



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.V.V.Narsi Reddy
Course Name & Code : Industrial Engineering and management (17MB80)
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CIVIL., VI-Sem., A.Y: 2019-20

PRE-REQUISITE: NIL

Course Objectives: To make students understand management, its principles, contribution to management, organization, and its basic issues and types

1. To make students understand the concept of plant location and its factors and plant layout and types, method of production and work study importance
2. To understand the purpose and function of statistical quality control and material management techniques
3. To make students understand the concept of HRM and its functions
4. To make students understand PERT & CPM methods in effective project management and need of project crashing and its consequence on cost of project

Course Outcomes:

Upon The Successful Completion of This Course Students Will Able To:

1. Apply management principles to the particle situations to be in a position to know which type of business organisation structure suits
2. Determine decision making relating to the problems in operations and production activities.
3. Apply SQC techniques and to take effective decision making relating to reduce the investment in materials through better control of inventory
4. Ability to manage people in working environment with the practices of HRM across corporate businesses
5. Identify the PERT & CPM techniques in effective project management.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1						2	2	2	1		1			
CO2					2							1			
CO3		2					2				2	1			
CO4								2	2	2		1			
CO5					2		2				2	1			

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put '-'

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

Text Books:

T1:Dr. A.R.Aryasri, Management Science, TMH, 10th edition, 2012

References:

R1: Koontz & wehrich – Essentials of management, TMH, 10th edition, 2015

R2: Stoner, Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004

R3:O.P. Khana, Industrial engineering and Management

R4:L.S.Srinath, PERT & CPM

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Introduction to Management**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Subject & Course Outcomes	1	25-11-2019		TLM1	
2.	Management Introduction and Definition	1	26-11-2019		TLM1	
3.	Nature Importance of management	1	29-11-2019		TLM2	
4.	Functions	1	02-12-2019		TLM2	
5.	Taylor’s scientific management theory	1	03-12-2019		TLM2	
6.	Fayal’s principles of management	1	06-12-2019		TLM2	
7.	Contribution of Elton mayo & MASLOW theory	1	09-12-2019		TLM2	
8.	Herzberg theory of motivation & Douglas MC Gregor theory of motivation	1	10-12-2019		TLM2	
9.	Organization Basic concept: Authority & responsibility & Delegation of Authority	1	13-12-2019		TLM2	
10.	Span of control & Departmentation and Decentralization	1	16-12-2019		TLM2	
11.	Organization structure :line organization structure, Line and staff organization &	1	17-12-2019		TLM2	
12.	Functional organization	1	20-12-2019		TLM2	
13.	Committee & Matrix organization	1	23-12-2019		TLM2	
No. of classes required to complete UNIT-I:13				No. of classes taken:		

UNIT-II: Operations Management

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Plant location and Factors influencing location	1	24-12-2019		TLM2	
2.	Objectives and Principles of plant layout	1	27-12-2019		TLM2	
3.	Types of plant layouts	1	30-12-2019		TLM2	

4.	Types of plant layouts	1	31-12-2019		TLM2	
5.	Methods of production : job batch and mass production	1	03-01-2020		TLM2	
6.	Work study: Basic procedure involved in method study work measurement	1	06-01-2020		TLM2	
7.	Basic procedure involved in method study work measurement	1	07-01-2020		TLM1	
8.	Time study problems	1	10-01-2020		TLM1	
9.	IMIDEXAM	1	20-01-2020			
10.	I MID EXAM	1	21-01-2020			
11.	I MID EXAM	1	24-01-2020			
No. of classes required to complete UNIT-II:			11	No. of classes taken:		

UNIT-III: Statistical quality control & Materials Management

UNIT-III: Statistical quality control & Materials Management						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Statistical quality control Meaning	1	27-01-2020		TLM2	
2.	Variables and attributes & X chart problems and R	1	28-01-2020		TLM1	
3.	C Chart problems AND P Chart problems	1	31-01-2020		TLM1	
4.	Acceptance sampling & Sampling plans & Deming's contribution to quality	1	03-02-2020		TLM2	
5.	Materials management :Objectives of Materials management	1	04-02-2020		TLM2	
6.	Need for inventory control	1	07-02-2020		TLM2	
7.	Purchase procedure, Store records	1	10-02-2020		TLM2	
8.	Methods of inventory control :ABC analysis & EOQ analysis	1	11-02-2020		TLM2	
9.	EOQ Problems	1	14-02-2020		TLM1	
10.	Stock levels & Problems on stock levels	1	17-02-2020		TLM1	
No. of classes required to complete UNIT-III:			10	No. of classes taken:		

UNIT-IV : Human Resource management (HRM)

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Concepts of HRM: Basic functions of HR manager	1	18-02-2020		TLM2	
2.	Man power planning	1	24-02-2020		TLM2	
3.	Recruitment & Selection	1	25-02-2020		TLM2	
4.	Training and development	1	28-02-2020		TLM2	
5.	Placement, Wage and salary administration	1	02-03-2020		TLM2	
6.	Promotion, Transfer & Separation	1	03-03-2020		TLM2	
7.	Performance Appraisal	1	06-03-2020		TLM2	

8.	Job evaluation & Merit rating	1	10-03-2020		TLM2	
No. of classes required to complete UNIT-IV:				08	No. of classes taken:	

UNIT-V : Project management

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Project management: Introduction Early techniques in project management	1	13-03-2020		TLM2	
2.	Network analysis & Rules for drawing of networks and Critical path method	1	16-03-2020		TLM2	
3.	Problems on CPM & Identifying critical path	1	17-03-2020		TLM1	
4.	Problems on CPM & Identifying critical path	1	20-03-2020		TLM1	
5.	Programme evaluation and review technique (PERT)	1	23-03-2020		TLM1	
6.	Problems on PERT	1	24-03-2020		TLM1	
7.	Problems on PERT	1	27-03-2020		TLM1	
8.	Project cost analysis	1	30-03-2020		TLM1	
9.	project crashing (simple problems)	1	31-03-2020		TLM1	
10.	project crashing (simple problems)	1	03-04-2020		TLM1	
11.	II MID EXAM	1	06-04-2020			
12.	II MID EXAM	1	07-04-2020			
13.	II MID EXAM	1	10-04-2020			
No. of classes required to complete UNIT-V:			13	No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5

Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES:

1. To possess knowledge in both fundamental and application aspects of mathematical, scientific, engineering principles to analyze complex engineering problems for meeting the national and international requirements and demonstrating the need for sustainable development.
2. To adapt to the modern engineering tools for planning, analysis, design, implementation of analytical data and assess their relevant significance in societal and legal issues necessary in their professional career.
3. To exhibit professionalism, ethical attitude, communication, managerial skills, team work and social responsibility in their profession and adapt to current trends by engaging in continuous learning.

PROGRAMME OUTCOMES:

At the end of the programme, the students will possess

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to

assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES IN CIVIL ENGINEERING

PSO1: Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO2: Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO3: Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr.V.V.Narsi Reddy)	(Dr.V.V.Narsi Reddy)	(U.RAMBABU)	(Dr.A.Adishesha Reddy)



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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B RAMA KRISHNA
Course Name & Code : DESIGN OF STEEL STRUCTURES (17CE21)
L-T-P Structure : 3-1-0 Credits: 3
Program/Sem/Sec : B.Tech., CIVIL, VI-Sem. A.Y : 2019-20

PRE-REQUISITE: Strength of material-I, Strength of materials-II and Structural Analysis.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course serves as introduction to the concepts of structural steel design through the use of the Indian Standard IS 800 design code. It deals with the design of individual members and connections, such as, the design of tension members, compression members, beams, and beam columns; roof trusses and bolted, welded, and connections. The primary objective is to equip the students with the tools necessary for designing steel structures and to familiarize them with the relevant national design codes.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Identify the different structural steel elements and their connection system
CO 2	Design the compression and tension members.
CO 3	Analyse and design the beams.
CO 4	Design the column bases and built up columns.
CO 5	Design the roof trusses.

COURSE ARTICULATION MATRIX(Correlation between COs, POs & PSOs):

COs	PO1	P O2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	2	2	2	1	2	1	-	3	3	3
CO2	3	3	3	3	2	2	2	2	1	2	1	-	3	3	3
CO3	3	3	3	3	2	2	2	2	1	2	1	-	3	3	3
CO4	3	3	3	3	2	2	2	2	1	2	1	-	3	3	3
CO5	3	3	3	3	2	2	2	2	1	2	1	-	3	3	3

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put '-'

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

TEXT BOOKS:

- T1** N. Subramanian, “Design of Steel Structures”, Oxford University Press, 2nd Edition, 2011.
T2 S.K. Duggal, “Design of Steel Structures”, Tata McGraw Hill, New Delhi, 3rd Edition, 2017.

REFERENCE BOOKS:

- R1** S.S.Bhavikatti, “Design of Steel Structures”, I.K. International Publishing House Pvt. Ltd, 4th Edition, 2014. .
R2 V.L.Shah and Veena Gore; “Limit State Design of steel structures IS:800-2007”-, Structures Publications, 1st edition

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Design of steel connections**

UNIT-I: Design of steel connections						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course and COs	1	26-11-2019		TLM1	
2.	Introduction and fundamental concepts of design of structures	1	27-11-2019		TLM1	
3.	Grades of steel and IS Specifications	1	29-11-2019		TLM1	
4.	Different types of rolled sections	1	30-11-2019		TLM1	
5.	Stress strain relationship for steel	1	03-12-2019		TLM1	
6.	Introduction to connections	1	04-12-2019		TLM1	
7.	Tutorial-1	1	06-12-2019		TLM3	
8.	Bolted connection & Strength and efficiency	1	07-12-2019		TLM1	
9.	design of bolted joints	1	10-12-2019		TLM1	
10.	Problems on bolted joints	1	11-12-2019		TLM1	
11.	Introduction to welded joints	1	13-12-2019		TLM1	
12.	Design of welded connection	1	17-12-2019		TLM1	
13.	Problems on welded connection	1	18-12-2019		TLM1	
14.	Tutorial-2	1	20-12-2019		TLM3	
No. of classes required to complete UNIT-I: 12				No. of classes taken:		

UNIT-II: Design of tension and compression members

UNIT-II: Design of tension and compression members						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	21-12-2019		TLM1	
2.	Types of tension members	1	24-12-2019		TLM1	
3.	Design of tension members	1	27-12-2019		TLM1	
4.	Problems on tension members	1	28-12-2019		TLM1	
5.	Problems on tension members	1	31-12-2019		TLM1	
6.	Introduction to compression members	1	02-01-2020		TLM1	
7.	Effective length and slenderness ratio Different types of compression members	1	04-01-2020		TLM1	
8.	Tutorial-3	1	07-01-2020		TLM3	
9.	Design of compression members	1	08-01-2020		TLM1	
10.	Problems on compression members	1	10-01-2020		TLM1	
No. of classes required to complete UNIT-II: 09				No. of classes taken:		

UNIT-III: Design of beams

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	21-01-2020		TLM1	
2.	MID-1		22-01-2020			
3.	MID-1		24-01-2020			
4.	MID-1		25-01-2020			
5.	MID-1		28-01-2020			
6.	Types of section	1	29-01-2020		TLM1	
7.	IS Specifications	1	31-01-2020		TLM1	
8.	Design of laterally supported beams	1	01-02-2020		TLM1	
9.	Design of unsupported beams	1	04-02-2020		TLM1	
10.	Design of built up sections and Curtailment of flange plates	1	05-02-2020		TLM1	
11.	Tutorial-4	1	07-02-2020		TLM3	
12.	Problems on beams	1	11-02-2020		TLM1	
13.	Web buckling and web crippling	1	12-02-2020		TLM1	
14.	Tutorial-5	1	14-02-2020		TLM3	
No. of classes required to complete UNIT-III: 08				No. of classes taken:		

UNIT-IV : Built up columns and column bases

UNIT IV: Built up columns and column bases						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to built up columns	1	15-02-2020		TLM1	
2.	IS Specifications	1	18-02-2020		TLM1	
3.	Design of built up columns	1	19-02-2020		TLM1	
4.	Problems on built up columns	1	22-02-2020		TLM1	
5.	Design of lacing	1	25-02-2020		TLM1	
6.	Design of battens	1	26-02-2020		TLM1	
7.	Tutorial-6	1	28-02-2020		TLM3	
8.	Introduction to column bases & Design of slab base	1	29-02-2020		TLM1	
9.	Design of gusseted base	1	03-03-2020		TLM1	
10.	Design problems	1	04-03-2020		TLM1	
11.	Tutorial-7	1	06-03-2020		TLM3	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : Roof trusses

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	07-03-2020		TLM1	
2.	Types of trusses	1	11-03-2020		TLM1	
3.	IS Specification	1	13-03-2020		TLM1	
4.	Loads on roof trusses	1	17-03-2020		TLM1	
5.	IS 875 Standards for estimation of wind loads	1	18-03-2020		TLM1	
6.	Design of members of roof truss and joints	1	20-03-2020		TLM1	
7.	Design of purlins	1	21-03-2020		TLM1	
8.	Design problems	1	24-03-2020		TLM1	
9.	Design problems	1	25-03-2020		TLM1	
10.	Tutorial-8	1	27-03-2020		TLM3	
11.	Revision	1	28-03-2020		TLM1	
12.	CRT Classes		31-03-2020			
13.	CRT Classes		01-04-2020			
14.	CRT Classes		03-04-2020			
15.	CRT Classes		04-04-2020			
16.	MID-2		07-04-2020			
17.	MID-2		08-04-2020			
18.	MID-2		10-04-2020			
19.	MID-2		11-04-2020			
No. of classes required to complete UNIT-V: 09				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks = 75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks = 75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
(B.Rama Krishna)

Course Coordinator
(B.Rama Krishna)

Module Coordinator
(B.Rama Krishna)

HOD
(Dr. V. Ramakrishna)



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DEPARTMENT OF CIVIL ENGINEERING COURSE HANDOUT

PART-A

Name of Course Instructor : M.Manoj kumar
Course Name & Code : Railway ,Airport Planning and Harbour Engineering (17CE25)
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CE., VI-Sem., A.Y : 2019-20

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course aims to introduce the different transportation systems available around the world. It further addresses the aspects of analyzing the different components of railways, airways and water ways.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Illustrate the rail network development and railway planning in India.
CO 2	Analyze different technical aspects of railway junctions.
CO 3	Characterize the concepts of railway Interlocking and signaling systems.
CO 4	Identify the technical issues related to planning and design of airports
CO 5	Describe the technical components of harbour.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1				1						1	2		2	1	1
CO2		1		1							1		1	1	1
CO3				1						1	2		1	1	1
CO4				1						1	2		1	1	1
CO5				1						1	2		1	1	1

Note: Enter Correlation Levels **1** or **2** or **3**. If there is no correlation, put ‘-’

1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

- T1** S.C. Saxena. and S. Arora, “A Text Book of Railway Engineering”, Dhanpat Rai Publications Pvt., Ltd, New Delhi, 2005
- T2** S.K. Khanna, M.G. Arora, and S.S. Jain, “Airport Planning and Design”, Nem Chand and Bros, Roorkee, 2001.

REFERENCE BOOKS:

- R1** S.C. Rangwala, “Principles of Railway Engineering”, Charotar Publishing House, Anand,

2000.

R2 R. Srinivasan, “Dock, Harbour and Tunnel Engineering”, Charotar Publishing House, Anand, 1989.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: RAILWAY PLANNING AND PERMANENT WAY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Role of Indian Railways in National Development	01	26-11-19		TLM1	
2.	Alignments	01	27-11-19		TLM1	
3.	Role of Remote Sensing, GIS and GPS	01	30-11-19		TLM1	
4.	Permanent way	01	3-12-19		TLM1	
5.	Specification of Components Gauges	01	4-12-19		TLM1	
6.	Typical cross sections	01	7-12-19		TLM1	
7.	Construction	01	10-12-19		TLM1	
8.	renewal and maintenance of permanent way	01	11-12-19		TLM1	
9.	Rail joints	01	14-12-19		TLM1	
10.	Welding of rails.	01	17-12-19		TLM1	
No. of classes required to complete UNIT-I:10				No. of classes taken:		

UNIT-II: TRACK JUNCTIONS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Points and crossings	01	18-12-19		TLM1	
2.	Devices and layouts	01	21-12-19		TLM1	
3.	Most commonly employed layouts	01	24-12-19		TLM1	
4.	Special fittings and safety devices	01	28-12-19		TLM1	
5.	Station and yard	01	31-12-19		TLM1	
6.	Different types and their typical layouts	01	01-01-20		TLM1	
7.	General equipments	01	04-01-20		TLM1	
8.	Track junction	01	07-01-20		TLM1	
9.	Track junction	01	08-01-20		TLM1	
10.	Movable diamond crossing	01	11-01-20		TLM1	
No. of classes required to complete UNIT-II:10				No. of classes taken:		

UNIT-III: SIGNALS AND INTERLOCKING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Signals	01	21-01-20		TLM1	
2.	Different types and their working	01	22-01-20		TLM1	
3.	Different types and their working	01	25-01-20		TLM1	
4.	Principles and mechanism of interlocking	01	28-01-20		TLM1	
5.	Principles and mechanism of interlocking	01	29-01-20		TLM1	
6.	Different system of control on movement of trains	01	01-02-20		TLM1	
7.	Different system of control on movement of trains	01	04-02-20		TLM1	
8.	Introduction to modern trends	01	05-02-20		TLM1	
9.	Indian railways in the design of high speed tracks	01	08-02-20		TLM1	
10.	Quiz	01	11-02-20		TLM1	
No. of classes required to complete UNIT-III:10				No. of classes taken:		

UNIT-IV : AIRPORT ENGINEERING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Importance of Airports in National Transportation Sector	01	12-02-20		TLM1	
2.	Airport Planning	01	15-02-20		TLM1	
3.	Standards for planning of airports as per ICAO	01	18-02-20		TLM1	
4.	Site selection survey	01	19-02-20		TLM1	
5.	Airport Zoning	01	22-02-20		TLM1	
6.	Runway	01	25-02-20		TLM1	
7.	Orientation	01	26-02-20		TLM1	
8.	Geometric design- Different types	01	29-02-20		TLM1	
9.	Taxiways and Aprons	01	3-03-20		TLM1	
10.	Planning and layout of Terminal Buildings, Hangars and Parking area.	01	04-03-20		TLM1	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V : HARBOUR COMPONENTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Harbours and Ports – Requirement and classification	01	07-03-20		TLM1	
2.	surveys	01	11-03-20		TLM1	
3.	Breakwaters and pier heads	01	14-03-20		TLM1	
4.	Docking platforms	01	17-03-20		TLM1	
5.	Piers, wharves	01	18-03-20		TLM1	
6.	jetties and quays	01	21-03-20		TLM1	
7.	Fender mooring accessories – Entrance channels	01	24-03-20		TLM1	
8.	Docks- types	01	25-03-20		TLM1	
9.	Docks- types	01	28-03-20		TLM1	
10.	Dredgers and dredging	01	31-03-20		TLM1	
11.	Transit sheds and warehouses	01	01-04-20		TLM1	
12.	Navigational aids and signals	01	04-04-20		TLM1	
No. of classes required to complete UNIT-V: 12				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C**EVALUATION PROCESS (R17 Regulations):**

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20

II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
M.Manoj Kumar

Course Coordinator
M.Manoj Kumar

Module Coordinator
(B Narasimharao)

HOD
(Dr.V.Ramakrishna)



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B NARASIMHARAO
Course Name & Code : GEOTECHNICAL ENGINEERING-1 & 17CE23
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CE., VI-Sem., A.Y : 2019-20

PRE-REQUISITE: Geo technical engineering-1

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course aims to teach the different conditions of site investigation for soil exploration. The course coverage includes the various procedures for determining the bearing capacity of various soils and get acquainted with the principles of soil mechanics in design of retaining walls.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Interpret the principles of soil exploration.
CO 2	Design different types of foundations.
CO 3	Determine safe bearing capacity for design of buildings.
CO 4	Design different types of retaining walls.
CO 5	Design the special foundations and perform stability analysis of slopes.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	1	1	1	3	-	-	-	-	3	2	1	2
CO2	3	3	-	1	1	1	3	-	-	-	-	3	3	1	2
CO3	3	3	-	1	1	1	3	-	-	-	-	3	3	1	2
CO4	3	3	3	1	1	1	3	-	-	-	-	3	3	1	2
CO 5	3	3	-	1	1	1	3	-	-	-	-	3	3	1	2

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put '-'

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

TEXT BOOKS:

T1 Arora K.R, “Soil Mechanics and Foundation Engineering”, Standard Publishers & Distributors, Nai Sarak, Delhi. 1987.

T2 B. C. Punmia, A. K. Jain. "**Soil Mechanics and Foundation Engineering**". Laxmi Publications, 16th edition, New Delhi, 2016.

REFERENCE BOOKS:

- R1** Murthy.V.N.S, "**A Text book of Soil Mechanics and Foundation Engineering**", KripaTechnical Consultants, Bangalore, 1992
- R2** C. Venkataramaiah, "**Geotechnical Engineering**", Wiley Eastern Ltd., Madras, 1993.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: SITE INVESTIGATION AND SELECTION OF FOUNDATIONS

UNIT -I: SITE INVESTIGATION AND SELECTION OF FOUNDATIONS						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to COs and UNIT-I	1	27.11.2019		TLM1	
2.	Objective of site investigation	1	28.11.2019		TLM1	
3.	Methods of investigation	1	29.11.2019		TLM1	
4.	Depth of soil exploration	1	04.12.2019		TLM1	
5.	Standard penetration test	1	05.12.2019		TLM1	
6.	Soil sampling techniques	1	06.12.2019		TLM1	
7.	Methods of obtaining undisturbed samples	1	11.12.2019		TLM1	
8.	Functions and requisites of foundation	1	12.12.2019		TLM1	
9.	Different types of shallow foundations and situations under which they are adopted.	1	13.12.2019		TLM1	
10.	TUTORIAL-1	1	18.12.2019		TLM3	
No. of classes required to complete UNIT-I:09				No. of classes taken:		

UNIT-II: SHALLOW FOUNDATIONS AND BEARING CAPACITY OF SOILS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Bearing Capacity of soils – Factors affecting Bearing capacity of soil	1	19.12.2019		TLM1	
2.	Terzaghi's bearing capacity theory	1	20.12.2019		TLM1	
3.	Meyerhof's bearing capacity theory	1	26.12.2019		TLM1	

4.	Plate bearing test and its limitations	1	27.12.2019		TLM1	
5.	Settlement of foundation	1	02.01.2020		TLM1	
6.	Methods of controlling settlement	1	03.01.2020		TLM1	
7.	Problems	1	08.01.2020		TLM1	
8.	Problems	1	09.01.2020		TLM1	
9.	TUTORIAL-2	1	10.01.2020		TLM3	
No. of classes required to complete UNIT-II:08				No. of classes taken:		

UNIT-III: DEEP FOUNDATIONS AND GROUP CAPACITY OF PILES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Functions and Types of piles	1	05.02.2020		TLM1	
2.	Estimation of individual pile capacity by Static approaches.	1	06.02.2020		TLM1	
3.	Estimation of individual pile capacity by Dynamic approaches.	1	07.02.2020		TLM1	
4.	Problems	1	12.02.2020		TLM1	
5.	Problems	1	13.02.2020		TLM1	
6.	Pile group efficiency	1	14.02.2020		TLM1	
7.	Pile load test	1	19.02.2020		TLM1	
8.	Problems	1	20.02.2020		TLM1	
9.	TUTORIAL-3	1	26.02.2020		TLM3	
No. of classes required to complete UNIT-III:08				No. of classes taken:		

UNIT- IV: EARTH PRESSURE THEORIES AND RETAINING WALLS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Rankine's active earth pressure theory	1	27.02.2020		TLM1	
2.	Rankine's passive earth pressure theory	1	28.02.2020		TLM1	
3.	Coulomb's earth pressure theory	1	04.03.2020		TLM1	
4.	Problems	1	05.03.2020		TLM1	
5.	Problems	1	06.03.2020		TLM1	
6.	Different types of Retaining Walls and Design principles	1	11.03.2020		TLM1	
7.	Problems	1	12.03.2020		TLM1	
8.	TUTORIAL-4	1	13.03.2020		TLM3	
No. of classes required to complete UNIT-IV:07				No. of classes taken:		

UNIT-V : UNIT-V: SPECIAL FOUNDATIONS AND STABILITY OF SLOPES

UNIT-V: CAISSON FOUNDATIONS AND STABILITY OF SLOPES						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Caisson Foundation – Necessity of selection	1	18.03.2020		TLM1	
2.	Types of Caisson foundation	1	19.03.2020		TLM1	
3.	Foundation in filled up grounds	1	20.03.2020		TLM1	
4.	Foundation on expansive soil	1	25.03.2020		TLM1	
5.	under-reamed pile foundations	1	26.03.2020		TLM1	
6.	Stability analysis of finite earth slopes	1	27.03.2020		TLM1	
7.	Taylor’s stability number and its significance	1	01.04.2020		TLM1	
8.	TUTORIAL-5	1	03.04.2020		TLM3	
No. of classes required to complete UNIT-V:07				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks = 75% of Max(M1,M2)+25% of Min(M1,M2)	M=20

Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
(B Narasimharao)

Course Coordinator
(B Narasimharao)

Module Coordinator
(B Narasimharao)

HOD
(Dr.V.Ramak
rishna)



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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : **Dr V. Ramakrishna**
Course Name & Code : 17CE22: Water and Wastewater Engineering
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CE., VI-Sem., Sections- A A.Y : 2019-20

PRE-REQUISITE: Environmental Studies, Mechanics of Fluids.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with concept of water demand and water quality parameters, design of water treatment units, sewage quality parameters, sewage treatment units, and sludge handling in sewage treatment.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO1	Estimate the water demand for the community and assess the significance of water quality parameters
CO2	Design the sedimentation based water treatment systems
CO3	Design the filtration and disinfection based water treatment systems
CO4	Interpret the importance of sewage quality parameters and design the primary treatment units
CO5	Design the secondary treatment and sludge handling aspects sewage treatment plant

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1								1	1		1
CO2	2	2	2	3								1	3	2	1
CO3	2	2	2	3								1	3	2	1
CO4	3	2	2	2								1	2	3	2
CO5	3	2	2	2								1	2	3	2

Note: Enter Correlation Levels **1** or **2** or **3**. If there is no correlation, put **‘-’**

1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

- T1** B.C. Punmia, A.K. Jain and A.K. Jain, “Water Supply Engineering”, Laxmi Publications, 2nd edition, 1995, Reprint 2005.
T2 B.C. Punmia, A.K. Jain and A.K. Jain, “Wastewater Engineering”, Laxmi Publications, 2nd edition, 1996, Reprint 2014.

REFERENCE BOOKS:

- R1** S.K. Garg, “Water Supply Engineering”, Khanna Publishers, 26th Revised edition, New Delhi, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Water Demand and Water Quality

UNIT-I: Water Demand and Water Quality						
S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	25.11.19		1	
2.	Need for protected water supply, Water demand	1	26.11.19		1	
3.	Factors affecting water demand, fluctuations in demand	1	27.11.19		1	
4.	Population forecast	1	2.12.19		1	
5.	Population forecast	1	3.12.19		1	
6.	Sources of water, Physical parameters	1	4.12.19		1	
7.	Chemical parameters	1	9.12.19		1	
8.	Bacteriological parameters	1	10.12.19		1	
9.	Tutorial-1	1	11.12.19		3	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Water Treatment - Sedimentation

UNIT-II: Water Treatment - Sedimentation						
S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Treatment objectives, Screening, Aeration	1	16.12.19		1	
2.	Stokes law	1	17.12.19		1	
3.	Theory of sedimentation	1	18.12.19		1	
4.	Problems	1	23.12.19		1	
5.	Coagulation concept	1	24.12.19		1	
6.	Problems	1	30.12.19		1	
7.	Jar test, Flash mixer	1	31.12.19		1	
8.	Flocculator	1	01.01.20		1	
9.	Problems	1	06.01.20		1	
10.	Tutorial-2	1	07.01.20		3	
11.	Tutorial-3	1	08.01.20		3	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Water Treatment – Filtration & Disinfection

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Filtration Mechanism		09.01.20		1	
2.	Rapid sand filter		27.01.20		1	

3.	Slow sand filter		28.01.20		1	
4.	Problems		29.01.20		1	
5.	Forms of disinfection		03.02.20		1	
6.	Types of Chlorination		04.02.20		1	
7.	Problems		05.02.20		1	
8.	Tutorial-4		10.02.20		3	
9.	Tutorial-5		11.02.20		3	
No. of classes required to complete UNIT-III: 9				No. of classes taken:		

UNIT-IV: Sewage Quality & Primary Treatment

UNIT-IV: Sewage Quantity & Primary Treatment						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Systems of sanitation, Decomposition cycles		12.02.20		1	
2.	Physical parameters		17.02.20		1	
3.	Physical parameters		18.02.20		1	
4.	Chemical parameters		19.02.20		1	
5.	BOD rate equation		24.02.20		1	
6.	Problems		25.02.20		1	
7.	Preliminary Treatment		26.02.20		1	
8.	Preliminary Treatment		02.03.20		1	
9.	Primary sedimentation tank design		03.03.20		1	
10.	Tutorial-6		04.03.20		3	
11.	Tutorial-7		09.03.20		3	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V: Secondary Treatment & Sludge Handling

UNIT-V: Secondary Treatment & Sludge Handling						
S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Biological growth & Processes		10.03.20		1	
2.	Activated sludge process		11.03.20		1	
3.	Complete mix process – design		16.03.20		1	
4.	Diffused aeration process-design		17.03.20		1	
5.	Trickling filter construction		18.03.20		1	
6.	Low rate filter, High rate filter		23.03.20		1	
7.	Sludge properties		24.03.20		1	
8.	Sludge digestion		25.03.20		1	
9.	Design of digester		30.03.20		1	
10.	Sludge dry beds		31.03.20		1	
11.	Tutorial-8		01.04.20		3	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		

Teaching Learning Methods

TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks = 75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks = 75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory test required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr V. Ramakrishna)	(Dr V. Ramakrishna)	(J. Rangaiah)	(Dr V. Ramakrishna)



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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : J.RANGAIAH
 Course Name : IRRIGATION AND WATER RESOURCES ENGINEERING
 Course Code : 17CE21
 L-T-P Structure : 3-1-0 Credits: 3
 Program/Sem/Sec : B.Tech., CE., VI-Sem., A.Y : 2019-20

PRE-REQUISITE: Mechanics of Fluids, Hydraulics and Hydraulic Machinery Systems,
 Hydrology

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The course is designed to know the concepts of analysis and design of Storage and Diversion Head Works and introduce the types of Irrigation Systems. It also addresses the concepts of planning and design of Irrigation water requirements, design methods of erodible and non-erodible canals.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Analyze the stability of Gravity dams
CO 2	Design the impervious floors for Diversion Head Works.
CO 3	Estimate Irrigation Water Requirements.
CO 4	Design the erodible and non-erodible canals
CO 5	Interpret the design principles of Cross Drainage Works

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	2					1		1		3
CO2	3	2	2	2	1	2					1		1		3
CO3	3	3	3	2	2	2	1				1		1		3
CO4	2	2	2	2	1	2					1		1		3
CO5	2	2	2	2	1	2					1		1		3

Note: Enter Correlation Levels **1** or **2** or **3**. If there is no correlation, put ‘-’
1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

- T1** B C Punmia, B.B Lal, A.K. Jain and A.K. Jain; „Irrigation and Water Power Engineering“, Laxmi Publications Pvt. Ltd., New Delhi. 2015.
- T2** Santosh Kumar Garg, “Irrigation Engineering and Hydraulic Structures: Water Resources Engineering - Vol. II”, Khanna Publishers; 2017.

REFERENCE BOOKS:

- R1** Ch. Satyanarayana Murthy, “Water Resources Engineering”, New Age International Publishers; 2002.
- R2** P.N. Modi, “Irrigation Water Resources and Water Power Engineering”, Standard Book House, New Delhi; 2008.
- R3** Water Resources Engineering, NPTEL video lectures and web notes

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DAMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Types of dams, Gravity dams: drainage galleries, grouting.	1	25.11.2019		TLM1	
2.	Selection of type of dam, selection of site for a dam.	1	27.11.2019		TLM1	
3.	Forces acting on a gravity dam, causes of failure of a gravity dam,	1	28.11.2019		TLM1	
4.	Elementary profile and practical profile of a gravity dam,	1	30.1.2019		TLM1	
5.	Limiting height of a dam	1	02.12.2019		TLM1	
6.	Tutorial-1	1	04.12.2019		TLM3	
7.	Problems	1	05.12.2019		TLM1	
8.	Stability analysis	1	07.12.2019		TLM1	
9.	Problems	1	09.12.2019		TLM1	
10.	Problems	1	11.12.2019			
11.	Problems	1	12.12.2019			
12.	Tutorial-2	1	14.12.2019		TLM3	
13.	Drainage galleries,	1	16.12.2019		TLM1	

	grouting.					
No. of classes required to complete UNIT-I: 11				No. of classes taken:		

UNIT-II: DIVERSION HEAD WORKS

UNIT-II: DIVERSION HEAD WORKS						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Types of diversion head works, weirs and barrages, layout of diversion head works, components	1	18.12.2019		TLM1	
2.	Causes and failures of weirs on permeable foundations	1	19.12.2019		TLM1	
3.	Bligh's creep theory	1	23.12.2019		TLM1	
4.	Tutorial-3	1	26.12.2019		TLM3	
5.	Khosla's theory	1	28.12.2019		TLM1	
6.	Problems	1	26.12.2019		TLM1	
7.	Design of impervious floors for subsurface flow, exit gradient.	1	28.12.2019		TLM1	
8.	Problems	1	30.12.2019		TLM1	
9.	Problems	1	02.01.2020			
10.	Problems	1	04.01.2020			
11.	Spillways: Types, design principles of Ogee spillways,	1	06.01.2020		TLM1	
12.	Tutorial-4	1	08.01.2020		TLM3	
13.	Types of spillways crest gates. Energy dissipation below spillways-stilling basin and its appurtenances	1	09.01.2020		TLM1	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT III: IRRIGATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Necessity and Importance of Irrigation, advantages and ill effects of Irrigation	1	27.01.2020		TLM1	
2.	types of Irrigation	1	29.01.2020		TLM1	
3.	methods of application of Irrigation water,	1	30.01.2020		TLM1	
4.	water logging and drainage, principal	1	01.02.2020		TLM1	

	crops and crop seasons, crop rotation					
5.	Soil-water-plant relationship, estimation of consumptive use	1	03.02.2020		TLM1	
6.	Tutorial-5	1	05.02.2020		TLM3	
7.	Duty and delta, factors affecting duty	1	06.02.2020		TLM1	
8.	Problems	1	10.02.2020		TLM1	
9.	Tutorial-6	1	12.02.2020		TLM3	
10.	depth and frequency of Irrigation		13.02.2020		TLM1	
11.	Irrigation efficiencies.	1	15.02.2020		TLM1	
12.	Assignment/Quiz	1	17.02.2020		TLM3	
No. of classes required to complete UNIT-III:9				No. of classes taken:		

UNIT-IV: CANALS AND REGULATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Canals: Classification	1	17.02.2020		TLM1	
2.	design of non-erodible canals	1	19.02.2020		TLM1	
3.	Problems	1	20.02.2020		TLM1	
4.	Methods of economic section and maximum permissible velocity, economics of canal lining	1	22.02.2020		TLM1	
5.	design of erodible canals -Kennedy's silt theory	1	24.02.2020		TLM1	
6.	Tutorial-7	1	26.02.2020		TLM3	
7.	Lacey's regime theory	1	27.02.2020		TLM1	
8.	Problems	1	29.02.2020		TLM1	
9.	Head regulators, design principles.	1	02.03.2020		TLM1	
10.	Tutorial -8	1	04.03.2020		TLM3	
11.	Cross regulators, design principles.	1	05.03.2020		TLM1	
12.	Assignment/Quiz	1	07.03.2020		TLM3	
No. of classes required to complete UNIT-IV:9				No. of classes taken:		

UNIT-V: CANAL FALLS AND CROSS DRAINAGE WORKS

UNIT-V: CANAL FALLS AND CROSS DRAINAGE WORKS						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Canal Falls: Types and location	1	09.03.2020		TLM1	
2.	Design principles of Sarda type fall	1	11.03.2020		TLM1	
3.	Design principles of Straight glacis fall.	1	12.03.2020		TLM1	
4.	Cross Drainage Works: Types,	1	16.03.2020		TLM1	
5.	Tutorial -9	1	18.03.2020		TLM3	
6.	selection,	1	19.03.2020		TLM1	
7.	Design principles of aqueduct	1	21.03.2020		TLM-1	
8.	Design principles of siphon aqueduct	1	23.03.2020		TLM1	
9.	Tutorial -10	1	25.03.2020		TLM3	
10.	Design principles of Super passage.	1	26.03.2020		TLM1	
11.	Assignment/Quiz	1	28.03.2020		TLM3	
No. of classes required to complete UNIT-V: 9				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20

II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor
(J.RANGAIAH)

Course Coordinator
(J.RANGAIAH)

Module Coordinator
(J.RANGAIAH)

HOD
(Dr.V.RAMAKRISHNA)



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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : P Mohana Ganga Raju
Course Name & Code : Low Cost & Eco-Friendly Building Technology-17CE91
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech., ECE., IV-Sem., Sections- A A.Y : 2019-2020

PRE-REQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): The course focuses on study of available traditional and eco-friendly materials, Eco friendly and cost effective technologies, Eco-friendly building materials, rural housing approaches in disaster prone areas.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Select appropriate traditional materials for construction.
CO 2	Select appropriate eco-friendly materials for construction.
CO 3	Analyze the eco friendly technologies for low cost construction.
CO 4	Describe prefabrication techniques and assess the wind effects on low rise buildings.
CO 5	Categorize the approaches followed in disaster prone areas.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	2	2	3	-	-	-	-	1	2	1	3
CO2	-	-	-	-	2	2	3	-	-	-	-	1	2	1	3
CO3	-	-	-	-	2	2	3	-	-	-	-	3	2	-	3
CO4	-	-	-	-	2	1	3	-	-	-	-	3	2	-	3
CO4	-	-	-	-	2	2	3	-	-	-	-	3	2	-	3

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put '-'

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

TEXT BOOKS:

- T1** A.G.Madhavrao, D.S.Ramachandramurthy –Appropriate technologies for low cost housing-oxford & IBH Publishing, 1996.

T2 A K Lal, “Hand Book of Low Cost Housing”, New Age Publishing, 1995.

REFERENCE BOOKS:

R1 N. Kumara Swamy and A. Kameswara Rao, “Building Planning and Drawing”, Charotar Publications, 2013.

R2 S K Duggal, “Building materials”, New Age International Publishers. 2012.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Traditional Building Materials

UNIT-I: Traditional Building Materials						
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	CO's and PO's	1	25-11-2019		TLM1	
2.	Introduction-housing scenario in India	1	26-11-2019		TLM1	
3.	Traditional building materials-stabilized soil bricks, improved mud and thatch	1	28-11-2019		TLM2	
4.	burnt and un burned bricks, laterite-lime bricks,	1	02-12-2019		TLM2	
5.	sand-lime blocks, stone block masonry units	1	03-12-2019		TLM2	
6.	bamboo, hollow cement blocks	1	05-12-2019		TLM2	
7.	light weight concrete blocks, wood-cement products	1	09-12-2019		TLM2	
8.	fly ash bricks, cementitious binder from rice husk, lime based binders	1	10-12-2019		TLM2	
9.	Assignment and Quiz-1	1	12-12-2019			
No. of classes required to complete UNIT-I: 9				No. of classes taken:		

UNIT-II: Eco-Friendly Building Materials

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Basics and practical applications of locally available building materials- Soil, Fly ash,	1	16-12-2019		TLM1 TLM2	
2.	Ferrocement, Lime	1	17-12-2019		TLM1	
3.	Fibres, Stone Dust	1	19-12-2019		TLM1	
4.	Red mud, Gypsum,	1	23-12-2019		TLM1	

	Alternate Wood,					
5.	Polymer-ADOBE, Light Clay, Straw-Bale,	1	24-12-2019		TLM2	
6.	Bamboo, Agro-Industrial Waste,	1	26-12-2019		TLM2	
7.	Innovative materials developed by CBRI, SERC	1	30-12-2019		TLM2	
8.	Structural Properties of Alternate Building Materials	1	31-12-2019		TLM2	
9.	Earthen Finishes, Earth Plasters, Earth Floors	1	02-01-2020		TLM2	
10.	Assignment and Quiz-2	1	06-01-2020			
No. of classes required to complete UNIT-II:10				No. of classes taken:		

UNIT-III: Improved Building Technologies

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Foundations: Introduction, types of soli, types of foundations	1	07-01-2020		TLM1	
2.	permissible settlements, soil investigations	1	09-01-2020		TLM2	
3.	Walls: Introduction, stabilized earth wall construction, building blocks (lato blocks) from lateritic soil	1	27-01-2020		TLM2	
4.	brick masonry walls, cellular concrete blocks, hallow concrete blocks	1	28-01-2020		TLM2	
5.	shell type houses made of hallow clay blocks, pre cast concrete panels	1	30-01-2020		TLM2	
6.	Roofs: Introduction, catenary hollow clay blocks/brick shell roofs	1	03-02-2020		TLM2	
7.	pre cast reinforced concrete-channel units-cored units	1	04-02-2020		TLM2	
8.	roofing system with cellular unit	1	06-02-2020		TLM2	
9.	cellular light weight concrete roofing system	1	10-02-2020		TLM2	

10.	Assignment and Quiz-3	1	11-02-2020			
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

UNIT-IV : Pre-Fabrication And Wind Effects

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Pre-fabrication: Introduction, advantages of pre- fabrication	1	13-02-2020		TLM1	
2.	areas where prefabrication techniques can be introduced	2	17-02-2020, 18-02-2020		TLM2	
3.	joints in pre cast concrete structures	1	20-02-2020		TLM2	
4.	Wind effects on low rise buildings: Introduction	1	25-02-2020		TLM1	
5.	wind structure interaction concepts, codal provision	1	27-02-2020		TLM2	
6.	housing in cyclone prone areas	1	02-03-2020		TLM2	
7.	cyclone resisting core units	1	03-03-2020		TLM2	
8.	Assignment and Quiz- 4	1	05-03-2020			
No. of classes required to complete UNIT-IV: 9				No. of classes taken:		

UNIT-V : Rural Housing And Housing In Disaster Prone Areas

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Rural housing: Introduction, traditional practice of rural house construction	1	09-03-2020		TLM1	
2.	appropriate rural housing technology	1	12-03-2020		TLM2	
3.	mud housing technology, mud roofs, characteristics of mud	1	16-03-2020		TLM2	
4.	fire retardant treatment for trench roof	1	17-03-2020		TLM2	
5.	Housing in disaster prone areas: Introduction, traditional	2	19-03-2020, 23-03-2020		TLM2	

	houses in disaster prone areas					
6.	types of damages failures of non engineered buildings	1	24-03-2020		TLM2	
7.	repair and rehabilitation of earthquake damaged non engineered buildings	1	26-03-2020		TLM2	
8.	recommendations for feature construction	1	30-03-2020		TLM2	
9.	Assignment and Quiz-5	1	31-03-2020			
No. of classes required to complete UNIT-V: 09				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks = 75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks = 75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor

P. Mohana Ganga Raju

Module Coordinator

B. Rama Krishna

HOD

Dr. V. Rama
Krishna



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

FRESHMAN ENGINEERING DEPARTMENT

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. Ch.Nagarjuna
Course Name & Code : Presentation Skills Lab; 17FE61
L-T-P Structure : 0-0-2+2
Program/Sem/Sec : B.Tech.,CIVIL, VI-Sem.,
Credit : 1
A.Y: 2019-2020

PRE-REQUISITE: Should have fundamental knowledge in making conversations in English and be with readiness to speak

COURSE EDUCATIONAL OBJECTIVE (CEOs): To help students make oral presentations, power point presentations, participate in group discussions and write project/research/technical reports/formal letters by gathering information and organizing ideas relevantly and coherently.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Make power point presentations and oral presentations
CO 2	Use standard vocabulary contextually.
CO 3	Manage skillfully through group discussions.
CO 4	Negotiate skillfully for better placement.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

Course		Program Outcomes (POs)											
	POs→	1	2	3	4	5	6	7	8	9	10	11	12
Presentation Skills Lab 17FE61	CO1		1		3		2			3	3		2
	CO2		1		3		2			3	3		2
	CO3		1		3		2			3	3		2
	CO4		1		3		2			3	3		2

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put ‘-’

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

Bos Approved Lab Manual:

Board of Editors, “ELCS Lab Manual – A Workbook of CALL and ICS Lab Activities”,
Orient Black Swan Pvt. Ltd., Hyderabad, 2016.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

BATCH-A

S.No.	Activity	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
10.	Introduction	2	28-11-2019		TLM4		
11.	Self Introduction	2	05-12-2019		TLM4	CO1	
12.	JAM- I (prepared)	2	12-12-2019		TLM4	CO1	
13.	JAM-II (Extempore)	2	19-12-2019		TLM4	CO1	
14.	Group Discussion	2	26-12-2019		TLM4, TLM6	CO3	
15.	Group Discussion	2	02-01-2020		TLM4, TLM6	CO3	
16.	Reading Comprehension/Listening Comprehension	2	09-01-2020		TLM3	CO2	
17.	Poster Presentation	2	30-01-2020		TLM2, TLM4	CO1	
18.	Power point Presentation	2	06-02-2020		TLM2, TLM4	CO1	
19.	Power point Presentation	2	13-02-2020		TLM2, TLM4	CO1	
20.	Vocabulary(one-word substitutes/analogy/idioms)	2	20-02-2020		TLM1, TLM3	CO2	
21.	Vocabulary(one-word substitutes/analogy/idioms)	2	27-02-2020		TLM1, TLM3	CO2	
22.	Letter & Résumé writing	2	05-03-2020		TLM1, TLM3	CO4	
23.	Vocabulary(Synonyms/Antonyms)	2	12-03-2020		TLM1, TLM3	CO2	
24.	Mock Interviews	2	19-03-2020		TLM6	CO4	
25.	Mock Interviews	2	26-03-2020		TLM6	CO4	
26.	Internal Lab Exam	2	03-04-2020				
27.	Total	34					

BATCH-B

S.No.	Activity	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction	2	30-11-2019		TLM4		
2.	Self Introduction	2	07-12-2019		TLM4	CO1	
3.	JAM- I (prepared)	2	14-12-2019		TLM4	CO1	
4.	JAM-II (Extempore)	2	21-12-2019		TLM4	CO1	
5.	Group Discussion	2	28-12-2019		TLM4, TLM6	CO3	
6.	Group Discussion	2	04-01-2020		TLM4, TLM6	CO3	
7.	Reading Comprehension/Listening Comprehension	2	11-01-2020		TLM3	CO2	
8.	Poster Presentation	2	18-02-2020		TLM2, TLM4	CO1	
9.	Power point Presentation	2	01-02-2020		TLM2, TLM4	CO1	
10.	Power point Presentation	2	08-02-2020		TLM2, TLM4	CO1	
11.	Vocabulary(one-word substitutes/analogy/idioms) (Synonyms/Antonyms)	2	15-02-2020		TLM1, TLM3	CO2	
12.	Vocabulary(one-word substitutes/analogy/idioms) (Synonyms/Antonyms)	2	22-02-2020		TLM1, TLM3	CO2	
13.	Letter & Résumé writing	2+2	29-02-2020 07-03-2020		TLM1, TLM3 TLM6	CO4	
14.	Mock Interviews	2	21-03-2020		TLM6	CO4	
15.	Mock Interviews	2	28-03-2020		TLM6	CO4	
16.	Internal Lab Exam	2	04-04-2020				
17.	Total	34					

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM3	Tutorial	TLM6	Group Discussion/Project

Part - C

EVALUATION PROCESS:

According to Academic Regulations of R17 Distribution and Weightage of Marks for Laboratory Courses is as follows:

(a) Continuous Internal Evaluation (CIE):

- ✓ The continuous internal evaluation for laboratory courses (including Computer aided engineering drawing, computer aided engineering graphics, Computer aided machine drawing etc.) is based on the following parameters:

Parameter		Marks
Day – to – Day Work	Observation	10 Marks
	Record	10 Marks
Internal Test		10 Marks
Attendance		05 Marks
Viva – Voce During Regular Lab Sessions		05 Marks
Total		40 Marks

(b) Semester End Examinations (SEE):

- ✓ The performance of the student in laboratory courses shall be evaluated jointly by internal and external examiners for 3 hours duration as per the parameters indicated below:

Sl.No.	Topic	Marks
I.	i. Synonyms	5
	ii. Antonyms	5
	iii. One-Word substitutes	5
	iv. Idioms	2 ½
	v. Analogy	2 ½
II.	Resum`e	5
III.	Reading Comprehension	5
IV.	Oral & written task (JAM/GD/PPT)	20
V.	Interview	10
	Total	60

% of Attendance	Marks
≥ 95	05 Marks
90 to < 95	04 Marks
85 to < 90	03 Marks
80 to < 85	02 Marks
75 to < 80	01 Mark

Rubrics For Evaluation of Laboratory Courses

Day-To-Day Lab (Observation) Performance Evaluation (R-17)				Record Performance Evaluation (R-17)				
S.N	Criteria	Poor	Average	Good	Criteria	Poor	Average	Good
1	Language suitability (4 Marks)	Wrong usage of words Grammatical errors (2 Marks)	Some points are missing from the data written Wrong usage of grammar & vocabulary. (3 Marks)	Well-written & spoken Language is error free (4 Marks)	Language (4 Marks)	Language used is not suitable Full of incorrect vocabulary (2 Marks)	Some words are inappropriately used / wrongly spelt (3Marks)	Language used is good No word/ spelling errors (4 Marks)
2	Content (4Marks)	Unable to Deliver all the points Delivering Irrelevant point (2 Marks)	Some points are not given Point analysis is not up to the mark (3 Marks)	All the points are analyzed properly More content was delivered. (4 Marks)	Content (4 Marks)	Very less points were written Points were not analyzed properly (2 Marks)	Some of the points were missing Some points are not properly analyzed (3 Marks)	Complete information is provided for the topic Important information is provided with illustrations/ examples (4 Marks)
3	Style of Presentation (2 Marks)	Inappropriate body language Improper presentation (0 Marks)	Presentation is not up to the mark (1 Mark)	Presented well with appropriate etiquette All important conclusions have been clearly made, student shows good understanding of the topic. (2 Marks)	Grammar & Neatness (2 Mark)	Frequent grammar and/r spelling errors writing style is rough and immature (1/2 Mark)	Some grammatical errors (1 Marks)	No grammar/ spelling corrections are found and well-written (2 Marks)

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
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PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Instructor
Mr.Ch.Nagarjuna

Course Coordinator
Dr.B. Samrajya Lakshmi

Module Coordinator
Dr.B. Samrajya Lakshmi

HOD
Dr.A. Rami Reddy



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17CE71 – ENVIRONMENTAL ENGINEERING LAB

Course Instructor: Dr. V. RAMAKRISHNA

B.Tech(VI sem)

B. NARASIMHARAO

A.Y 2019-20

CYCLE-1

C-1-1. Determination of Turbidity of water sample.

C-1-2. Determination of Settleable solids using Imhoff cone in sewage sample.

C-1-3. Determination of pH value and Conductivity.

C-1-4. Determination of TDS in water sample.

C-1-5. Determination of Dissolved Oxygen of water sample.

C-1-6. Determination of Optimum dose of coagulant.

CYCLE-2

C-2-1. Determination of Total, temporary and permanent hardness of water sample.

C-2-2. Determination of Total, Calcium and Magnesium hardness of water sample.

C-2-3. Determination of Chloride concentration of water sample.

C-2-4. Determination of Acidity of water sample.

C-2-5. Determination of Alkalinity of water sample.

C-2-6. Determination of Fluorides in water sample.

CYCLE-3

C-3-1. Determination of Suspended, fixed and volatile solids in sewage sample.

C-3-2. Determination of Total, fixed and volatile solids in sewage sample.

C-3-3. Determination of Sulphates in water sample.

17CE71 – ENVIRONMENTAL ENGINEERING LAB

Course Instructor: Dr. V. RAMAKRISHNA

B.Tech(VI sem)

B. NARASIMHARAO

A.Y 2019-20

Batch-A

Date/Batch	A1	A2	A3	A4	A5	A6
30.11.19	Introduction	Introduction	Introduction	Introduction	Introduction	Introduction
07.12.19	C-1-1 C-1-2	C-1-1 C-1-2	C-1-3 C-1-4	C-1-3 C-1-4	C-1-5 C-1-6	C-1-5 C-1-6
21.12.19	C-1-3 C-1-4	C-1-3 C-1-4	C-1-5 C-1-6	C-1-5 C-1-6	C-1-1 C-1-2	C-1-1 C-1-2
28.12.19	C-1-5 C-1-6	C-1-5 C-1-6	C-1-1 C-1-2	C-1-1 C-1-2	C-1-3 C-1-4	C-1-3 C-1-4
04.01.20	C-2-1	C-2-2	C-2-3	C-2-4	C-2-5	C-2-6
11.01.20	C-2-2	C-2-3	C-2-4	C-2-5	C-2-6	C-2-1
15.02.20	C-2-3	C-2-4	C-2-5	C-2-6	C-2-1	C-2-2
22.02.20	C-2-4	C-2-5	C-2-6	C-2-1	C-2-2	C-2-3
29.02.20	C-2-5	C-2-6	C-2-1	C-2-2	C-2-3	C-2-4
07.03.20	C-2-6	C-2-1	C-2-2	C-2-3	C-2-4	C-2-5
21.03.20	C-3-1	C-3-1	C-3-2	C-3-2	C-3-3	C-3-3
28.03.20	C-3-2	C-3-2	C-3-3	C-3-3	C-3-1	C-3-1
04.04.20	C-3-3	C-3-3	C-3-1	C-3-1	C-3-2	C-3-2

17CE71 – ENVIRONMENTAL ENGINEERING LAB

Course Instructor: Dr. V. RAMAKRISHNA

B.Tech(VI sem)

B. NARASIMHARAO

A.Y 2019-20

Batch-B

Date/Batch	B1	B2	B3	B4	B5	B6
29.11.19	Introduction	Introduction	Introduction	Introduction	Introduction	Introduction
06.12.19	C-1-1 C-1-2	C-1-1 C-1-2	C-1-3 C-1-4	C-1-3 C-1-4	C-1-5 C-1-6	C-1-5 C-1-6
13.12.19	C-1-3 C-1-4	C-1-3 C-1-4	C-1-5 C-1-6	C-1-5 C-1-6	C-1-1 C-1-2	C-1-1 C-1-2
20.12.19	C-1-5 C-1-6	C-1-5 C-1-6	C-1-1 C-1-2	C-1-1 C-1-2	C-1-3 C-1-4	C-1-3 C-1-4
27.12.20	C-2-1	C-2-2	C-2-3	C-2-4	C-2-5	C-2-6
03.01.20	C-2-2	C-2-3	C-2-4	C-2-5	C-2-6	C-2-1
10.01.20	C-2-3	C-2-4	C-2-5	C-2-6	C-2-1	C-2-2
07.02.20	C-2-4	C-2-5	C-2-6	C-2-1	C-2-2	C-2-3
14.02.20	C-2-5	C-2-6	C-2-1	C-2-2	C-2-3	C-2-4
28.02.20	C-2-6	C-2-1	C-2-2	C-2-3	C-2-4	C-2-5
06.03.20	C-3-1	C-3-1	C-3-2	C-3-2	C-3-3	C-3-3
13.03.20	C-3-2	C-3-2	C-3-3	C-3-3	C-3-1	C-3-1
20.03.20	C-3-3	C-3-3	C-3-1	C-3-1	C-3-2	C-3-2
27.03.20	REVISION					
03.04.20	LAB INTERNAL EXAMINATION					

17CE71 – ENVIRONMENTAL ENGINEERING LAB

Course Instructor: Dr. V. RAMAKRISHNA

B.Tech(VI sem)

B. NARASIMHARAO

A.Y 2019-20

Batch-A

A1- 17761A0101 TO 17761A0106

A2- 17761A0107 TO 17761A0113

A3- 17761A0114 TO 17761A0119

A4- 17761A0120 TO 17761A0124

A5- 17761A0125 TO 17761A01129

A6- 17761A0132 TO 17761A0135

Batch-B

B1- 17761A0137 TO 17761A0142

B2- 17761A0143 TO 17761A0149

B3- 17761A0150 TO 17761A0154

B4- 17761A0155 TO 18765A0101

B5- 18765A0102 TO 18765A0106

B6- 18765A0107 TO 18765A0113



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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : B. RAMA KRISHNA, K. HARISH KUMAR
Course Name & Code : COMPUTER AIDED ANALYSIS AND DESIGN LAB
L-T-P Structure : 0-0-2 Credits : 1
Program/Sem/Sec : B.Tech., CE., VI-Sem., A.Y : 2019-20

PRE-REQUISITE: Reinforced concrete structures, Design of steel structures, Auto CAD

COURSE EDUCATIONAL OBJECTIVES (CEOs): To impart hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Apply structural analysis software to analyze and design the beams, 2D and 3D frames.
CO 2	Design of retaining walls and foundations using STAAD Pro
CO 3	Analyze, design and draw the details of RCC and steel structural elements.

COURSE ARTICULATION MATRIX(Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	1			2			1		3	3	1
CO2	3	3	3	2	1			2			1		3	3	1
CO3	3	3	3	2	1			2			1		3	3	1

Note: Enter Correlation Levels 1 or 2 or 3. If there is no correlation, put '-'

1- Slight (Low), 2 – Moderate (Medium), 3 - Substantial (High).

TEXT BOOKS

1. N. Subramanian, Design of Steel Structures, Oxford University Press, 2016.
2. Varghese, "Limit State Design of Reinforced Concrete", Prentice Hall of India Pvt., Ltd., New Delhi, 2002

REFERENCE BOOKS:

1. S.K.Duggal, Design of Steel Structures –Tata McGraw Hill, New Delhi, 2017.
2. Unni Krishnan Pillai and Devdas Menon, "**Reinforced concrete design**", Tata McGraw Hill Publishing company Ltd, New Delhi, 1998

List of experiments

S.No	Name of the experiments
1.	Reinforcement particulars of T-beams and L-beams.
2.	Reinforcement detailing of continuous beams
3.	Reinforcement particulars of columns.
4.	Detailing of Compound beams including curtailment of flange plates.
5.	Detailing of Column including lacing and battens
6.	Detailing of Beams including curtailment of flange plates
7.	Analysis and Design of different Beams
8.	2-D Frame Analysis and Design
9.	3-D Frame Analysis and Design
10.	Design and analysis of multi-storied building
11.	Design of a different types of Retaining Walls
12.	Foundation design

COMPUTER AIDED ANALYSIS AND DESIGN LAB A.Y: 2019-20

I-CYCLESCHEDULE

Date / batch	A1	A2	A3	A4	A5	A6
29.11.19	DEMO	DEMO	DEMO	DEMO	DEMO	DEMO
06.12.19	1	1	1	1	1	1
13.12.19	2	2	2	2	2	2
20.12.19	3	3	3	3	3	3
27.12.19	4	4	4	4	4	4
03.01.20	5	5	5	5	5	5
10.01.20	6	6	6	6	6	6

Date / batch	B1	B2	B3	B4	B5	B6
28.11.19	DEMO	DEMO	DEMO	DEMO	DEMO	DEMO
05.12.19	1	1	1	1	1	1
12.12.19	2	2	2	2	2	2
19.12.19	3	3	3	3	3	3
26.12.19	4	4	4	4	4	4
02.01.20	5	5	5	5	5	5
09.01.20	6	6	6	6	6	6

II CYCLESCHEDULE

Date / batch	A1	A2	A3	A4	A5	A6
31.01.20	DEMO	DEMO	DEMO	DEMO	DEMO	DEMO
07.02.20	7	7	7	7	7	7
14.02.20	8	8	8	8	8	8
28.02.20	9	9	9	9	9	9
06.03.20	10	10	10	10	10	10
13.03.20	11	11	11	11	11	11
20.03.20	12	12	12	12	12	12
27.03.20	Repetition	Repetition	Repetition	Repetition	Repetition	Repetition

Date / batch	B1	B2	B3	B4	B5	B6
30.01.20	DEMO	DEMO	DEMO	DEMO	DEMO	DEMO
06.02.20	7	7	7	7	7	7
13.02.20	8	8	8	8	8	8
20.02.20	9	9	9	9	9	9
27.02.20	10	10	10	10	10	10
05.03.20	11	11	11	11	11	11
12.03.20	12	12	12	12	12	12
19.03.20	Repetition	Repetition	Repetition	Repetition	Repetition	Repetition
26.03.20	Repetition	Repetition	Repetition	Repetition	Repetition	Repetition

Batch A (17761A0101 to 17761A0136): **Friday**,

Batch B (17761A0137 to 17761A0158 & 18765A0101 to 18765A0113): **Thursday**

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor

B.Ramakrishna

Course Coordinator

B.Ramakrishna

Module Coordinator

B.Ramakrishna

HOD

Dr.V.Ramakrishna