



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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech,V-SEM, Civil

ACADEMIC YEAR : 2021-22

COURSE NAME & CODE : Design of Reinforced Concrete Structures-I 17CE13

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : B Rama krishna

PRE-REQUISITES: Applied Mechanics, Strength of Materials, Structural Analysis, Concrete technology

COURSE EDUCATIONAL OBJECTIVE: Learn the design principles of Working stress and Limit state designs as per IS: 456-2000, Identify the procedures of shear design parameters, Understand the design aspects of beams, slabs and columns as per IS: 456-2000.

COURSE OUTCOMES(COs):At the end of the course, the student will be able to:

CO1: Analyze and design the RCC structures using working stress methods.

CO2: Design the singly and doubly reinforced RC beams in limit state method.

CO3: Illustrate the shear reinforcement for different elements of a building. .

CO4: Design the one way and two way slabs with different end conditions.

CO5: Design the columns subjected to axial load, uni-axial and bi-axial moments

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	1					2		3	1	1
CO2	2	2	3		1	1					2		3	1	1
CO3	2	2	3		1	1					2		3	1	1
CO4	2	2	3		1	1					2		3	1	1
CO5	2	2	3		1	1					2		3	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).

BOS APPROVED TEXT BOOKS:

T1 B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain “Comprehensive RCC Design”, Laxmi Publications (P) Ltd, New Delhi, 2015.

T2 N. Krishnaraju, “Advanced Reinforced Concrete design”, CBS Publishers & Distributors, New Delhi, 2005

BOS APPROVED REFERENCE BOOKS:

R1 P.C. Varghese, “Limit State Design of Reinforced Concrete”, Prentice Hall of India Pvt., Ltd., New Delhi, 2008.

R2 P.C. Varghese, “Advanced Reinforced Concrete Design”, Prentice Hall of India Pvt.,

Part-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: CONCEPT OF WORKING STRESS METHOD

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to working stress method	1	21-09-2021		1	CO 1	T1	
2.	Design of singly reinforced sections	1	22-09-2021		1	CO 1	T1	
3.	Design of doubly reinforced sections	1	24-09-2021		1	CO 1	T1	
4.	Design problems	1	25-09-2021		1	CO 1	T1	
5.	Design problems	1	28-09-2021		1	CO 1	T1	
6.	Design problems	1	29-09-2021		1	CO 1	T1	
7.	Calculation for deflection	1	01-10-2021		1	CO 1	T1	
8.	Calculation of crack width	1	05-10-2021		1	CO 1	T1	
9.	Design problems	1	08-10-2021		1	CO 1	T1	
10.	Tutorial-1	1	12-10-2021		3	CO 1		
No. of classes required to complete UNIT-I		09			No. of classes taken:			

UNIT-II: PRINCIPLES OF LIMIT STATE METHOD OF DESIGN

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	18-10-2021		1	CO 2	T1	
2.	characteristic load and strength	1	20-10-2021		1	CO 2	T1	
3.	Partial safety factor, l/d ratio	1	22-10-2021		1	CO 2	T1	
4.	stress block	1	23-10-2021		1	CO2	T1	

	parameters						
5.	balance and under reinforced	1	26-10-2021		1	CO 2	T1
6.	Design of singly reinforced rectangular section.	1	27-10-2021		1	CO 2	T1
7.	Design problems	1	29-10-2021		1	CO 2	T1
8.	design of doubly reinforced rectangular section	1	30-10-2021		1	CO 2	T1
9.	Design problems	1	02-11-2021		1	CO 2	T1
10.	Design of flanged beams	1	03-11-2021		1	CO2	T1
11.	Design problems	1	05-11-2021		1	CO2	T1
12.	Tutorial-2	1	06-11-2021		3	CO2	
13.	MID I EXAMS	08-11-2021 to 13-11-2021					
No. of classes required to complete UNIT-II		11			No. of classes taken:		

UNIT-III : LIMIT STATE OF COLLAPSE-SHEAR AND TORSION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	16-11-2021		1	CO 3	T1	
2.	Procedure for design of shear	1	17-11-2021		1	CO 3	T1	
3.	Design of vertical stirrups	1	19-11-2021		1	CO 3	T1	
4.	Design problems	1	20-11-2021		1	CO 3	T1	
5.	Design of inclined stirrups	1	23-11-2021		1	CO 3	T1	
6.	Design problems	1	24-11-2021		1	CO3	T1	
7.	Design for torsion	1	26-11-2021		1	CO 3	T1	
8.	Design problems	1	27-11-2021		1	CO3	T1	
9.	Bond	1	30-11-2021		1	CO3	T1	
10.	Design problems	1	01-12-2021		1	CO3		
11.	Tutorial-3	1	03-12-2021		3	CO3		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV: DESIGN OF SLABS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to slabs	1	04-12-2021		1	CO 4	T1	
2.	Types of slabs	1	07-12-2021		1	CO 4	T1	
3.	Design procedure for one way slab	1	08-12-2021		1	CO 4	T1	
4.	Design problems	1	10-12-2021		1	CO 4	T1	
5.	Design problems	1	14-12-2021		1	CO4		
6.	Design procedure for two way slab	1	15-12-2021		1	CO 4	T1	
7.	Design problems	1	17-12-2021		1	CO 4	T1	
8.	Design procedure for one way continuous slab	1	18-12-2021		1	CO 4	T1	
9.	Design problems Tutorial-4	1	21-12-2021		3	CO 4	T1	
No. of classes required to complete UNIT-IV		09			No. of classes taken:			

UNIT-V: LIMIT STATE OF COLLAPSE-COMPRESSION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to columns	1	22-12-2021		1	CO 5	T1	
2.	Design of rectangular columns	1	24-12-2021		1	CO 5	T1	
3.	Design of square columns	1	28-12-2021		1	CO 5	T1	
4.	Design of circular columns	1	29-12-2021		1	CO 5	T1	
5.	Design problems	1	31-12-2021		1	CO5	T1	

6.	Design of columns subjected to bending	1	04-01-2022		1	CO 5	T1	
7.	Design problems	1	05-01-2022		1	CO5		
8.	Design of long columns	1	07-01-2022		1	CO5	T1	
9.	Design problems	1	11-01-2022		1	CO5	T1	
10.	Tutorial-5	1	12-01-2022		3	CO5		
11.	MID I EXAMS	17-01-2022 to 22-01-2022						
No. of classes required to complete UNIT-V		09			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
12.								

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

Part – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz -2	1,2	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: $C=75\%$ of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D ($>95\%=5$, $90-95\%=4$, $85-90\%=3$, $80-85\%=2$, $75-80\%=1$)		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations	1,2,3,4,5	E=60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

PROGRAM 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.

PROGRAM OUTCOMES (PO'S)

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.

PSO's

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	Module Coordinator	HOD



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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. K.V. Ramana
 Course Name & Code : Structural Analysis-2
 L-T-P Structure : 3-0-0 Credits : 3
 Program/Sem/Sec : B.Tech.,CE., V-Sem., Sections- A A.Y : 2021-2022

PRE-REQUISITE: Strength of materials, Structural analysis -I

COURSE EDUCATIONAL OBJECTIVES (CEOs):

1. To learn the procedures for analyzing three-hinged and two-hinged arches
2. To learn the procedures for analyzing cables and suspension bridges
3. To learn the impact of moving loads on structures
4. To draw influence lines for analysis purpose and building frame analysis
5. To know the basics of stiffness and flexibility methods for structural loads analysis

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

CO 1	Analyze the three hinged and two hinged arches.
CO 2	Estimate the impact of cables and suspension bridges on structures
CO 3	Assess the impact of moving loads on structures.
CO 4	Draw the influence lines for analysis purpose and analyze the continuous beams and portal frames.
CO 5	Describe the basics of stiffness and flexibility methods for structural loads analysis.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	2	1	2	2		1	2	2		3	3	2
CO2	3	3	3	2	1	2	2		1	2	2		3	3	2
CO3	3	3	3	2	1	2	2		2	2	2		3	3	2
CO4	3	3	3	3	1	2	2		2	2	2		3	3	2
CO5	3	3	3	3	1	2	2		2	2	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).

TEXT BOOKS:

1. S.S. Bhavikathi "Analysis of Structures" – Vol. I & 2, Vikas publications, 3rd Edition 2005
2. R. Vidyanathan and P. Perumal Structural Analysis-I & II, Laxmi Publications, 2nd Edition, 2017.

REFERENCE BOOKS:

1. B.C. Punmia, A.K. Jain and A.K. Jain, "Strength of Materials and Theory of Structures", Vol. II, 11th Laxmi Publications, New Delhi, 2002.
2. Jindal, R. L., Indeterminate Structural Analysis, S.Chand & Co. New Delhi, Third Edition, 1997.
3. R.C. Hibbeler, "Structural Analysis", Pearson Education Ltd. 8th Edition, 2012.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Arches and Two Hinged Arches**

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 about SA-II	1	20-09-2021		TLM1	
2.	Introduction about Arches, Components of Arches & its types	1	22-09-2021		TLM1	
3.	Three hinged Arch, Parabolic arch & its derivation	1	23-09-2021		TLM1	
4.	Parabolic arch & its derivation	1	25-09-2021		TLM1	
5.	Problems on parabolic arch	1	27-09-2021		TLM1	
6.	Springing at different levels	1	29-09-2021		TLM1	
7.	Problems on springing at different levels	1	30-09-2021		TLM1	
8.	Linear Arch & Eddy's theorem	1	02-10-2021		TLM1	
9.	Tutorial-I	1	04-10-2021		TLM3	
10.	Two hinged Arches and its derivation	1	06-10-2021		TLM1	
11.	Problems on Two hinged arches	1	07-10-2021		TLM1	
12.	Problems on two hinged arches	1	09-10-2021		TLM1	
13.	Problems on two hinged arches, Fixed Arch	1	11-10-2021		TLM1	
14.	Tied arch & Temperature changes in Arches	1	13-10-2021		TLM1	
15.	Tutorial-II		14-10-2021		TLM3	
No. of classes required to complete UNIT-I:15				No. of classes taken:		

UNIT-II: Cables and suspension bridges

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HO D Sign Weekly
1.	Introduction and General cable Theorem	1	16-10-2021		TLM 1	
2.	Uniformly Loaded Cable	1	18-10-2021		TLM 1	
3.	Problems	1	20-10-2021		TLM 1	
4.	Anchor Cable	1	21-10-2021		TLM 1	
5.	Problems	1	23-10-2021		TLM 1	
6.	Temperature Stresses in Suspended Cable	1	25-10-2021		TLM 1	
7.	3 Hinged stiffening girders	1	27-10-2021		TLM 1	
8.	Problems 3 Hinged stiffening girders	1	28-10-2021		TLM 1	
9.	2hinged stiffening Girders	1	30-10-2021		TLM 1	
10.	Problems on 2hinged stiffening Girders	1	1-11-2021		TLM 1	
11.	Problems on 2hinged stiffening Girders	1	3-11-2021		TLM 1	
12.	Revision	1	4-11-2021		TLM 3	
13.	Tutorial -2	1	6-11-2021		TLM 3	
No. of classes required to complete UNIT-II:13				No. of classes taken:		

UNIT-III: Moving Loads

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HO D Sign Weekly
1.	Introduction about Moving loads, classification of loads & Simply Supported Beams	1	15-11-2021		TLM1	
2.	Dérivation about UDL longer than the span	1	17-11-2021		TLM1	
3.	Problems on Single Concentrated load	1	18-11-2021		TLM1	
4.	UDL longer than span derivation & Problems	1	20-11-2021		TLM1	

5.	UDL shorter than span, Problemson UDL shorter than span	1	22-11-2021		TLM1
6.	UDL shorter than span, Problemson UDL shorter than span	1	24-11-2021		TLM1
7.	TUTORIAL-III	1	25-11-2021		TLM3
8.	Two Concentrated load derivation & Problems on Two Concentratedload derivation	1	27-11-2021		TLM1
9.	UVL Derivation & Problems	2	29-11-2021		TLM1
10.	Multi Wheel axial loads Derivation and problems	2	1-12-2021		TLM1
11.	Problems on multi wheel axialloads	1	2-12-2021		TLM1
12.	TUTORIAL-IV	1	4-12-2021		TLM3
No. of classes required to complete UNIT-III:12				No. of classes taken:	

UNIT-IV : Influence lines and Building frame analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HO D Sign Weekly
1.	Introduction about Influence lines,classification of loads & Simply Supported Beams	1	6-12-2021		TLM1	
2.	Defination of influence lines forshear force,influence lines for bending moment	1	8-12-2021		TLM1	
3.	Load position for maximum shear force at a section and,load positionfor maximum bending moment at a section	1	9-12-2021		TLM1	
4.	Single point load moving form left to right along the length of the span.	1	11-12-2021		TLM1	
5.	Uniform distributed load shorter the span ,moving from left to right alongthe length of the span.	1	13-12-2021		TLM1	
6.	Uniform distributed load longer thanthe span ,moving from left to right along the length of the span.	1	15-12-2021		TLM1	
7.	Tutorial-I	1	16-12-2021		TLM3	
8.	Introduction to building framesanalysis	1	18-12-2021		TLM1	

9.	Types of substitute frames	1	20-12-2021		TLM1
10.	Analysis of vertical loads on substitute frames	1	22-12-2021		TLM1
11.	Analysis of Horizontal loads on substitute frames by portal method	1	23-12-2021		TLM1
12.	Analysis of Horizontal loads on substitute frames by cantilever method	1	25-12-2021		TLM1
13.	Tutorial-II	1	27-12-2021		TLM3
No. of classes required to complete UNIT-IV:13				No. of classes taken:	

UNIT-V : Introduction to Matrix methods

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HO D Sign Weekly
1.	Introduction about Flexibility matrix and stiffness method & Steps on flexibility matrix method	1	29-12-2021		TLM1	
2.	Problems on flexibility matrix method	1	30-12-2021		TLM1	
3.	Problems on flexibility matrix method	1	1-1-2022		TLM1	
4.	Problems on flexibility matrix method	1	3-1-2022		TLM1	
5.	Stiffness matrix method steps and problem	1	5-1-2022		TLM1	
6.	Stiffness matrix method steps and problem	1	6-1-2022		TLM1	
7.	TUTORIAL-IX	1	8-1-2022		TLM3	
8.	Problems on stiffness matrix method	1	10-1-2022		TLM1	
9.	Problems on stiffness matrix method	1	12-01-2022		TLM1	
10.	Problems on stiffness matrix method	1	13-01-2022		TLM1	
11.	Revision & TUTORIAL-X	1	15-01-2022		TLM3	
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	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development
PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

Course Instructor

Dr. K.V.Ramana

Course
Coordinator

Dr. K.V.Ramana

Module
Coordinator
B.Ramakrishna

HOD

Dr. V.Ramakrishna



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

COURSE HANDOUT

PROGRAM : B.Tech. V-Sem., CIVIL
ACADEMIC YEAR : 2021-22
COURSE NAME & CODE : CONSTRUCTION MANAGEMENT & 17CE18
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : K. Harish Kumar
COURSE COORDINATOR : K. Harish Kumar
PRE-REQUISITE: Building materials and construction

COURSE OBJECTIVE:

1. Learn management of various projects and financial facilities
2. Know how to plan and organize for any project
3. Learn proper utilization of materials equipments and labour
4. Know the procedure of scheduling.
5. Know the programming for any project by network analysis

COURSE OUTCOMES (CO)

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

- CO1: Manage any project technically and financially
CO2: Control project budget.
CO3: Plan the project to complete in schedule.
CO4: Perform detailed network analysis to complete project within schedule.
CO5: Deal contracts and bidding processes.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1				2	1	3	3		3	3	1		1		2
CO2				2	1	3	1			3	1		1		2
CO3				2	1		1			3	1		1		2
CO4		3	3	2	1	3	1			3	1		3	3	2
CO5				2	3		1			3	1		1	2	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 TEXT BOOKS:

- T1:** S. Sanga Reddy & Meyyappan, "Construction Management", Kumaran Publications, 2009.
T2: Gahlot, P.S & Dhir, D.M., "Construction Planning and Management", Wiley Eastern Limite

T3: Chitkara, K.K., "Construction Project Management", Tata McGraw Hill Publishing Co, Ltd Delhi, 1992.

T4: Punmia B.C., "Project Planning and Control with PERT and CPM", Laxmi Publications, New Delhi, 1987.

BOS APPROVED REFERENCE BOOKS:

R1 Jerome D. Wiest &K. Levy, "Management Guide to PERT/CPM",

R2 Clough R.H. & Sears. G.A, "Construction Project Management"2008.

COURSE DELIVERY PLAN (LESSON PLAN): Civil

UNIT-I: CONSTRUCTION PROJECT MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to CO's ,PO's & Basics of construction mangmt	01	21/09/21		TLM2	CO1	T1	
2.	Project Life Cycle	01	24/09/21		TLM2	CO1	T1	
3.	Major Types of construction	01	25/09/21		TLM2	CO1	T1	
4.	Selection of professional services – Construction contractors	01	28/09/21		TLM2	CO1	T1	
5.	Stages in Construction	01	01/10/21		TLM2	CO1	T1, T2	
6.	Financing of constructed facilities	01	05/10/21		TLM2	CO1	T1, T2	
7.	Legal & Regulatory requirements	01	08/10/21		TLM2	CO1	T1	
8.	Role of project managers	01	09/10/21		TLM2	CO1	T1	
9.	TUTORIAL-I	01	12/10/21		TLM2			
	Assignment-1				TLM6			
No. of classes required to complete UNIT-I		09			No. of classes taken:			

UNIT-II: PROJECT PLANNING & ORGANIZATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Project Planning	01	19/10/21		TLM2	CO2	R3, T1	
	Stages of planning				TLM2	CO2	R3, T1	
2.	Objective, principles, advantages and limitation of planning	01	22/10/21		TLM2	CO2	R3, T1	
3.	Programming – Types of plans	01	23/10/21		TLM2			

4.	Introduction to Scheduling	01	26/10/21		TLM2	CO2	R3, T3	
5.	Scheduling – Uses, advantages	01	29/10/21		TLM2	CO2	R3, T3	
6.	Bar chart, milestone charts	01	30/10/21		TLM1	CO2	R3, T1	
7.	Examples on Bar chart, milestone charts				TLM1	CO2	R3, T3	
8.	Project Organization – its types	02	02/11/21		TLM1	CO2	R3, T1	
9.	Project budget fund flow statement	01	05/11/21		TLM2	CO2	R3, T3	
10.	Controlling system	01	06/11/21		TLM2	CO2		
	TUTORIAL-II				TLM1			
	Assignment-2				TLM6			
No. of classes required to complete UNIT-II		10			No. of classes taken:			

UNIT-III: LABOUR, MATERIAL & EQUIPMENT UTILIZATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
	I MID EXAMINATIONS		08/11/21 To 15/11/21					
1.	Introduction – Productivity	01	16/11/21		TLM2	CO3	T2, R3	
	Labour Productivity							
2.	Factors affecting job site productivity	01	19/11/21		TLM2			
3.	Introduction – Materials Management- Objectives, functions & uses	01	20/11/21		TLM2	CO3	T2, R3	
4.	Introduction – Material procurement & Delivery	01	23/11/21		TLM2			
5.	Approaches to Material procurement & Delivery	01	26/11/21		TLM2	CO3	T2, R3	
6.	Inventory control – benefits, objectives	01	27/11/21		TLM2	CO3	T2, R3	
7.	Plant & Equipment management	01	30/11/21		TLM2	CO3	T2, R3	
8.	Advantages, factors				TLM2	CO3	T2	
	TUTORIAL-III	00	30/11/21		TLM2			
	Assignment-3				TLM6			
No. of classes required to complete UNIT-III		08			No. of classes taken:			

UNIT-IV: NETWORK ANALYSIS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction - Network Analysis	01	03/12/21		TLM2	CO4	T1, R1	
2.	Basic concepts of network analysis	01	04/12/21		TLM2	CO4	T1, R1	
3.	Introduction - CPM & PERT	01	07/12/21		TLM2	CO4	T1, R1	
4.	Use & applications of CPM & PERT Techniques	01	10/12/21		TLM2	CO4	R1	
5.	Problems - CPM	01	11/12/21		TLM1	CO4	T2	
6.	Problems - CPM	01	14/12/21		TLM1	CO4	T1, T2	
7.	Problems - PERT	01	17/12/21		TLM1			
8.	Problems - PERT	01	18/12/21		TLM1	CO4	T1	
9.	Introduction-software application	01	21/12/21		TLM2	CO4	T1	
	TUTORIAL-IV				TLM1			
	Assignment-4				TLM6			
No. of classes required to complete UNIT-IV		09			No. of classes taken:			

UNIT-V: CONTRACTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction - Contracts	01	24/12/21		TLM2	CO5	T3	
2.	Types of Contract – Contract document	01	28/12/21		TLM2	CO5	T3	
3.	Specifications – Important conditions of contract	01	31/12/21		TLM2	CO5	T1	
4.	Tender and tender document	01	04/12/21		TLM2	CO5	T1	
5.	Deposits by the contractor	01	07/01/22		TLM2	CO5	T1, R4	
6.	M. Book, R.A Bills & Advances – Muster Roll	01	08/01/22		TLM2	CO5	T3	
7.	Stores – e-Procurement.	01	11/01/22		TLM2	CO5	R4	
8.	TUTORIAL-VI	01	15/01/22		TLM2			

	Assignment-5				TLM6			
	II MID EXAMINATIONS		17/01/2022 To 22/01/2022					
No. of classes required to complete UNIT-V		08			No. of classes taken:			

Teaching Learning Methods					
TLM1	Chalk and Talk	TLM4	Problem Solving	TLM7	Seminars or GD
TLM2	PPT	TLM5	Programming	TLM8	Lab Demo
TLM3	Tutorial	TLM6	Assignment or Quiz	TLM9	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	20-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	15-01-2022	9W
II Mid Examinations	17-01-2022	22-01-2022	1W
Preparation and Practicals	24-01-2022	29-01-2022	1W
Semester End Examinations	31-01-2022	12-02-2022	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg (Best of four (A1, A2, A3, A4, A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% OF Max (C1, C2)+ 25% of Min (C1,C	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations: E	1,2,3,4,5	60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

PROGRAMME OUTCOMES (POs):

PO 1	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development
PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

Course Instructor	Course Coordinator	Module Coordinator	HOD



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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech,V-SEM, Civil
ACADEMIC YEAR : 2021-22
COURSE NAME & CODE : HIGHWAY ENGINEERING
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS :3
COURSE INSTRUCTOR : K. Jaya Rao
PRE-REQUISITES: Nil

Course Educational Objective: The course aims to explore the students with elements of highway engineering like geometric elements, sight distances and gradients, properties of various highway materials and construction. The student will be able to design the various types of pavements and can easily control traffic generated on the highways.

COURSE OUTCOMES(COs):

CO1	Discriminate the studies of highway planning, development, surveys and alignment.
CO2	Design the geometric elements of highway
CO3	Identify the suitability of appropriate highway materials based on their properties.
CO4	Design the Flexible and Rigid pavement using IRC codes.
CO5	Interpret the elements of traffic management.

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	3	-	-	-	2	-	3	-	2	-	-	1	1	-
CO2	-	3	-	-	-	-	-	3	-	2	-	-	2	2	-
CO3	-	3	2	-	-	-	-	3	-	2	-	-	1	2	-
CO4	-	3	2	-	-	1	-	3	-	2	-	-	-	2	-
CO5	-	3	2	-	-	1	-	3	-	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).

BOS APPROVED TEXT BOOKS:

T1 Khanna,S.K and Justo, “**Highway Engineering**”, New Chand and Bros, Roorkee, 10th edition, 2009.

T2 Khanna,S.K and Arora,M.G & Jain,S.S, “**Airport Planning and Design**”, New Chand and Bros, Roorkee, 2004.

BOS APPROVED REFERENCE BOOKS:

R1 Kadiyali,L.R., “**Principles and Practice of Highway Engineering**”, Khanna Publishers Ltd. New Delhi, 2000

R2 Sehgal,S.B and Bhanot,B.L, “**Highway and Airport Engineering**”, S.Chand and Company Ltd. New Delhi,

Part-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT- I:**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, COs, POs	1	20-09-2021		1	CO 1		
2.	History, Jayakar committee	1	22-09-2021		2	CO 1		
3.	Institutions for highway planning	1	23-09-2021		2	CO 1		
4.	Road patterns, surveys	1	27-09-2021		2	CO 1		
5.	IRC classification	1	29-09-2021		2	CO 1		
6.	IRC classification	1	30-09-2021		2	CO 1		
7.	Highway Alignment	1	04-10-2021		1	CO 1		
8.	Preparation of project report	1	06-10-2021		1	CO 1		
9.	Highway cross section elements	1	07-10-2021		1	CO 1		
10.	Highway cross section elements	1	11-10-2021		1	CO 1		
11.	Quiz/class room test	1	12-10-2021			CO 1		
No. of classes required to complete		12			No. of classes taken:			

UNIT-I		
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UNIT-II:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly	
1.	Geometric design	1	14-10-2021		1	CO 2			
2.	Super elevation	1	18-10-2021		1	CO 2			
3.	Widening of the pavement	1	21-10-2021		1	CO 2			
4.	Transition curves	1	25-10-2021						
5.	Gradients	1	27-10-2021		1	CO 2			
6.	Stopping sight distance	1	28-10-2021		1	CO 2			
7.	Stopping sight distance	1	01-11-2021		1	CO 2			
8.	Overtaking sight distance	1	02-11-2021		1	CO 2			
9.	Overtaking sight distance	1	03-11-2021		1	CO 2			
10.	Example problems	1	05-11-2021		1	CO 2			
11.	Quiz/class room test	1	06-11-2021			CO2			
No. of classes required to complete UNIT-II		10			No. of classes taken:				

UNIT-III :

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Highway materials Introduction	1	15-11-2021		2	CO 3		
2.	Soil properties and tests	1	17-11-2021		1	CO 3		
3.	Aggregate properties and tests	1	18-11-2021		4	CO 3		
4.	Bitumen properties and tests	1	22-11-2021		4	CO 3		

5.	Construction of roads	1	24-11-2021		1	CO 3		
6.	Earth and gravel road	1	25-11-2021		1			
7.	WBM and bituminous road	1	29-11-2021		1	CO 3		
8.	Cement concrete roads	1	30-11-2021		1	CO 3		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Design principles	1	01-12-2021		1	CO 4		
2.	Design of flexible pavement	1	02-12-2021		1	CO 4		
3.	Example problems	1	06-12-2021		1	CO 4		
4.	Design of rigid pavement	1	08-12-2021		1	CO 4		
5.	Factors of design	1	09-12-2021		1	CO 4		
6.	Example problems	1	13-12-2021		1	CO 4		
7.	Failures in flexible pavement	1	15-12-2021		3	CO 4		
8.	QUIZZ	1	16-12-2021		1	CO 4		
9.	Failures in rigid pavement	1			1	CO 4		
10.	Special repairs	1	20-12-2021		1	CO 4		
11.	Quiz/class room test	1			3			
No. of classes required to complete UNIT-IV		09			No. of classes taken:			

UNIT-V:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Basic parameters of traffic	1	22-12-2021		2	CO 5		
2.	Volume studies	2	23-12-2021		1	CO 5		
3.	Problems	1	27-12-2021		1	CO 5		
4.	Speed studies	2	29-12-2021		1	CO 5		
5.	Problems	1	30-12-2021		1	CO5		
6.	Parking studies	1	03-01-2022		1	CO 5		
7.	Road accidents	1	05-01-2022		1	CO5		
8.	Road traffic signs	1	08-01-2022		2	CO5		
9.	Road markings	1	09-01-2022		2	CO5		
10.	Road markings	1	10-01-2022		2	CO5		
11.	Quiz/class room test	1	12-01-2022			CO5		
No. of classes required to complete UNIT-V		08			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Signaling design	1					T1	
2.	Signaling design	1					T1	
3.	PCU	1					T1	
4.	Peak hour factor	1					T1	

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1			7W
I Mid Examinations			1W
II Phase of Instructions			9W
II Mid Examinations			1W
Preparation and Practicals			2W
Semester End Examinations			2W

Part – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz -2	1,2	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: $C=75\%$ of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D ($>95\%=5$, $90-95\%=4$, $85-90\%=3$, $80-85\%=2$, $75-80\%=1$)		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations	1,2,3,4,5	E=60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

PROGRAMME OUTCOMES (POs):

PO 1	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development
PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

Course
Instructor
K. Jaya Rao

Course
Coordinator
K. Jaya Rao

Module
Coordinator
B.Narasimha Rao

HOD
Dr.V.Ramakrish
na



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

COURSE HANDOUT

PROGRAM	: B.Tech., V-Sem., CIVIL
ACADEMIC YEAR	: 2021-22
COURSE NAME & CODE	: HYDROLOGY (17CE15)
L-T-P STRUCTURE	: 3-1-0
COURSE CREDITS	: 3
COURSE INSTRUCTOR	: P.Keerthi
COURSE COORDINATOR	: J.Rangaiah
PRE-REQUISITE	: Applied Mechanics, Mechanics of Fluids, Hydraulics and Hydraulic Machinery

COURSE EDUCATIONAL OBJECTIVE:

The course is designed to understand the physical processes in hydrology and know the measurement of rainfall. Learn measurement of water losses and runoff in hydrological process. Understand the Unit Hydrograph theory and its analysis and flood routing. Estimate the ground water potential based on theoretical principles

COURSE OUTCOMES:

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

- CO1 : Estimate the average rainfall over a basin and know the various methods to determine the water losses.
- CO2 : Compute direct run off from total rain fall.
- CO3 : Develop unit hydrograph and storm hydrograph.
- CO4 : Assess the flood magnitude and carry out flood routing.
- CO5 : Determine aquifer parameters and yield of wells.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2	2	2	2					1		1		2
CO2	3	2	2	2	2	2					1		1		2
CO3	3	2	2	2	2	2					1		1		2
CO4	3	2	2	2	2	2					1		1		2
CO5	3	2	2	2	1	2					1		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).

BOS APPROVED TEXT BOOKS:**T1** Jayarami Reddy.P., “Hydrology”, Tata McGraw Hill, New Delhi , 1999**T2** Subramanya.K., “Engineering Hydrology”, Tata McGraw Hill, New Delhi , 1999**BOS APPROVED REFERENCE BOOKS:****R1** Santhosh Kumar Garg, “Irrigation Engineering and Hydraulic Structures,” Khann Publishers, New Delhi, 2003**R2** Vijay P.Singh, “Elementary Hydrology”, Prentice Hall of India, New Delhi, 1994.**R3** Ragunath.H., “Hydrology”, Wiley Eastern Limited, New Delhi, 1998.**R4** Ground Water Hydrology and Advanced Hydrology, NPTEL, video lectures and web notes.**COURSE DELIVERY PLAN (LESSON PLAN): Civil****UNIT-I**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Engineering hydrology	1	20/09/2021	TLM-1	CO1	T1	
2.	Engineering hydrology and its applications, Hydrologic cycle	1	22/09/2021	TLM-2	CO1	T1	
3.	Precipitation: Types & Forms of precipitation	1	23/09/2021	TLM-2	CO1	T1	
4.	Rainfall Measurement- Types of Rain Gauges	1	27/09/2021	TLM-2	CO1	T1	
5.	Rain Gauge Network	1	29/09/2021	TLM-1	CO1	T1	
6.	Average Rainfall over a Basin	1	30/09/2021	TLM-1	CO1	T1	
7.	Problems	1	04/10/2021	TLM-4	CO1	T1	
8.	Presentation of Rainfall Data	1	06/10/2021	TLM-1	CO1	T1	
9.	Evaporation & Factors Affecting Evaporation	1	07/10/2021	TLM-1	CO1	T1	
10.	Measurement of Evaporation & Evaporation Reduction	1	11/10/2021	TLM-1	CO1	T1	
11.	Evapotranspiration & Factors Affecting	1	14/10/2021	TLM-1	CO1	T1	

	Evapotranspiration Measurement of Evapotranspiration							
12.	Infiltration, Factors Affecting Infiltration Measurement of Infiltration	1	18/10/2021		TLM-1	CO1	T1	
No. of classes required to complete UNIT-I		12			No. of classes taken:			

UNIT-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Catchment Characteristics, Factors Affecting Runoff	1	21/10/2021		TLM-2	CO2	T2	
2.	Components of Runoff , Basin Yield	1	25/10/2021		TLM-2	CO2	T2	
3.	Rainfall Runoff Relationship	1	27/10/2021		TLM-2	CO2	T2	
4.	SCS-CN Method of Estimating Runoff Volume	1	28/10/2021		TLM-2	CO2	T2	
5.	Problems	1	29/10/2021		TLM-1	CO2	T2	
6.	Flow Mass Curve and Flow Duration Curve,	1	01/11/2021		TLM-1	CO2	T1	
7.	Reservoir Capacity	1	03/11/2021		TLM-1	CO2	T1	
No. of classes required to complete UNIT-II		7			No. of classes taken:			

UNIT-III

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Components of Hydrograph, Separation of Base Flow	1	15/11/2021		TLM-2	CO3	T1	
2.	Effective Rainfall, Direct Runoff Hydrograph	1	17/11/2021		TLM-1	CO3	T1	
3.	Unit Hydrograph, Assumptions, Derivation of Unit Hydrograph	1	18/11/2021		TLM-1	CO3	T1	
4.	Problems	1	22/11/2021		TLM-4	CO3	T1	
5.	Unit Hydrographs of Different	1	24/11/2021		TLM-1	CO3	T1	

	Durations							
6.	Principle of Superposition	1	25/11/2021		TLM-1	CO3	T1	
7.	S-Hydrograph Methods	1	29/11/2021		TLM-1	CO3	T1	
8.	Problems	1	01/12/2021		TLM-4	CO3	T1	
9.	Limitations and Applications of Unit Hydrograph,	1	02/12/2021		TLM-1	CO3	T1	
10.	Synthetic Unit Hydrograph.	1	06/12/2021		TLM-1	CO3	T1	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Causes and Effects of Floods	1	08/12/2021		TLM-2	CO4	T1	
2.	Frequency Analysis-Gumbel's method	1	09/12/2021		TLM-1	CO4	T1	
3.	Log-Pearson Type III Distribution Methods,	1	13/12/2021		TLM-1	CO4	T1	
4.	Problems	1	15/12/2021		TLM-4	CO4	T1	
5.	Standard Project Flood (SPF)	1	16/12/2021		TLM-2	CO4	T1	
6.	Probable Maximum Flood (MPF)	1	20/12/2021		TLM-1	CO4	T1	
7.	Flood Control Methods and Management.	1	22/12/2021		TLM-1	CO4	T1	
8.	Problems	1	23/12/2021		TLM-4	CO4	T1	
No. of classes required to complete UNIT-IV		8			No. of classes taken:			

UNIT-V

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Ground Water : Occurrence, Types of Aquifers, Aquifer Parameters	1	27/12/2021		TLM-2	CO5	T2	
2.	Types of Wells	1	29/12/2021		TLM-1	CO5	T1	
3.	Darcy's Law	1	30/12/2021		TLM-1	CO5	T1	
4.	Dupuit's Equation	1	03/01/2022		TLM-1	CO5	T1	
5.	Steady Radial Flow to Wells in Confined and Unconfined Aquifers	1	05/01/2022		TLM-1	CO5	T1	
6.	Steady Radial Flow to Wells in Confined and Unconfined Aquifers	1	06/01/2022		TLM-1	CO5	T1	
7.	Problems	1	10/01/2022		TLM-4	CO5	T1	
8.	Yield of an Open Well- Recuperation Test.	1	12/01/2022		TLM-1	CO5	T1	
No. of classes required to complete UNIT-V		8			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
9.								
10.								
11.								

Teaching Learning Methods						
TLM1	Chalk and Talk	TLM4	Problem Solving	TLM7	Seminars or GD	
TLM2	PPT	TLM5	Programming	TLM8	Lab Demo	
TLM3	Tutorial	TLM6	Assignment or Quiz	TLM9	Case Study	

ACADEMIC CALENDAR

Description	From	To	Weeks
I Phase of Instructions	20-09-2021	06-11-2021	7 W
I Mid Examinations	08-11-2021	13-11-2021	1 W
II Phase of Instructions	15-11-2021	15-01-2022	9 W
II Mid Examinations	17-01-2022	22-01-2022	1 W
Preparation and Practicals	24-01-2022	29-01-2022	1 W
Semester End Examinations	31-01-2022	12-02-2022	2 W

EVALUATION PROCESS

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz -2	1,2	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: $C=75\%$ of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D(>95%=5, 90-95%=4,85-90%=3,80-85%=2,75-80%=1)		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations	1,2,3,4,5	E=60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

PROGRAMME OUTCOMES (POs):

PO 1	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development

PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

Course Instructor

Course Coordinator

Module Coordinator

HOD



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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., V-Sem., Civil
ACADEMIC YEAR : 2021-22
COURSE NAME & CODE : Green Buildings (17CE90)
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : M.Satyanarayana
COURSE COORDINATOR: M.Satyanarayana
PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES: This Course aims to provide study of appropriate materials for constructing a green building and planning for energy and resource conservation in green building. The course also provides the practices of optimum use of the renewable energy resources, the principle of the designing the building using climatic factors and planning for effective green building rating system.

COURSE OUTCOMES (COs):

- CO1** : Categorize the benefits of a green building.
CO2 : Asses the impact of climate in the design of a green building.
CO3 : Identify appropriate materials for constructing a green building.
CO4 : Plan the various options for energy and resource conservation in a green building.
CO5 : Optimally use renewable energy resources and plan the building for best green building rating system

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
CO2	-	-	-	-	1	1	-	-	-	1	1	-	-	-	1
CO3	-	-	-	-	2	1	-	-	-	1	1	-	-	-	1
CO4	-	-	-	-	-	1	-	-	-	2	1	-	-	-	1
CO5	-	-	-	-	1	1	-	-	-	2	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).

BOS APPROVED TEXT BOOKS:

T1 K.S. Jagadish B.V. Venkatama Reddy and K.S Nanjunda Rao, “ Alternative building materials and technologies “ New age international, 2014.

T2 N.Kumara swamy and A.Kameswara Rao, “ Building Planning and Drawing”, Charotar Publications, 2013.

BOS APPROVED REFERENCE BOOKS:

R1 Abe Kruger and Carl Seville, “Green Building Principle and Practices in Residential Construction”, Demar Cengage Learning, 2012

R2 G.D Rai, “ Non-Conventional Energy Resources”, Khanna Publishers: 18th Edition, 2017.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A/B/C

UNIT-I : Green Buildings Concept

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Definition of Green Buildings	1	20/09/21		TLM-1	CO 1	T1	
2.	Typical features if green building	1	22/09/21		TLM-2	CO 1	T1	
3.	Benefits and environmental impacts of green building	1	25/09/21		TLM-2	CO 1	T1	
4.	Brown field development	1	27/09/21		TLM-2	CO 1	T1	
5.	Green field development	1	29/09/21		TLM-1	CO 1	T1	
6.	Sustainable site selection	1	04/10/21		TLM-1	CO 1	T1	
7.	Planning of buildings	1	06/10/21		TLM-1	CO 1	T1	
8.	Planning of buildings to maximize comfort	1	06/10/21		TLM-2	CO 1	T1	
9.	Planning of buildings to maximize day lighting and Ventilation	1	11/10/21		TLM-2	CO 1	T1	
No. of classes required to complete UNIT-I		08			No. of classes taken:			

UNIT-II : Climate Design

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction about Climatic conditions	1	18/10/21		TLM-1	CO 2	T1	
2.	Local climatic conditions	1	20/10/21		TLM-1	CO 2	T1	
3.	Impact of déforestation	1	23/10/21		TLM-2	CO 2	T1	
4.	Climate change on built environment	1	25/10/21		TLM-2	CO 2	T1	
5.	Climate change desirable conditions	1	27/10/21		TLM-2	CO 2	T1	
6.	Fresh air requirents	1	30/10/21		TLM-2			
7.	Fresh air Standards	1	01/11/21		TLM-1	CO 2	T1	
8.	Sick building syndrome	1	03/11/21		TLM-1	CO 2	T1	
9.	Air pollutants	1	06/11/21		TLM-1	CO 2	T1	
No. of classes required to complete UNIT-II		09			No. of classes taken:			

UNIT-III : Green materials

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction about recycling of building materials	1	15/11/21		TLM-2	CO 3	T1	
2.	Advantages in usage of natural materials	1	17/11/21		TLM-2	CO 3	T1	
3.	Usage of bamboo, timber, rammed earth and its advantages	1	20/11/21		TLM-2	CO 3	T1	
4.	Usage of stabilized mud	1	22/11/21		TLM-2	CO 3	T2	

	blocks, hollow blocks							
5.	Usage of lime and lime-pozzolana cement	1	24/11/21		TLM-2	CO 3	T2	
6.	Materials from agro and industrial waste	1	27/11/21		TLM-2	CO 3	T2	
7.	Usage of ferro-cement and free-concrete	1	29/11/21		TLM-2		T2	
8.	Alternative roofing systems	1	01/12/21		TLM-2	CO 3	T2	
9.	Paints reducing the heat gain of the building	1	04/12/21		TLM-1	CO 3	T2	
No. of classes required to complete UNIT-III		09			No. of classes taken:			

UNIT-IV : Energy and Resource Conservation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction about building envelope	1	06/12/21		TLM-2	CO 4	T1	
2.	Need for energy conservation	1	08/12/21		TLM-2	CO 4	T1	
3.	Various forms of energy used in buildings	1	13/12/21		TLM-2	CO 4	T1	
4.	Building automation and building, management	1	15/12/21		TLM-2	CO 4	T1	
5.	Principle of thermal design light and lighting	1	18/12/21		TLM-2	CO 4	T1	
6.	Principle of thermal design for energy efficient lighting,	1	20/12/21		TLM-2	CO 4	T1	

	Ventilation							
7.	Water conservation systems in buildings	1	22/12/21		TLM-2	CO 4	T1	
8.	Water conservation systems in buildings	1	22/12/21		TLM-2	CO 4	T1	
No. of classes required to complete UNIT-IV		08			No. of classes taken:			

UNIT-V : Renewable Energy and Green Building Rating Systems

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction about wind and Solar Energy Harvesting	1	27/12/21		TLM-1	CO 5	T2	
2.	Potential of solar energy in India and world	1	27/12/21		TLM-1	CO 5	T2	
3.	Construction and operation of various solar based appliances	1	29/12/22		TLM-1	CO 5	T2	
4.	Geothermal energy usage in buildings	1	03/01/22		TLM-2	CO 5	T2	
5.	Case study on Geothermal building	1	03/01/22		TLM-2	CO 5	T2	
6.	Introduction to LEED	1	05/01/22		TLM-2	CO 5	T2	
7.	Green rating system for integrated Habitat Assessment for GRIHA	1	08/01/22		TLM-2	CO 5	T2	
8.	Green rating	1	10/01/22		TLM-2	CO 5	T2	

	system for integrated Habitat Assessment for IGBC							
9.	Salient features of Green Buildings Constructed in India	1	12/01/22		TLM-2	CO 5	T2	
No. of classes required to complete UNIT-V		08			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
10.								
11.								
12.								

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 Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Quiz -1	1,2	C1=10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Quiz -2	1,2	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Quiz Marks: $C=75\%$ of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks: D(>95%=5, 90-95%=4,85-90%=3,80-85%=2,75-80%=1)		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations	1,2,3,4,5	E=60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

PROGRAMME OUTCOMES (POs):

PO 1	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development
PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

Course Instructor	Module Coordinator	HOD



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COURSE HANDOUT

Part-A

PROGRAM : B.Tech., V-Sem., CE
ACADEMIC YEAR : 2021-22
COURSE NAME & CODE : **ENGINEERING ECONOMICS & ACCOUNTANCY- 17HS01**
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : **N. SAMBASIVA RAO**
COURSE COORDINATOR : Dr. A ADISESHA REDDY

PRE-REQUISITE:

COURSE OBJECTIVE: Basic Sciences & Humanities

The objective of this course is to inculcate basic knowledge to students relating to concepts of Engineering Economics and Accountancy to make them effective business decision makers.

COURSE OUTCOMES (CO)

CO1	Capable of analyzing fundamentals of economics concepts which helps in effective business administration.
CO2	Discuss cost output relationship in business operations.
CO3	Analyze the features of market structures and present the pricing policies.
CO4	Identify the types of business organization of the company and the implementation requirements of each one.
CO5	Financial position of the company can be analyzing with the help of financial statements.

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

COs	a	b	c	d	e	f	g	h	i	j	k	l	PSOa	PSOb	PSOc	PSOd
CO1	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO2	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO3	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO4	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO5	-	-	-	2	3	2	-	-	2	-	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).

BOS APPROVED TEXT BOOKS:

T1 Aryasri: Managerial Economics and Financial Analysis, MHE, 2014

BOS APPROVED REFERENCE BOOKS:

R1 Varshney & Maheswari : Managerial Economics, Sultan Chand, 2003.

R2 Ambrish Gupta, Financial Accounting for Management, Pearson Education, New delhi.

R3 Lipey & Chrystal, Economics, Oxford University press.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT – I: Introduction to Engineering Economics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject, Course Outcomes	01	21.09.2021		TLM1	CO1	T1	
2.	Economics- definations, nature & scope	01	23.09.2021		TLM1		T1	
3.	Branches of economics, engineering economics –	01	24.09.2021		TLM1	CO1	T1	
4.	features and scope.	01	28.09.2021		TLM1	CO1	T1	
5.	Demand- types, determinants, law of demand	01	30.09.2021		TLM1	CO1	T1	
6.	Elasticity of demand – significance-	01	01.10.2021		TLM1	CO3	T1	
7.	Types of elasticity of demand	01	05.10.2021		TLM2	CO1	T1	
8.	Demand forecasting types- factor governing-	01	07.10.2021		TLM1	CO1	T1	
9.	Methods of demand forecasting.	01	08.10.2021		TLM2	CO1	T1	
10.	TUTORIAL-1	01	12.10.2021		TLM3	CO1	T1	
11.	Assignment/Quiz – 1	01	19.10.2021		TLM6	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT – II Theory of Production & Cost Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-II	01	21.10.2021		TLM1	CO1	T1	
2.	Production function- isoquant and isocost.	01	22.10.2021		TLM1	CO1	T1	
3.	MRTS, least cost combination of inputs , law of returns	01	26.10.2021		TLM2	CO1	T1	
4.	Internal and external economies of scale	01	28.10.2021		TLM1	CO1	T1	
5.	Cost analysis: cost concepts, cost & output relationship in short run	01	29.10.2021		TLM2	CO1	T1	

	& long run,							
6.	Break even analysis, determination of BEP	01	02.11.2021		TLM1	CO1	T1	
7.	Significance & limitation of BEA.	01	02.11.2021		TLM1	CO1	T1	
8.	TUTORIAL-2	01	05.11.2021		TLM3	CO1	T1	
9.	Assignment/Quiz – 2	01	16.11.2021		TLM6	CO1	T1	
No. of classes required to complete UNIT-II		09			No. of classes taken:			

UNIT-III:Market Pricing Policies- Market structures.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-III	01	18.11.2021		TLM1	CO3	T1	
2.	Types of markets, features & price output determinations under perfect competitions.	01	19.11.2021		TLM1	CO3	T1	
3.	Monopoly, monopolistic competitions, oligopoly markets.	01	23.11.2021		TLM2	CO3	T1	
4.	Pricing policies-	01	25.11.2021		TLM1	CO3	T1	
5.	Pricing objectives- methodes		26.11.2021			CO3	T1	
6.	Applications in business	01	30.11.2021		TLM3, TLM9	CO3	T1	
7.	Assignment/Quiz – 3	01	02.12.2021		TLM6	CO3	T1	
No. of classes required to complete UNIT-III		07			No. of classes taken:			

UNIT IV–Capital & Capital Budgeting

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-IV	01	03.12.2021		TLM1	CO2	T1	
2.	Capital & its significance- types of capital	01	07.12.2021		TLM1	CO2	T1	
3.	Estimation of fixed cost and working capital	01	09.12.2021		TLM1	CO2	T1	
4.	Components of working capital & factors determining the need of working capital	01	10.12.2021		TLM1	CO4	T1	
5.	Sources of raising working capital.	01	14.12.2021		TLM9	CO2	T1	
6.	Capital budgeting significance- process	01	16.12.2021		TLM1	CO4	T1	
7.	Techniques of capital budgeting	01	17.12.2021		TLM2	CO4	T1	
8.	Non discounted cash flow techniques		21.12.2021			CO4	T1	

9.	Discounted cash flow techniques.	01	21.12.2021		TLM1	CO2	T1	
10.	TUTORIAL-4	01	23.12.2021		TLM3	CO2	T1	
11.	Assignment/Quiz – 4	01	24.12.2021		TLM6	CO2	T1	
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

UNIT-V Financial Accounting & Analysis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to UNIT-V	01	28.12.2021		TLM1	CO5	T1	
2.	Accounting significance- book keeping- double entry system	01	30.12.2021		TLM1	CO5	T1	
3.	Journal- ledger- trail balance	01	31.12.2021		TLM2	CO5	T1	
4.	Final accounts with simple adjustments.	01	04.01.2022		TLM1	CO5	T1	
5.	Financial statement analysis through ratios.	01	06.01.2022		TLM1	CO5	T1	
6.	TUTORIAL-5, Assignment/Quiz – 5	01	07.01.2022		TLM3	CO5	T1	
No. of classes required to complete UNIT-V		06			No. of classes taken:			

Teaching Learning Methods

TLM1	Chalk and Talk	TLM5	ICT (NPTEL/Swayam Prabha/MOOCs)
TLM2	PPT	TLM6	Assignment or Quiz
TLM3	Tutorial	TLM7	Group Discussion/Project
TLM4	Demonstration (Lab/Field Visit)		

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	20.09.2021	06.11.2021	7W
I Mid Examinations	08.11.2021	13.11.2021	1W
II Phase of Instructions	15.11.2021	15.01.2022	9W
II Mid Examinations	17.01.2022	22.01.2022	1W
Preparation and Practicals	24.01.2022	29.01.2022	1 W
Semester End Examinations	31.01.2022	12.02.2022	2W

PROGRAMME OUTCOMES (POs):

PO 1	An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
PO 2	An ability to identify-, formulate-, and analyze- complex engineering problems
PO 3	An ability to design the experiments, analyze and interpret the data
PO 4	An ability to use the techniques, skills, resources and modern engineering tools necessary to solve engineering problems
PO 5	An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
PO 6	An ability to demonstrate the knowledge needed for sustainable development
PO 7	An ability to apply ethical principles and responsibilities in engineering practice
PO 8	An ability to function effectively as an individual and as a team member or leader in multidisciplinary settings
PO 9	An ability to communicate effectively
PO 10	An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
PO 11	An ability to engage in life-long learning to keep abreast with technological changes
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	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.
PSO 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.
PSO 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.

N.SAMBASIVA RAO	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD



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

COURSE HANDOUT

PROGRAM	: B.Tech., V-Sem., CIVIL
ACADEMIC YEAR	: 2021-22
COURSE NAME & CODE	: GEOTECHNICAL ENGINEERING LAB (17CE70)
L-T-P STRUCTURE	: 0-0-2
COURSE CREDITS	: 2
COURSE INSTRUCTOR	: B. NARASIMHARAO
COURSE COORDINATOR	: B.NARASIMHARAO
PRE-REQUISITE	: GEOTECHNICAL ENGINEERING-I

COURSE OBJECTIVE:

The course teaches the basic principles of soil mechanics and determination of index and engineering properties of soil.

COURSE OUTCOMES:

CO1: Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils

CO2: Perform field tests for soil investigations.

CO3: Apply field conditions for computing and analyzing the experimental data.

CO4: Infer the results and compare.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	3	-	-	-	-	-	-	-	2	-	3	-	2
CO2	2	-	3	-	-	-	-	-	-	-	2	-	3	-	2
CO3	2	3	3	-	-	-	-	-	-	-	2	-	3	-	2
CO4	2	-	3	-	-	-	-	-	-	-	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).

DEPARTMENT OF CIVIL ENGINEERING

NOTIFICATION OF CYCLES

GEOTECHNICAL ENGINEERING LAB

Faculty Name: B. NARASIMHA RAO
M.SATYANARAYANA

subject code: 17CE70

B.Tech (V SEM)

A.Y 2021-2022

CYCLE-I

1. Determination of specific gravity of solids by Pycnometer method.
2. Gradation analysis of given soil by mechanical sieve analysis.
3. Determination of field unit weight of soil by core cutter method.
4. IS - Light compaction test.
5. IS - Heavy compaction test.
6. Determination of co-efficient of permeability of sand by Constant head permeameter.

CYCLE-II

7. Determination of field unit weight of soil by sand replacement method.
8. Determination of Liquid limit of given soil sample.
9. Determination of Plastic limit of given soil sample.
10. Vane shear test.
11. Direct shear test.
12. Unconfined compression test.

INCHARGE

HOD

DEPARTMENT OF CIVIL ENGINEERING

NOTIFICATION OF CYCLES

GEOTECHNICAL ENGINEERING LAB

Faculty Name: B. NARASIMHA RAO
M.SATYANARAYANA

subject code: 17CE70

B.Tech (V SEM)

A.Y 2021-2022

I –CYCLE SCHEDULE

S. NO	List of Experiments	Tentative Date		Actual Date
		BATCH-A	BATCH-B	
1	Determination of specific gravity of solids by Pycnometer method.	28-09-2021	27-09-2021	
2	Gradation analysis of given soil by mechanical sieve analysis.	05-10-2021	04-10-2021	
3	Determination of field unit weight of soil by core cutter method.	12-10-2021	11-10-2021	
4	IS - Light compaction test.	19-10-2021	18-10-2021	
5	IS - Heavy compaction test.	26-10-2021	25-10-2021	
6	Determination of co-efficient of permeability of sand by Constant head permeameter.	02-11-2021	01-11-2021	

II CYCLE SCHEDULE

S. NO	List of Experiments	Tentative Date		Actual Date
		BATCH-A	BATCH-B	
7	Determination of field unit weight of soil by sand replacement method.	23-11-2021	22-11-2021	
8	Determination of Liquid limit of given soil sample.	30-11-2021	29-11-2021	
9	Determination of Plastic limit of given soil sample.	07-12-2021	06-12-2021	
10	Vane shear test.	14-12-2021	13-12-2021	
11	Direct shear test.	21-12-2021	20-12-2021	
12	Unconfined compression test.	28-12-2021	27-12-2021	

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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
(B.NARASIMHA
RAO)

Course Coordinator
(B NARASIMHARAO)

Module Coordinator
(B NARASIMHARAO)

HOD
(Dr.V.RAM
AKRISHNA)



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

COURSE HANDOUT

PROGRAM	: B.Tech., V-Sem., CIVIL
ACADEMIC YEAR	: 2021-22
COURSE NAME & CODE	: TRANSPORTATIONENGINEERING LAB (17CE69)
L-T-P STRUCTURE	: 0-0-2
COURSE CREDITS	: 2
COURSE INSTRUCTOR	: K. JAYA RAO
COURSE COORDINATOR	: K. JAYA RAO
PRE-REQUISITE	: HIGHWAY ENGINEERING

COURSE OBJECTIVE:

The course aims to identify the properties of different materials used in highway construction and makes students to identify the grades of materials.

COURSE OUTCOMES:

CO1: Categorize and analyse the properties of road aggregates.

CO2: Determine and analyse the properties of bitumen.

CO3: Determine the suitability of aggregates and bitumen for pavement designs.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	-	2	-	-	-	-	2	-	2	3	3
CO2	3	-	3	-	-	2	-	-	-	-	2	-	2	3	3
CO3	3	-	3	-	-	2	-	-	-	-	2	-	2	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).

DEPARTMENT OF CIVIL ENGINEERING
NOTIFICATION OF CYCLES
TRANSPORTATION ENGINEERING LAB

Faculty Name: K. JAYA RAO
J. RANGAIAH
B.Tech (V SEM)

subject code: 17CE69

A.Y 2021-2022

CYCLE-I

1. Aggregate Crushing value.
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test.
5. Abrasion Test.
6. Shape tests.

CYCLE-II

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Bitumen content by centrifugal extractor
5. Specific gravity of bitumen.
6. Viscosity of bitumen.

INCHARGE

HOD

DEPARTMENT OF CIVIL ENGINEERING
NOTIFICATION OF CYCLES
TRANSPORTATION ENGINEERING LAB

Faculty Name: K. JAYA RAO
J RANGAIAH
B.Tech (V SEM)

subject code: 17CE69
A.Y 2021-2022

I –CYCLE SCHEDULE

S. NO	List of Experiments	Tentative Date		Actual Date
		BATCH-A	BATCH-B	
1	Aggregate Crushing value.	27-09-2021	28-09-2021	
2	Aggregate Impact Test.	04-10-2021	05-10-2021	
3	Specific Gravity and Water Absorption.	11-10-2021	12-10-2021	
4	Attrition Test.	18-10-2021	19-10-2021	
5	Abrasion Test.	25-10-2021	26-10-2021	
6	Shape tests.	01-11-2021	02-11-2021	

II CYCLE SCHEDULE

S. NO	List of Experiments	Tentative Date		Actual Date
		BATCH-A	BATCH-B	
7	Penetration Test.	22-11-2021	23-11-2021	
8	Ductility Test.	29-11-2021	30-11-2021	
9	Softening Point Test.	06-12-2021	07-12-2021	
10	Bitumen content by centrifugal extractor	13-12-2021	14-12-2021	
11	Specific gravity of bitumen.	20-12-2021	21-12-2021	
12	Viscosity of bitumen.	27-12-2021	28-12-2021	

INCHARGE

HOD

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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PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor

K. Jaya Rao

Course Coordinator

K. Jaya Rao

Module Coordinator

B.Narasimha Rao

HOD

Dr.V.Ramakrishna