Railway Track, Coning of Wheels, Permanent way-Rails-Types, Rail failures, Creep of Rails, Rail Joints-Types of Joints, Sleepers-Types, Comparison of sleepers, Ballast and formation-Types of Ballast materials- Specifications of Indian Railways.

UNIT-II

3. GEOMETRIC DESIGN OF RAILWAY TRACK
Geometric Design Of Track-Necessity; Gradients & Gradient Compensation; Elements of horizontal alignment; Super elevation; Cant deficiency and cant excess; Negative Super elevation; Length of Transition Curve.

4. POINTS AND CROSSINGS & SIGNALLING
Switches, Components and types of crossing, Turnouts and its working principle, Classification of signals.

UNIT-III

5. AIRPORT PLANNING AND DESIGN
Aero plane components; Air–craft characteristics; Selection of site for airport; Typical airport

layouts; Airport Obstructions-Zoning laws; Classification of obstructions;

6. RUNWAY DESIGN

Runway Design-Runway orientation; Basic runway length; Corrections for elevation; Temperatureand gradient; Runway geometric design

UNIT-IV

7. AIRFIELD PAVEMENT DESIGN

Design of Airport Pavements- Design methods for flexible airfield Pavement- CBR Method, Mcleod Method and rigid pavement Design- PCA Method; LCN Method of pavement design.

8. HARBOUR ENGINEERING

Harbour layout: types of harbours, port terms, site selection, Break Waters, Piers and wharves, dry docks and slipwaves.

TEXT BOOKS:

1. Railway Engineering by S.C.Saxena and S.AroraDhanpatRai Publications (P) Ltd.
2. Airport Planning and Design by S. K. Khanna& M. G. Arora; Nemchand& Bros, Roorkee
3. Dock and Harbour Engineering by Dr. S.P. Bindra, DhanpatRai& Sons

REFERENCE BOOKS:

1. Railway Engineering by M.M.Agarwal; Prabha& Co, New Delhi
2. Airport Engineering by G.V.Rao; Tata McGraw Hill, New Delhi.
3. Dock and Harbour Engineering by Hasmukh P. Oza, Gautam H. Oza, Charotar Publishing House, 8th Revised Edition : 2016.

NPTEL:

http://nptel.ac.in/courses/105107123/
http://nptel.ac.in/courses/105101008/
http://nptel.ac.in/courses/114106025/

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - IV

GROUND WATER DEVELOPMENT AND MANAGEMENT
IV B.Tech – I Semester (Code : 18CED42)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To provide knowledge on groundwater availability and distribution in different types of rocks
2. To demonstrate the groundwater movement and groundwater reservoir parameters
3. To develop the skills needed for ground water investigation
4. To study the concept of artificial recharge of ground water
5. To estimate the groundwater management concepts

Course Outcomes:

The student will be able to

1. Understand the location of ground water and the relationship with the rock type.
2. Assess the ground water movement and reservoir parameters
3. Use of the different techniques of ground water investigation
4. Apply RS & GIS techniques for artificial recharge of groundwater.
5. Apply conjunctive use technique for effective management of groundwater.

UNIT I

Introduction:

Ground Water Occurrence, Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

Ground Water Movement:

Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, Ground water flow contours and their applications.

UNIT II

Analysis of Pumping Test Data – Steady flow

Steady flow towards a well in confined and unconfined aquifers – Dupit's and Theim's equations, Assumptions, Formation constants, yield of an open well and well tests.

Analysis of Pumping Test Data- Unsteady flow

Unsteady flow towards a well – Non equilibrium equations – Theis solution – Jocob and Chow's simplifications, Leaky aquifers.

UNIT III

Surface and Subsurface Investigation

Surface methods of exploration - Electrical resistivity and Seismic refraction methods.Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

Artificial Recharge of Ground Water

Concept of artificial recharge – recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT IV

Saline Water Intrusion

Occurrence of Saline Water intrusion– Relation between fresh and saline waters – Ghyben–Herzberg equation – Shape and structure of fresh–salt water interface – Upcoming of saline water – Control of saline water intrusion – Examples of seawater intrusion.

Groundwater Modelling and Management Basic principles of groundwater modelling-Analog models-viscous fluid models and membrane models, digital models-Finite difference and finite element models, Concepts of groundwater management, basin management by conjunctive use-case studies.

TEXT BOOKS:

1 Groundwater by H.M. Raghunath, New Age International, 2008.
2 Ground water Hydrology by David Keith Todd, John Wiley & Sons, 1980

REFERENCES:

1. Fundamentals of Ground Water by Franklin W. Schwartz and Hubao Zhang, Wiley India Pvt.Ltd., 2012.
2. Groundwater System Planning & Management by R. Willis & W.W.G. Yeh, Printice Hall,1987.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - IV

FINITE ELEMENT ANALYSIS
IV B.Tech – I Semester (Code : 18CED43)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Equip the students with the fundamentals of finite element analysis
2. Enable the students to formulate the design problems into FEA
3. Enable the students to solve Boundary value problems using FEM

Course Outcomes:

1. Understand the basic concept of FEM
2. Solve simple boundary value problems using Numerical technique of Finite element method
3. Develop finite element formulation of one dimensional and beam problems and solve them
4. Develop FEM formulation of truss element
5. Compute plain stresses and plain strains problems

UNIT -I

1. **BASIC PRINCIPLES OF STRUCTURAL MECHANICS:** A brief history of F.E.M, Need of the method, Applications of FEM, Review of basic principles of solid mechanics, Basic equation in Elasticity Equations of equilibrium, Constitutive relationship, Concept of Axi-symmetric elements. Concept of Energy Principles and method
2. **ELEMENT PROPERTIES:** Basic theory relating to the formulation of the finite element method, element shapes ,nodes , nodal degree of freedom, node numbering, Coordinate system (local and global), Convergence requirements, Compatibility requirement, Geometric Invariance

UNIT-II

3. **Finite element analysis of - single bar element**: (One –Dimensional problem) – Shape functions, derivation of stiffness matrix, stress-strain relations– All with reference to bar element and trusses under axial forces.

4. **Finite element formulation of beam elements**: Beam stiffness-assemblage of beam stiffens matrix- example on analysis of beam subjected to concentrated and distributed loading

UNIT-III

5. **Finite element formulation of truss element**: Stiffens matrix-properties –selection of approximate displacement functions'- solutions of a plane truss –transformation matrix – Galerkins's method for 1-D truss-Computation of stress in a truss element.

UNIT-IV

6. **PLANE STRESS AND PLANE STRAIN ANALYSIS:** Finite element formulation for plane stress and plane strain problems Derivation of CST and LST stiffness matrix and equations-treatment of body and surface forces
7. **Iso-parametric formulation**: An isoparametric bar elements-plane bilinear isoparametric element-quadratic plane element-shape functions evaluations of stiffness matrix,

TEXT BOOK:

1. Finite Element Analysis - Theory and Programming by C. S. Krishnamoorthy; Tata Me Graw - Hill Publishing Co.Ltd., New Delhi
2. "Introduction to Finite Elements in Engineering", Tirupathi R. Chandrupatla, Ashok D
3. Finite Element Analysis", by S.S.Bhavikatti, New Age International Publishers

REFERENCE BOOK:

1. Introduction to the Finite Element method - A Numerical method for engineering analysis by Desai & Abel; CBS Publishers & Distributors., Delhi
2. The finite element method in engineering by S. S.Rao, Butterworth-Heinemann, New Delhi, 1999

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - IV

SOLID AND HAZARDOUS MANAGEMENT
IV B.Tech – I Semester (Code : 18CED44)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To explain brief introduction about suitable methods for collection, transport, recovery, reuse and disposal of solid waste.
2. To explain brief introduction about various functional elements of hazardous waste management.
3. To introduce various physicochemical methods of solid and hazardous waste treatment with special emphasis on recovery and reuse of solid waste.
4. To introduce various biological methods of solid and hazardous waste treatment.

Course Outcomes:

1. Explain municipal solid waste management systems with respect to its physical properties, types and composition of solid waste with methods of handling, sampling and storage of solid waste.
2. Explain hazardous waste management systems with respect to its physical properties, types, composition of waste and their health effects.
3. Appraise the current practices available and physicochemical methods of handling, sampling and disposal of solid and hazardous waste
4. Select the appropriate biological methods for solid waste collection, transportation, redistribution and disposal.

UNIT –I

Municipal Solid Waste Management – Fundamentals

Introduction of solid waste; Sources; composition; generation rates; collection of waste; separation, transfer and transport of waste; treatment and disposal options

UNIT-II

Hazardous Waste Management – Fundamentals

Characterization of waste; compatibility and flammability of chemicals; fate and transport of chemicals; health effects

UNIT- III

Physicochemical Treatment of Solid and Hazardous Waste

Chemical treatment processes for MSW (combustion, stabilization and solidification of hazardous wastes); physicochemical processes for hazardous wastes (soil vapor extraction, air stripping, chemical oxidation); ground water contamination and remediation

UNIT – IV

Biological Treatment of Solid and Hazardous Waste
Composting; bioreactors; anaerobic decomposition of solid waste; principles of biodegradation of toxic waste; inhibition; co-metabolism; oxidative and reductive processes; slurry phase bioreactor; in-situ remediation

REFERENCES/TEXT BOOKS:

1. VesilindP.A.,WorrellW.andReinhartD.R.,"SolidWasteEngineering",ThomsonBooks.
2. BhideA.D.andSundaresanB.B.,"SolidWasteManagement,Collection,Processingand Disposal",Nagpur.
3. Pichtel, John. Waste Management Practices:Municipal,HazardousandIndustrial.CRC Press, Taylor and Francis Group,2005.
4. LaGrega,MichaelD.,Buckingham,PhilipL.andEvans,JeffreyC.HazardousWaste Management. Waveland Press Inc., Reissue Edition,2010.

Video Lectures (Web Links):

1. http://nptel.ac.in/courses/105106056/

BAPATLA ENGINEERING COLLEGE : : BAPATLA

(Autonomous)

Institution Elective - I

AIR POLLUTION & CONTROL

IV B.Tech – I Semester (Code : 18CE101)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To take up the basic concepts of sources and effects of Air Pollution
2. The contents involved the knowledge of the effect of metrological parameters on air pollution
3. The contents involved the knowledge of the control of air pollution from particulates
4. To develop skills relevant to control of gaseous pollution and also introduce about Air Quality Management

Course Outcomes: On the completion of the course, one should be able to understand:

1. The concepts of sources of air pollution and effects of air pollutants on man, materials and plants
2. Be able to understand the effect of air pollution with meteorological parameters
3. The knowledge about particulate control by different devices
4. Be able to develop gaseous pollution control technologies and estimate the quality monitoring of air pollutants

UNIT –I

Air Pollution –Definitions, Air Pollutants–Classifications –Natural and Artificial– Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution-stationary and mobile sources.

Effects of Air pollutants on man, material land vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT –II

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomenon Air Quality-wind rose diagrams.

UNIT – III

Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Theory and problem related to Gaussian dispersion model.

Control of particulates –Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's–Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

General Methods of Control of NOx and Sox emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

Air Quality Management–Monitoring of SPM, SO;NO and CO Emission Standards.

TEXTBOOKS:

1.AirpollutionByM.N.RaoandH.V.N.Rao –Tata Mc.GrawHillCompany.
2.AirpollutionbyWarkand Warner. -Harper&Row,NewYork.

REFERENCE BOOK:

1. An introduction to Air pollution by R.K.Trivedy and P.K.Goel,B.S.Publications

BAPATLA ENGINEERING COLLEGE : : BAPATLA
(Autonomous)

Institution Elective - I

RURAL WATER SUPPLY AND ENVIRONMENT SANITATION

IV B.Tech – I Semester (Code : 18CE102)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Apply knowledge of basic sciences and engineering to analyze water resources systems for socio-economic development.
2. Identify the sources of water and their characteristics.
3. Identify and select criteria for the selection of sanitation technology
4. To learn about analytical & design methods for environmental systems.

Course Outcomes:
At the end of the course the student will be able to:

1. Identify problems pertaining to rural water supply and sanitation.
2. Design water supply and sanitation system for rural community.
3. Design low-cost waste management systems for rural areas.
4. Plan and design an effluent disposal mechanism.

UNIT - I

WATER SUPPLY: Issues of rural water supply –Various techniques for rural water supply-merits- National rural drinking water program- rural water quality monitoring and surveillance-operation and maintenance of rural water supplies

UNIT - II

LOW-COST WATER TREATMENT: Introduction – Epidemiological aspects of water quality methods for low cost water treatment - Specific contaminant removal systems

UNIT - III

RURAL SANITATION: Introduction to rural sanitation- Community and sanitary latrines - Planning of wastewater collection system in rural areas- Treatment and Disposal of wastewater - Compact and simple wastewater treatment units and systems in rural areas stabilization ponds - septic tanks - Imhoff tank- soak pits- low-cost excreta disposal systems Effluent disposal.

UNIT - IV

4. INDUSTRIAL HYGIENE AND SANITATION: Occupational Hazards- Schools- Public Buildings- Hospitals- Eating establishments- Swimming pools – Cleanliness and maintenance and comfort- Industrial plant sanitation. SOLID WASTE MANAGEMENT: Disposal of Solid

Wastes- Composting- land filling incineration- Biogas plants - Rural health - Other specific issues and problems encountered in rural sanitation.

TEXT BOOKS:

1. Eulers, V.M., and Steel, E.W., Municipal and Rural Sanitation, 6 th Ed., McGraw Hill Book Company, 1965.
2. Park, J.E., and Park, K., Text Book of Preventive and Social Medicine, BanarsidasBhanot, 1972

REFERENCE BOOKS:

1. Wright, F.B., Rural Water Supply and Sanitation, E. Robert Krieger Publishing Company, Huntington, New York, 1977.
2. Juuti, P., Tapio S. K., and Vuorinen H., Environmental History of Water: Global Views

BAPATLA ENGINEERING COLLEGE : : BAPATLA
(Autonomous)

DESIGN AND DETAILING OF IRRIGATION STRUCTURES LABORATORY
IV B.Tech – I Semester (Code : 18CEL71)

Lectures	0	Tutorial	0		Practical	3	Credits	1
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To explain design of various Irrigation Structures
2. To describe detailing of various Irrigation Structures
3. To explain detailing of various Irrigation Structures using AutoCAD software
4. To demonstrate developing a spreadsheet using MS-EXCEL software of various Irrigation structures

Course Outcomes: Student will be able to

1. To design various Irrigation structures
2. To detail various Irrigation structures
3. To detail various Irrigation structures using AutoCAD software
4. To develop a spreadsheet using MS-EXCEL software of various Irrigation structures

Students are required to design the following Irrigation structures using Excel Spread sheets software and detailing using software packages like Auto CAD/Micro station etc.,

Note: A minimum of FOUR (4 No) shall be done and recorded

1. Irrigation canal.
2. Canal drop – Notch type.
3. Canal regulator.
4. Vertical drop weir on permeable foundations.
5. Syphon Aqueduct (Type – III Aqueduct).
6. Profile of a Ogee spillway.

TEXT BOOKS

1. Design of Minor Irrigation and Canal Structures by C. Satyanarayana Murthy; Wiley Eastern Ltd., New Delhi.
2. Irrigation and Water Power Engineering by Dr. B.C.Punmia&Dr.Pande B.B. Lal; Laxmi Publications Pvt. Ltd., New Delhi.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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TRANSPORTATION ENGINEERING LABORATORY
IV B.Tech – I Semester (Code : 18CEL72)

Lectures	0	Tutorial	0		Practical	3	Credits	1
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Prerequisites: Geotechnical Engineering Lab (18CEL63)

Course Objectives:

1. To assess the physical properties of aggregates and bitumen for road construction.
2. To assess the properties of bituminous mix.
3. To evaluate the sub-grade soil properties.
4. To measure the unevenness of the pavement surface.

Course Outcomes: Student will be able to

1. Evaluate the physical properties of aggregate and bitumen for road construction
2. To design the Job mix formula for Bituminous mixes
3. To examine the feasibility of soil as a suitable material in road construction.
4. Evaluate the roughness of pavement surface.

A. Tests on Aggregates

1. Aggregate Crushing value test.
2. Aggregate impact value test.
3. Los Angele's abrasion test.
4. Deval's attrition value test.
5. Shape test a) Flakiness index test b) Elongation index test c) Angularity number test. .
6. Specific gravity Test.

B. Tests on Bituminous Materials

7. Penetration test.
8. Softening point test.
9. Flash and fire point test.
10. Ductility test.
11. Viscosity test.
12. Bitumen Extractions Test.
13. Specific gravity of Bitumen.

C. Test on Bituminous Mixes

14. Marshall stability test.

D. Test on Soil Sub grade

15. California bearing ratio test.
16. Dynamic cone penetrometer test

E. Pavement Evaluation

17. Roughness of pavement by using MERLIN

TEXT/REFERENCE BOOKS:

1. S.K. Khanna, C. E. G. Justo, A.Veeraragavan" Manual on Highway Materials and Pavement Testing" Nem Chand Bros, Roorkee (2013). Revised 5th Edition.
2. Laboratory Manual in Highway Engineering by Ajay K. Duggal and Vijay P. Puri - New age Publishers.
3. Bureau of Indian standards, Indian standard methods of test for soils, Part-16, Laboratory determination of CBR, IS:2720 (part-16)-1987 Reaffirmed 1997.
4. Bureau of Indian standards, Indian standard methods of test for aggregate for concrete, mechanical properties, IS:2386-1963 (Reaffirmed 1997).
5. Bureau of Indian standards, Indian standard specification of coarse and fine aggregate from Natural sources for concrete, IS:383-1970 (Reaffirmed 1997).
6. Bureau of Indian standards, IS: 1201-1220(1978), Indian standard methods for testingTar and Bituminous materials.
7. Bureau of Indian standards IS: 73-2013, Indian standard Paving Bitumen -Specification.
8. Ministry of Road Transport and Highways- Specifications for Roads and Bridge Works, Fifth Revision, IRC, New Delhi, India-2013

BAPATLA ENGINEERING COLLEGE : : BAPATLA
(Autonomous)

QUANTITY ESTIMATION & PROJECT MANAGEMENT
IV B.Tech – I Semester (Code : 18CEL73)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To estimate the quantities of various items of a Residential Buildings.
2. To evaluate the Quantity of steel for Building elements
3. To determine the project duration and finding the critical path of the projects.

Course Outcomes: At the end of the course student will be able to

1. To calculate the quantities of Residential Building with different methods.
2. To determine the Steel quantity with bar bending details in RCC members.
3. To calculate the project completion time and prepare the project network by using different techniques.

UNIT – I

1.Quantity estimation of a single storey residential building (different items).
2. Cost estimation of a single storey residential building.
3. Quantity estimation of a B.T.Road(different items).
4. Cost estimation of a B.T.Road.
5. Quantity estimation of a Canal (different items).
6. Cost estimation of a Canal.
7. Find out the labour requirement and preparing the Rate Analysis for different items of work. a) C.C b) R.C.C c) Brick work d) Flooring

UNIT- II

8.Preparing the Project management report for a single storey residential building/Road/Canal by using the Bar Chart/Mile stone chart.
9. Preparing the Project management report for a single storey residential building by using the network technique (PERT/CPM).
10. Preparing the Project management report for a B.T.Road by using the network technique (PERT/CPM).
11. Preparing the Project management report for a Canal by using the network technique (PERT/CPM).

UNIT- III

12. Quantity estimation of RCC roof slab and preparing schedule of bars
13. Quantity estimation of RCC beam and preparing schedule of bars
14. Quantity estimation of RCC Column with foundation footing and preparing schedule of bars.
15. Quantity estimation of RCC retaining wall and preparing schedule of bars

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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ENGINEERING ECONOMICS & MANAGEMENT
IV B.Tech – II Semester (Code : 18CE801)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

UNIT-I

Introduction: Economics-flow in an Economy, Law of Supply and Demand, Concepts of Engineering Economics- types of Efficiency, Definition and Scope of Engineering Economics, Elements of Cost, Other Costs/ Revenues – Marginal Cost, Marginal Cost, Marginal Revenue, Sunk Cost, Opportunity Cost, Break – Even Analysis, Profit/ Volume Ratio.

Elementary Economic Analysis; Introduction, Examples for Simple Economic Analysis – Material selection for a product, Design selection for a product, Design selection for a process industry, building material selection for construction activities Process planning/ process modification.

UNIT-II

The Organisational Setting: the nature of organizational behavior- the meaning of organizational behavior, the study of organizational behavior, a frame work of study, influences on behavior, multidisciplinary approach, organizational metaphors, orientations to work and the work ethic, management as an integrating activity, the psychological contract, the peter principle, Parkinson's Law, the changing world of work organisations, globalization and the international context, a cross cultural approach to management, Organisational behavior culture-bound, five dimensions of culture, emerging frameworks for understanding culture, convergence or culture-specific organsational behavior, the importance of organisation behavior.

UNIT-III

Approaches toOrganisation andManagement: theory of Management, Developments in management and organizational behavior, the classical approach, scientific management, relevance of scientific management, bureaucracy – main characteristics, Criticisms, Evaluation, human relations - approach, evaluation, Neo-human relations. The systems approach, decision making approach, social action, relevance to management and organizational behavior.

UNIT-IV

The Nature and Context of Organizations; Perspectives of the organization, formal organsation, basic components of an organization, private and public sector organisations, social enterprise organization, production and service organisations, types of authority and organisations, classification of organisations, comparative study of organisations, organizational conflict contrasting views of conflict, positive and negative outcomes of conflict, sources of conflict. Strategies for managing conflict, organizational stress, causes of stress, coping with stress, the work /life balance, the organization of the future.

TEXT BOOKS

1. R. Panneerselvan, engineering economics, PHI Learning Private Limited2012
2. Laurie J. Mullins, Management and Organizational Behavior, Pearson Education Limited, 2010.

REFERENCES

1. Robbins, Stephen, S. Sanghi, Organizational Behavior, Pearson Education. 2010.

BAPATLA ENGINEERING COLLEGE : : BAPATLA

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Institution Elective - II

DISASTER MANAGEMENT

IV B.Tech – II Semester (Code : 18CE103)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

The subject provides

1. Clear knowledge of Disaster, Hazards and Vulnerabilities.
2. Knowledgeof Mechanism of Disaster Management.
3. Clear idea of Capacity Building.
4. Explains how to do the planning for disaster management.

Course Outcomes:

At the end of the course student will be able to

1. Understands Disaster, Man-made Hazards and Vulnerabilities.
2. Understands Disaster Management Mechanism
3. Understands Capacity Building Concepts
4. Understands Planning of Disaster Managements

UNIT-I

Understanding Disaster: Concept of Disaster - Different approaches- Concept of Risk - Levels of Disasters - Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency and forewarning levels of different hazards - Characteristics and damage potential or natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards.

UNIT-II

Disaster Management Mechanism: Concepts of risk management and crisis managements - Disaster Management Cycle - Response and Recovery - Development, Prevention, Mitigationand Preparedness - Planning for Relief.

UNIT-III

Capacity Building: Capacity Building: Concept - Structural and Nonstructural MeasuresCapacity Assessment; Strengthening Capacity for Reducing Risk - Counter-DisasterResources and their utility in Disaster Management - Legislative Support at the state andnational levels

UNIT-IV

Coping with Disaster: Coping Strategies; alternative adjustment processes – ChangingConcepts of disaster management - Industrial Safety Plan; Safety norms and survival kits -Mass media and disaster management.

Planning for disaster management: Strategies for disaster management planning - Steps forformulating a disaster risk reduction plan - Disaster management Act and Policy in India - Organizational structure for disaster management in India - Preparation of state and districtdisaster management plans.

TEXT BOOKS:

1. Manual on Disaster Management, National Disaster Management, Agency Govt ofIndia.
2. Disaster Management by MrinaliniPandey Wiley 2014.
3. Disaster Science and Management by T. Bhattacharya, McGraw Hill Education(India) Pvt Ltd Wiley 2015.

REFERENCES:

1. Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BSPublications 2009.
2. National Disaster Management Plan, Ministry of Home affairs, Government of India(http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)

BAPATLA ENGINEERING COLLEGE : : BAPATLA

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Institution Elective - II

REMOTE SENSING &GIS

IV B.Tech – II Semester (Code : 18CE104)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Learn basic concepts of Aerial Photographs.
2. Learn basic concepts of remote sensing and its characteristics, satellite sensors andplatforms.
3. Know about satellite digital image processing and classification techniques.
4. Understand the basic concepts GIS, spatial data and analysis
5. Applications of GPS in surveying.
6. Know various remote sensing and GIS applications in civil engineering

Course Outcomes:

1. Interpret Information from Aerial Photographs.
2. Exposure on Basics of Remote Sensing, Satellite Sensors and Platforms, Practical Knowledge on Satellite Image Classification.
3. Know Basics of GIS And Map Making. Exposure About Spatial Analysis Using Overlay Tools.
4. Geo-Tag Assets Using GPS And Add Attribute & Meta-Data.
5. Get the Knowledge on Various Remote Sensing and GIS Applications in Civil Engineering.

UNIT- I

PHOTOGRAMMETRY:

Fundamentals of Photogrammetry and Photo interpretation – types of photographs;Vertical photographs – principal point; scale; Stereoscopy; Overlap, side lap and flight planning.

UNIT – II

REMOTE SENSING:

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere and target –

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, Space-borne remote sensing. Visual Interpretation Techniques.

Overview of Indian Remote sensing satellites and sensors, satellite definition and types, characteristics of satellite, characteristics of satellite orbit

UNIT – III

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Introduction, key components, data entry &preparation – Spatial data input, Raster Data Model, Vector Data Model, Raster Vs Vector.advantages and dis advantages of Raster & Vectornetwork analysis - concept and types, Data storage-vector data storage, attribute data storage.

UNIT - IV

GLOBAL POSITIONING SYSTEM (GPS)&RS AND GISAPPLICATIONS:

GPS definition, components of GPS, GPS receivers.Space, Control and User segments of GPS.Advantages and disadvantages of GPS, Limitations and applications of GPS Indian Systems (IRNSS, GAGAN)Development of GPS surveying techniques, Navigation with GPS, Applications of GPS.

Applications: Photogrammetry, Remote Sensing and Geographical information Systems

TEXT BOOKS:

1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
2. Chang, K. T. (2006). Introduction to Geographic Information Systems. The McGraw-Hill.
3. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
4. Schowenger, R. A (2006) 'Remote Sensing' Elsevier publishers.
5. Parkinson,B. W., Spilker, J. J. (Jr.) (1996). Global Positioning System: Theory & Applications (Volume-I). AIAA, USA

REFERENCE BOOKS:

1. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013.
2. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt.Ltd, 2013.
3. Jensen John R. Introduction to Digital Image Processing: A Remote Sensing Perspective Prentice hall, New Jersey
4. Paul Wolf, Elements of Photogrammetry, McGraw Hill.
5. Leick Alfred, 1995: GPS Satellite Surveying, Wiley Interscience
6. Burrough, P. P. &McDonnel, R. A. (1998). Principles of GIS. Oxford University Press.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - IV

ADVANCED ENVIRONMENTAL ENGINEERING
IV B.Tech – II Semester (Code : 18CED51)

Lectures	4	Tutorial	0		Practical	0	Credits	3
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. Describe about the concept of sewage disposal in streams.
2. Learn about the available low-cost treatment methods.
3. Design construction, operation and maintenance of industrial treatment plants.
4. Explain about the sources, characteristics and control of Air Pollution and Noise Pollution.

Course Outcomes

1. Acquaint the knowledge of protection of water bodies againstContamination on disposal of wastewater.
2. Acquaint new concepts of waste water treatment & design of low-costtreatment units.
3. Plan suitable treatment process for selected industrial effluents.
4. Acquaint types of air pollutants, their effects and controlling devices to control particulate matter and develops an ability to understand basics of noise sources, effects andControlling measures

UNIT – I

1. Sludge Treatment and Disposal

Characteristics of sewage sludge; Anaerobic sludge digestion process; Stages of sludge digestion; Factors affecting sludge digestion; Sludge digestion tank; High-rate digestion; Sludge thickening; Sludge conditioning; Methods of dewatering the sludge; Methods of sludge disposal.

2. StreamSanitation

Introduction; Self-purification in streams; factors affecting self-purification; Dissolved Oxygen Balance in streams; Streeter-Phelps's Dissolved Oxygen Model; Zones of Self-purification;

UNIT – II

3. Low-Cost Wastewater TreatmentSystems

Introduction; Stabilization ponds (including design aspects); Aerated lagoons; Oxidation ditch; Extended aeration process.

4. New Concepts in Biological WasteTreatment

Introduction; Nitrogen removal by biological nitrification and de-nitrification; Rotating Disc Biological Contactor; U-Tube aeration systems.

UNIT – III

5. Industrial WastewaterTreatment

Characteristics of industrial wastewater, Introduction to Industrial Wastewater treatments.

Sugar Plant: Sources and characteristics of liquid waste; Methods of its treatment and disposal.

Dairy Industry: Sources and characteristics of liquid waste; Methods of its treatment and disposal.

PulpandPaperIndustry:Sources andcharacteristics ofliquidwaste;Methodsofits treatment anddisposal.

UNIT – IV

6. Sources and Effects ofAir Pollution

Natural and Anthropogenic sources; Stationary and mobile sources; Primary and secondary pollutants;Particulatematter;Gaseouspollutants;Effectsofairpollutantsonhumanhealth; Effectson plants; Economicaleffects.

7. Meteorology and AirPollution

Atmospheric stability and temperature inversions; Design of Stack Height based on Board formulas; Plume rise models; Plume behavior; Gaussian Dispersion Model;

8. Control of AirPollution

Objectives; Types of collection equipment: Settling chamber; Inertial separators; Cyclones; Filters; Electrostatic Precipitators; Scrubbers.

TEXT BOOKS

1. Wastewater Treatment by M.N. Raoand A.K. Datta; Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. WastewaterEngineering,Treatment,DisposalandReusebyMetcalf&EddyInc.;TataMcGraw– Hill Publishing Co. Ltd., New Delhi.
3. AirPollutionbyM.N. RaoandH.V.N.Rao;TataMcGraw–HillPublishingCo.Ltd.,NewDelhi.

REFERENCES

1. EnvironmentalPollutionControlEngineeringbyC.S.Rao;WileyEasternLtd.,NewDelhi.
2. Water Supply and Wastewater Disposal by G.M. Fair et all; John Wiley &Sons.
3. SewageDisposalandAirPollutionEngineeringbyS.K.Garg;Khanna Publications,Delhi.
4. Sewage and Sewage Treatment by S.K. Kshirasagar; RoorkeePublishing House,Roorkee.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - V

BRIDGE ENGINEERING
IV B.Tech – II Semester (Code : 18CED52)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

(Working stress method is to be adopted for all designs)

Course Objectives:
1. The main aim of this course is to enable students to choose the appropriate bridge type for a given project and to analyses and design the main components of the chosen bridge.
2. Discuss the IRC standard live loads and design the deck slab type bridges.
3. Design of T-Beam bridges using various methods.
4. Design of sub structure parts of the bridge.
5. Design of various bridge foundations and discuss the different types of bridge bearings.

Course Outcomes:
1. To develop an understanding of and appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.
2. The students are expected to be able to understand the load-carrying capacity of various types of bridges, upon learning the structural responses to different kinds of loads.
3. Students able design bridge economically by learning all the methods.
4. Able to decide which type of abutment walls and shape of piers used under various weather conditions.
5. Know the importance of bearings and helps to use latest bearings in construction technology.

UNIT – 1

1. Introduction & Investigation for Bridges

Components of a Bridge; Classification; Need for Investigation; Selection of Bridge Site; Preliminary Data to be Collected; Preliminary Drawings; Determination of Design Discharge; Economical Span; Location of Piers and Abutments; Vertical clearance above HFL; Scour depth; Traffic Projection; Choice of Bridge type; Importance of Proper Investigation.

UNIT – II

2. Standard specification for road bridges

IRC Bridge code: width of carriageway: clearances: loads to be considered – dead load: IRC standard live loads: impact effect.

3. Design of Culverts

Design of Reinforced concrete slab culvert.

UNIT – III

4. Design of T – Beam Bridge

Pigeaud's method for computation of slab moments; Courbon's method for computation of moments in girders; Design of simply supported T – beam bridge.

UNIT – IV

5. Sub Structure for Bridges

Pier and abutment caps; Materials for piers and abutments; Design of pier; Design of abutment; Backfill behind abutment.

UNIT – V

6. Foundations for Bridges

Scour at abutments and piers; Grip length; Types of foundations; Design of well foundation.

7. Bearings for Bridges

Importance of bearings; Bearings for slab bridges; Bearings for girder bridges; Expansion bearings; Fixed bearings; Design of elastomeric pad bearing.

TEXT BOOKS

1. Essentials of Bridge Engineering by Dr. Johnson Victor; Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Design of Bridge Engineering by T.R Jagadeesh, M.A Jayaram, PHI Learning Pvt. Ltd, New Delhi
3. Bridge Engineering by Rangwala, Charotar Publishing House Pvt. Ltd.,

REFERENCE BOOKS

1. Design of Bridges by N. Krishna Raju, Publisher: Oxford & IBH Publishing Co Pvt. Ltd.
2. Bridge Engineering by S. Punnuswamy, (Third Edition 2017) Mcgrawhill Education Pvt. Ltd.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - V

WATER RESOURCES FIELD METHODS
IV B.Tech – II Semester (Code : 18CED53)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. Identify soil conservation methods and create a plan to conserve soil in real-life situations
2. To provide a comprehensive discourse on the engineering practices of watershed management for realizing the higher benefits of watershed management.
3. An ability to use the techniques, skills, and modern modeling software tools necessary for water resource planning and management.
4. To identify appropriate measures for mitigating the potential impacts of the proposal

Course Outcomes: Students will be able to

1. Students will broadly explore soil erosion to understand the physical mechanisms behind the process of erosion and the impacts that sediment has on water quality.
2. The students will be able to apply the knowledge of overall concepts of watershed which would help to comprehend and analyze for better management.
3. They will be able to develop the Rainfall Runoff problems using computer software like ANN and Fuzzy.
4. Facilitate informed decision making, including setting the environmental terms and conditions for implementing the proposal.

UNIT – I

1.Operation, Maintenance and Management of Water Resource Project
Regulation of reservoirs; diversion works and canals; monitoring behavior of structures; works regulated for maintenance and management; causes of failure of hydraulic structures and their remedial measures.

UNIT – II

2. Impact Assessment of Water Resources Development Projects
Ecosystem, impact assessment methodologies, impact assessment of water resources projects – case studies, equilibrium analysis and sustainable development, policy and legislation.

UNIT – III

3. Water Quality Assessment of Management

Water movement and mixing process, nutrient cycle and budget, trophic dynamics and biological productivity, water supply and quality for dynamics and management, impact of pollution and toxicsubstances.

UNIT – IV

4. GIS in Water Resource Planning and Management

Introduction of GIS; Creation of digital geographical data; characteristics of GIS; utilization of GIS forwater resources; application for hydrologic modeling.

Practicals - Surface water body mapping, Delineation of watershed, DEM generation: slope, Aspect,flow direction, Flow accumulation, Drainage, network & morphometric analysis.

Practicals - Surface water body mapping, Delineation of watershed, DEM generation: slope, Aspect,flow direction, Flow accumulation, Drainage, network & morphometric analysis.

TEXT BOOKS

1. U.S. Geological Survey (1999). Book 9, Section A: National Field Manual for the Collection of Water-Quality Data. Techniques of Water Resources Investigations of the United States Geological Survey. Washington, D.C.: USGS.
2. Li, Y. and K. Migliaccio (2011). Water Quality Concepts, Sampling, and Analyses. Boca Raton, FL: CRC Press. Pp. 333.
3. Ghanashyam Das, Hydrology and Soil Conservation engineering, Prentice Hall of India Private Limited, New Delhi, 2000.
4. Neuro-Fuzzy and Soft Computing A Computational Approach to learning-Jang, J.R., Sun Chuen-tsaiand MizutaniEiji, Prentice Hall.

REFERENCE BOOK

1. Glenn O. Schwab, Soil and Water Conservation Engineering, John Wiley and Sons, 1981.
2. Rainwater Harvesting Techniques to augment Groundwater- Ministry of Water Resources
3. Neural Networks, A Comprehensive Foundation- Haykin, Prentice Hall India.
4. Introduction to Environmental Impact Assessment- John Glasson, Riki Therivel, Routledge.

BAPATLA ENGINEERING COLLEGE : : BAPATLA
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Elective - V

GROUND IMPROVEMENT TECHNIQUES
IV B.Tech – II Semester (Code : 18CED54)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To enable the students to acquire the knowledge of ground improvement techniques andtheir modification, suitability, feasibility and desirability, various methods of in-situ densification in granular soils
2. To enable the students to understand various methods of in-situ densification in cohesivesoils, principles of reinforced earth and design of reinforced earth walls.
3. To impart the students knowledge of geotextiles and their functions, applications and Tests, various methods of mechanical stabilization.
4. To enable the students to understand various methods of cement stabilization, various methods of lime and bitumen stabilization.

Course Outcomes:

The student should be able to know:

1. Various ground improvement techniques and their modifications, suitability, feasibility and desirability,various methods in-situ densification of granular soils.
2. Various methods in-situ densification of cohesive soils, design of reinforced earth walls
3. The functions and applications of geotextiles, various methods of mechanical stabilization
4. Various methods of cement, lime and bitumen stabilization.

UNIT-I

1. **Introduction**

Need for engineered ground improvement, classification of ground modification techniques; suitability, feasibility and desirability of ground improvement technique; objectives of improving soil.

2. **In-situ densification methods in granular soils**

Introduction, Vibration at the ground surface, impact at the ground surface, vibration at depth, impact at depth.

UNIT-II

3. **In-situ densification methods in cohesive soils**

Introduction, preloading, sand drains, sand wicks, band drains, stone and lime columns.

4. **Reinforced earth**

Principles, components of reinforced earth, governing design of reinforced earth walls, design principles of reinforced earth walls.

UNIT-III

5. Geotextiles

Introduction, types of geotextiles, functions and their applications, tests for geotextiles, geogrids and its functions.

6. **Mechanical Stabilization**

Soil aggregate mixtures, properties and proportioning techniques, soft aggregate stabilization, compaction, field compaction control.

UNIT-IV

7. Cement Stabilization

Mechanism, factors affecting and properties, use of additives, design of soil cement mixtures, construction techniques.

8. Lime and Bituminous Stabilization

Type of admixtures, mechanism, factors affecting, design of mixtures, construction methods.

TEXT BOOK

1. HausmannM.R(1990) Engineering Principles of ground modification, McGraw-Hill International edition.

REFERENCES

1. Ground improvement Techniques, P.PurushothamaRaju, Laxmi Publications Pvt. Ltd., New Delhi.
2. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, USA.
3. Construction and Geotechnical methods in Foundation Engineering, R.M.Koerner, McGraw-Hill Book Company.
4. Current Practices in Geotechnical Engineering Vol.-I, Alam Singh and Joshi, International BookTraders, New Delhi.

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Elective - VI

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES
IV B.Tech – II Semester (Code : 18CED61)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. Understand the basic concepts of structural dynamics under free vibration and forced vibration.
2. Know the geo technical factors which are affecting the earthquake engineering.
3. Analysis of buildings subjected to earthquake forces by using equivalent static method as per the IS:1893 – 2016
4. Design and Detailing of buildings as per IS: 13920 – 1993 and few concepts of masonry structures to make earthquake resistant.

Course Outcomes

1. Comprehensive analysis of structures subjected to free and forced vibration of single degree of freedom systems.
2. Learning earthquake engineering fundamentals and elements of Geo-technical engineering such as liquefaction and slope stability analysis.
3. Analysis of single storey and single bay RCC plane frames subjected to lateral forces.
4. Design of single storey and single bay RCC plane frames and its sub parts like beam, column, footing and Detailing as per IS: 13920 – 1993.

UNIT-I

1) Elements of structural dynamics Sources of vibrations; Types of vibrations; Degrees of freedom; Spring action and damping; Free vibration of undamped system having single degree of freedom; Free vibration of viscous damped system having single degree of freedom; Forcedvibration of a viscous damped single degree freedom system subjected to harmonic excitation; Earthquake excitation (Base excitation) of a single degree freedom system.

UNIT-II

2) Elements of Earth Quake Ground motion

Earthquake size- Intensity and magnitude; Seismic Zoning-Introduction; Strong Motion Earthquakes - Introduction; Response spectrum (elastic); Local site effect (Effect of type of soil).

3) Elements of GeotechnicalEarthquake Engineering

Liquefaction – Definition and types, Effect of liquefaction on built environment, Evaluation of liquefaction susceptibility, Liquefaction hazard mitigation Seismic slope stability – Introduction, Pseudo-static analysis, Sliding block methods

UNIT III

4) Analysis of single storey and single bay RCC Plane Frame (Columns vertical) : (As per IS:1893(part-I)-2016) Calculation of lateral force due to earthquake using equivalent static method ; Analysis for different load combinations; Design forces and moments in beam and columns.

UNIT-IV

5)Design of single storey and single bay RCC plane frames (Columns vertical)(As per IS:456-2000 and IS13920-2016) Design of column; Design of beam; Design of footing ; Detailing of entire frame

6) Masonry Structures

House types and damages, cause and location of damage, Understanding the knowledge hidden in your existing houses, Making houses earthquake resistant, Earthquake resistant features, Retrofitting-some examples, Technology choice, summary of earthquake resistant features, improving housing designs.

CODE BOOKS

IS:1893(part-I)-2016, IS13920-2016, IS:456-2000, SP16

TEXT BOOKS

1. Elements of Earthquake Engineering by Jai Krishna, A.R.Chandrasekaran and Brijesh Chandra, Second Edition(1994), South Asian Publishers, New Delhi.
2. Geotechnical Engineering - S.K.Gulati&ManojDatta, Tata McGraw-Hill Publishing Company Ltd.
3. Earthquake Resistant Design of Structures by PankajAgarwal, Manish Shrikhande , First edition(2006), Prentice Hall of India Private Ltd., New Delhi .
4. Earthquakes and Buildings – A.S.Arya, A.Revi, Pawan Jain

REFERENCE BOOK

1) Dynamics of Structures by A.K.Chopra, Second edition (2001), Prentice Hall India Private Ltd

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Elective - VI

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT
IV B.Tech – II Semester (Code : 18CED62)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives

1. To be introduced to environmental impact assessment and explain the components and decision-making processes involved in environmental assessment.
2. To introduce the various methodologies used in EIA
3. To introduce the Methodology for the assessment of soil, water, air and biological environment
4. To introduce environmental auditing procedure and relative legislation.

Course Outcomes:

1. The students will be able to assess the impact on the environment of various environmental management techniques.
2. The students will be able to analyze the impact on environment due to some new developmental activities.
3. Identify the Concepts on various environmental impact assessment methodologies.
4. Knowledge on environmental auditing procedure assessment of environmental impacts due to developmental activities.

UNIT – I

Basic concept of EIA

Definition, Initial environmental Examination, Elements of EIA,-factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmentalparameters.

UNIT – II

E I A Methodologies:

Introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method, Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – III

E I A in soil, surface water, Air and Biological environment

Introduction and Methodology for the assessment of soil and ground water, Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and incorporation of mitigation measures

Methodologyfortheassessment ofImpactsonsurfacewater environment,Air pollutionsources, generalized approach for assessment of Air pollutionImpact.

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT – IV

Environmental Audit & Environmental legislation

Objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.The Environmental pollution Act, The water; Act, The Air (Prevention & Control of pollution Act.), Mota Act. Wild life Act. Case histories of application of any construction industries.

REFERENCES/TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers
3. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K., Katania&Sons Publication,NewDelhi.
4. EnvironmentalPollutionandControl,byDrH.S.Bhatia–GalgotiaPublication(P)Ltd,Delhi

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Elective - VI

PAVEMENT ANALYSIS AND DESIGN
IV B.Tech – II Semester (Code : 18CED63)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Prerequisites: Soil Mechanics (18CE506)Highway Engineering (18CE604)

Course Objectives:

1. To discuss the Variables Considered in Pavement Design.
2. To discuss the various stresses induced in pavements.
3. To assess the properties of materials and mixes.
4. To design the flexible and rigid pavements.

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Course Outcomes: Student will be able to

1. Assess the factors Considered in Pavement Design.
2. Analyse the stresses induced flexible and rigid pavements.
3. Characterize the response characteristics of soil, aggregate, asphalt, and asphalt mixes.
4. Determine the crust thickness of the flexible and rigid pavement.

UNIT – I

Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT – II

Stresses in Pavements: Stress Inducing Factors in Flexible and Rigid pavements. Stresses in Flexible Pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two- and Three-Layered Systems, Fundamental Design Concepts. Stresses In Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars

UNIT – III

Material Characteristics: Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilization and Use of Geo Synthetics.

UNIT – IV

Design of Pavements: Flexible Pavement Design by IRC Method, Concepts of Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO.
Rigid Pavements: IRC Method of Design, Concepts of PCA & AASHTO method.
Pavement design for low volume roads, rural road designs – code of practice.
Design of Overlays: Types of Overlays, Suitability, Design of overlays.

TEXTBOOKS AND REFERENCE BOOKS:

1. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc
2. Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Revised 10th Edition, Nem Chand & Bros.
3. Relevant codes from Indian Roads Congress (IRC:37-2018)for design of Flexible and Rigid Pavements(IRC:58-2015) and overlay design, Bureau of Indian standards (BIS), Ministry of Road Transport and Highways (MoRTH-2013), and Asphalt Institute Manuals (AI).

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Elective - VI

TOWN PLANNING AND ARCHITECTURE
IV B.Tech – II Semester (Code : 18CED64)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			50

Course Objectives:

1. To discuss the history of architecture and design.
2. To discuss the historical background of town planning
3. To discuss the planning theory and principles of planning.
4. To discuss development of smart cities

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Course Outcomes:

Student will be able to

1. Understand the history of architecture and design.
2. Understand the historical background of town planning
3. Understand the planning theory and principles of planning
4. Understand the development of smart cities

UNIT–I

History of Architecture: Western Architecture: Egyptian, Greek, Roman Architectures. Indian Architecture: Vedicage, Indusvalley civilization Buddhist period: Stambas, Stupa, Toranas, Chaityas, Viharas Hindu temples: Dravidian and Indo Aryan Styles Temple of Aihole, Madurai, Bhuvaneshwar, Mount Abu. Indo Sarsanic(Islamic) Architecture: Mosque -Palace - Fort-Tomb.

Architectural Design:

Principles of designing–Composition of Plan relationship between plan and elevation building elements, form, surface texture, mass, line, color, tone, Principles of Composition: Unity,contrast, proportion, scale, balance, circulation, rhythm, character and expression.

UNIT–II

HistoricalBackGroundofTownPlanning: Town planning in ancient- medieval, renaissance, industrial and post-industrial cities;Contribution of individuals to city planning-Lewis Mumford, Patric Geddes, Peter Hall etc; Acropolis(Greece), Jerusalem, Mecca, Rome, London.

Town planning in India–Town plans of mythological Manasa-Town plans of ancient towns: Harappa, Mohenjo-Daro, Pataliputra, Delhi, Chandigarh etc;

UNIT–III

Planning Theory: Theories of urbanization including Concentric Zone Theory, Sector Theory,

Multiple Nuclei Theory and other latest theories, Land use and land value theory of William Alonso; Ebenezer Howard's Garden City Concept; Green Belt Concept.

PrinciplesofPlanning: Principles of planning aresidence-site selection, site orientation-aspect, prospect, grouping, circulation, privacy, furniture requirements, services and otherfactors.Types of Development Plans.

UNIT–IV

Building Systems:HVAC, Acoustics, Lighting; LEED ratings;
Development of Smart cities: Definition, introduction, fundamentals, possible systems required for a typical Smart City, Case studies.

TEXTBOOKS:

1. 'The great ages of WorldArchitecture' byG.K. Hiraskar.
2. 'Planningand Design ofBuildingsbySectionofArchitecture'byY. S. Sane.
3. 'ProfessionalPractice'byG.K.Krishnamurthy,S.V.Ravindra,PHILearning, NewDelhi.
4. 'IndianArchitecture–Vol.I&II'byPercyBrown,TaraporevalaPublications, Bombay.
5. 'Fundamentals ofTownPlanning'byG.K. Haraskar.

REFERENCES:

1. 'Drafting and Design for Architectureby Hepler, Cengage Learning
2. 'Architect's Portable Handbook' byJohnPattenGuthrie–McGraw Hill International Publications.
3. 'Mordern Ideal Homes for India' byR.S. Deshpande.
4. 'TownandCountyPlanning'byA.J.BrownandH.M.Sherrard.
5. 'TownDesign'byFederikGlbbard,Architecturalpress,London.