LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I)
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. V. V. Krishna Reddy
Course Name & Code : Deep Learning & 20AD07
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B. Tech /VII / A **A.Y.:** 2025-26
PREREQUISITES : **Probability and Statistics, LATT, Machine Learning**

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to make students learn the frameworks of deep learning and their application

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

CO1	Apply the fundamentals of linear algebra to machine learning algorithms. **(Apply- L3)**
CO2	Understand the fundamental building blocks of deep learning **(Understand- L2)**
CO3	Apply the concepts of Convolutional Neural Networks to computer vision applications. **(Apply- L3)**
CO4	Apply the concepts of Recurrent Neural Networks to Natural Language Processing. **(Apply- L3)**
CO5	Apply the regularization techniques to improve the model performance. **(Apply- L3)**

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	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO3	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO4	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO5	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
1 - Low						**2** –Medium						**3** – High			

TEXTBOOKS:

T1	Deep Learning, Ian Goodfellow, YoshuaBengio and Aaron Courvile, MIT Press, 2016
T2	Deep Learning with Python, Francois Chollet, Manning Publications, Released December 2017.
T3	Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence – Jon Krohn, Grant Beyleveld, AglaéBassens, Released September 2019, Publisher(s): Addison-Wesley Professional, ISBN: 9780135116821
T4	Deep Learning from Scratch - Seth Weidman, Released September 2019, Publisher(s): O'Reilly Media, Inc., ISBN: 9781492041412

REFERENCE BOOKS:

R1	Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009
R2	Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
R3	Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-HillEducation, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical foundations of Deep Learning

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.	Discussion of CO's and CO-PO Mappings	1	01-07-2025		TLM1,2	
2.	Mathematical foundations of Deep Learning	1	02-07-2025		TLM1,2	
3.	Multiplying Matrices and Vectors	2	03-07-2025 04-07-2025		TLM1,2	
4.	Identity and Inverse Matrices	1	08-07-2025		TLM1,2	
5.	Linear dependence and span	2	09-07-2025 10-07-2025		TLM1,2	
6.	Norms	2	11-07-2025 15-07-2025		TLM1,2	
7.	Special kinds of matrices and vectors	1	16-07-2025		TLM1,2	
8.	Trace operations	1	17-07-2025		TLM1,2	
9.	Eigen Decomposition	2	18-07-2025 22-07-2025		TLM1,2	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: Fundamentals of Deep Learning

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Anatomy of Neural Networks	1	23-07-2025		TLM1,2	
11.	Layers	1	24-07-2025		TLM1,2	
12.	Models	1	25-07-2025		TLM1,2	
13.	Loss functions	1	29-07-2025		TLM1,2	
14.	optimizers	1	30-07-2025		TLM1,2	
15.	Training Deep Networks	1	31-07-2025		TLM1,2	
16.	Cost Functions	1	01-08-2025		TLM1,2	
17.	Optimizers	1	05-08-2025		TLM1,2	

18.	Types of Deep Neural Networks	3	06-08-2025 07-08-2025 08-08-2025		TLM1,2	
No. of classes required to complete UNIT-II: 11				**No. of classes taken:**		

UNIT-III: Convolutional Neural Networks

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Motivation	1	12-08-2025		TLM1,2	
20.	Convolution Operation	2	13-08-2025 14-08-2025		TLM1,2	
21.	Types of layers	4	19-08-2025 20-08-2025 21-08-2025 22-08-2025		TLM1,2	
22.	Pooling	2	01-10-2025 03-10-2025		TLM1,2	
23.	LENET5 Architecture	3	07-10-2025 08-10-2025 09-10-2025		TLM1,2	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: Recurrent Neural Networks

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Architecture of traditional RNN	2	10-10-2025 14-10-2025		TLM1,2	
25.	Types and applications of RNN	3	15-10-2025 16-10-2025 17-10-2025		TLM1,2	
26.	Variants of RNNs	3	21-10-2025 22-10-2025 23-10-2025		TLM1,2	
27.	Word Embedding using Word2vec	4	24-10-2025 28-10-2025 29-10-2025 30-10-2025		TLM 4	
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: Cluster Analysis

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Introduction to Regularization for Deep Learning	1	31-10-2025		TLM1,2	
29.	L1 and L2 Regularizations	1	04-11-2025		TLM1,2	

30.	Dropout	1	05-11-2025		TLM1,2	
31.	Data Augmentation and Early Stopping	1	06-11-2025		TLM1,2	
32.	Case study on MNIST data	2	07-11-2025 11-11-2025		TLM 4	
33.	Introduction to Auto encoders	1	12-11-2025		TLM1,2	
34.	Architecture and Implementation	1	13-11-2025		TLM1,2	
35.	Denoising Auto encoders	1	14-11-2025		TLM1,2	
36.	Sparse Auto encoders	1	18-11-2025		TLM1,2	
37.	Use cases	1	19-11-2025		TLM1,2	
38.	Projects and evaluation	1	20-11-2025		TLM 6	
No. of classes required to complete UNIT-V: 16				**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	HOD Sign
39.	GAN (Generative Adversarial Network)	1	21-11-2025		TLM2	

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:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	30-06-2025		
I Phase of Instructions	30-06-2025	23-08-2025	8W
Technical Training	25-08-2025	20-09-2025	2W
I Mid Examinations	22-09-2025	27-09-2025	1W
II Phase of Instructions	29-09-2025	22-11-2025	9W
II Mid Examinations	24-11-2025	29-11-2025	1W
Preparation and Practical's	01-12-2025	06-12-2025	1W
Semester End Examinations	08-12-2025	20-12-2025	2W

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1 Pursue a successful career in the area of Information Technology or its allied fields.

PEO 2 Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.

PEO 3 Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.

PEO 4 Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication and team work and leadership skills in their job.

PROGRAMME OUTCOMES (POs):

PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2 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.

PO3 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.

PO4 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.

PO5 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.

PO6 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.

PO7 Environment and sustainability: Understand the impact of the professional engineering solution sin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 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.

PO11 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.

PO12 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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Mr. V. V. Krishna Reddy**	**Dr.S.Naganjaneyulu**	**Mrs. M.Hemalatha**	**Dr. D. Ratna kishore**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. S. Naganjaneyulu
Course Name & Code : Deep Learning & 20AD07
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VII/ B **A.Y.:** 2025-26
PREREQUISITES : **Probability and Statistics, LATT, Machine Learning**

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to make students learn the frameworks of deep learning and their application

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

CO1	Apply the fundamentals of linear algebra to machine learning algorithms. **(Apply- L3)**
CO2	Understand the fundamental building blocks of deep learning **(Understand- L2)**
CO3	Apply the concepts of Convolutional Neural Networks to computer vision applications. **(Apply- L3)**
CO4	Apply the concepts of Recurrent Neural Networks to Natural Language Processing.**(Apply- L3)**
CO5	Apply the regularization techniques to improve the model performance. **(Apply- L3)**

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	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO2	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO3	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO4	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO5	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
1 - Low						**2** –Medium						**3** - High			

TEXTBOOKS:

T1	Deep Learning, Ian Goodfellow, YoshuaBengio and Aaron Courvile, MIT Press, 2016
T2	Deep Learning with Python, Francois Chollet, Manning Publications, Released December 2017.
T3	Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence – Jon Krohn, Grant Beyleveld, AglaéBassens, Released September 2019, Publisher(s): Addison-Wesley Professional, ISBN: 9780135116821
T4	Deep Learning from Scratch - Seth Weidman, Released September 2019, Publisher(s): O'Reilly Media, Inc., ISBN: 9781492041412

REFERENCE BOOKS:

R1	Artificial Neural Networks, Yegnanarayana, B., PHI Learning Pvt. Ltd, 2009
R2	Matrix Computations, Golub, G.,H., and Van Loan,C.,F, JHU Press,2013.
R3	Neural Networks: A Classroom Approach, Satish Kumar, Tata McGraw-HillEducation, 2004.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical foundations of Deep Learning

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.	Mathematical foundations of Deep Learning	1	01-07-25		TLM1,2	
2.	Multiplying Matrices and Vectors	2	02-07-25 04-07-25		TLM1,2	
3.	Identity and Inverse Matrices	1	05-07-25		TLM1,2	
4.	Linear dependence and span	2	08-07-25 09-07-25		TLM1,2	
5.	Norms	2	11-07-25 15-07-25		TLM1,2	
6.	Special kinds of matrices and vectors	1	16-07-25		TLM1,2	
7	Trace operations	1	18-07-25		TLM1,2	
8	Eigen Decomposition Tutorial -1	2	19-07-25 22-07-25		TLM1 TLM3	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Fundamentals of Deep Learning

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	Anatomy of Neural Networks: Layers, Models, Loss functions and optimizers	4	23-07-25 25-07-25 29-07-25 30-07-25		TLM1,2	
10.	Training Deep Networks: Cost Functions, Optimizers Tutorial - 2	4	01-08-25 02-08-25 05-08-25 06-08-25		TLM1 TLM2 TLM3	
11.	Types of Deep Neural Networks	3	08-08-25 12-08-25 13-08-25		TLM1, TLM2	
No. of classes required to complete UNIT-II: 11				**No. of classes taken:**		

UNIT-III: Convolutional Neural Networks

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Motivation	1	19-08-25		TLM1,2	
13.	Convolution Operation	1	20-08-25		TLM1,2	
14.	Types of layers	2	22-08-25 23-08-25		TLM1,2	
15.	Pooling	3	07-10-25 08-10-25 10-10-25		TLM1,2	
16.	LENET5 Architecture	3	11-10-25 14-10-25 15-10-25		TLM1,2	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

UNIT-IV: Recurrent Neural Networks

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
17.	Architecture of traditional RNN	2	17-10-25 18-10-25		TLM1,2	
18.	Types and applications of RNN	4	03-10-25 04-10-25 07-10-25 08-10-25		TLM1,2	
19.	Variants of RNNs	3	10-10-25 14-10-25 15-10-25		TLM1,2	
20.	Word Embedding using Word2vec Tutorial-3	3	17-10-25 18-10-25 22-10-25		TLM1, TLM 2, TLM 3	
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: Cluster Analysis

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction to Regularization for Deep Learning	1	24-10-25		TLM1,2	
22.	L1 and L2 Regularizations	2	25-10-25 28-10-25		TLM1,2	
23.	Dropout	1	29-10-25		TLM1,2	
24.	Data Augmentation and Early Stopping	2	31-10-25 01-11-25		TLM1,2	
25.	Case study on MNIST data	1	04-11-25		TLM 4	

26	Introduction to Auto encoders	1	05-11-25		TLM1,2	
27	Architecture and Implementation	2	07-11-25 08-11-25		TLM1,2	
28	Denoising Auto encoders	1	11-11-25		TLM1,2	
29	Sparse Auto encoders Use cases	1	12-11-25		TLM1,2	
30	Projects and evaluation	1	14-11-25		TLM 6	
No. of classes required to complete UNIT-V: 13				**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	HOD Sign
32.	GAN (Generative Adversarial Network)	1	15-11-2025		TLM2	

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:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2)	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	30-06-2025		
I Phase of Instructions	30-06-2025	23-08-2025	8W
Technical Training	25-08-2025	20-09-2025	2W
I Mid Examinations	22-09-2025	27-09-2025	1W
II Phase of Instructions	29-09-2025	22-11-2025	9W
II Mid Examinations	24-11-2025	29-11-2025	1W
Preparation and Practical's	01-12-2025	06-12-2025	1W
Semester End Examinations	08-12-2025	20-12-2025	2W

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 engineer**ing 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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr.S.Naganjaneyulu**	**Dr.S.Naganjaneyulu**	**Mrs.M.Hemalatha**	**Dr. B.Srinivasa Rao**
Signature				

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L.B.REDDYNAGAR,MYLAVARAM,KRISHNADIST.,A.P.-521230.

DEPARTMENT OF INFORMATIONTECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : **Dr. Ch. Malathi**
Course Name & Code : SOFT COMPUTING & 20CS26
L-T-P Structure : **3-0-0** **Credits:**3
Program/Sem/Sec : B.Tech/VII/A **A.Y.:**2025-26

PREREQUISITE: Linear Algebra and Python

COURSE EDUCATIONAL OBJECTIVES(CEOs):

The objective of the course is to make students learn the frameworks of deep learning and their application

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

CO1	Describe the preliminaries of Artificial intelligence and Neural networks.(Understand- L2)
CO2	Map the issues to AI-based solutions.(Apply-L3)
CO3	Apply Soft computing techniques to solve real world problems.(Apply–L3)
CO4	Implement systems based on fuzzy logic. (Apply–L3)
CO5	Use Genetic algorithms to develop evolutionary approaches for solving real-world problems. (Apply–L3)

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	-	-	-	-	-	-	-	-	-	2	-
CO2	3	2	-	2	-	-	-	-	-	-	-	-	1	2	-
CO3	2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO4	2	2	-	2	-	-	-	-	-	-	-	-	2	2	-
CO5	2	2	2	2	-	-	-	-	-	-	-	-	2	2	-
1-Low **2 –**Medium **3-**High															

TEXTBOOKS:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, John Wiley & Sons,3rd Edition 2010.
2. S,Rajasekaran & G.A.VijayalakshmiPai,“NeuralNetworks,FuzzyLogic&GeneticAlgorithms, Synthesis & applications”, PHI Publication, 1st Edition, 2009.
3. David E.Goldberg, "Genetic Algorithms",Pearson Education India,2006.REFERENCE

BOOKS:

R1	Laurene Fauseett,”Fundamentals of Neural Networks”,Prentice Hall India,NewDelhi, 1994.
R2	B.Yagna Narayana,"Artificial Neural Networks",PHI,3rdEdition,2009
R3	SimonO.Haykin,"Neural Networks and Learning Machines", Prentice Hall,3rd Edition,2009.
R4	https://pypi.org/project/fuzzywuzzy/

PART-B

COURSE DELIVERY PLAN(LESSONPLAN):

UNIT-I: **Introduction & Architecture:**

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	30.06.2025		TLM2	
2.	Architecture: Neuron, Nerve Structure and synapse	1	01.07.2025		TLM2	
3.	Artificial Neuron and its model	1	02.07.2025		TLM2	
4.	Activation functions	2	03.07.2025 05.07.2025		TLM1	
5.	Neural network architecture: Single layer and multi-layer feed forward networks,	1	07.07.2025		TLM1	
6.	Recurrent networks	1	08.07.2025		TLM1	
7.	Various learning techniques; perception rule	1	09.07.2025		TLM1	
8.	Convergence rule	1	10.07.2025		TLM1	
9.	Associative Memory	1	14.07.2025		TLM2	
10.	Auto-associative	1	15.07.2025		TLM2	
11.	Hetero-associative memory.	1	16.07.2025		TLM1	
12.	Derivative of Activation Functions.	2	17.07.2025 19.07.2025		TLM1	
13.	Numericals on Activation Functions.	2	21.07.2025 22.07.2025		TLM1	
14.	Numericals on Neural Networks.	1	23.07.2025		TLM1	
15	Revision	2	24.07.2025 28.07.2025		TLM3	
No.of classes required to complete UNIT-I:19				**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	HOD Sign Weekly
16	Introduction	1	29.07.2025		TLM1	
17.	Perceptron model, solution.	1	30.07.2025		TLM1	
18.	Single layer artificial neural network,	1	31.07.2025		TLM1	
19.	multi-layer perception model	1	02.08.2025		TLM1	
20.	Backpropagation learning Methods	2	04.08.2025 05.08.2025		TLM1	
21.	Effect of learning rule co-Efficient	1	06.08.2025		TLM1	
22.	backpropagation algorithm,	2	07.08.2025 11.08.2025		TLM1	
23.	Factors affecting back Propagation training	1	12.08.2025		TLM1	
24.	Applications	1	13.08.2025		TLM2	
25.	Numericals on back Propagation algorithm	2	14.08.2025 18.08.2025		TLM1	
26.	Revision	1	19.08.2025		TLM3	
No.of classes required to complete UNIT-II:14				**No.of classes taken:**		

UNIT-III: Fuzzy Logic-I

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27	Introduction	1	20.08.2025		TLM1	
28.	Basic concepts of fuzzy logic	1	21.08.2025		TLM1	
29.	Fuzzy sets and Crispsets	1	23.08.2025		TLM1	
30.	Fuzzy set theory	1	06.10.2025		TLM1	
31.	Operations	1	07.10.2025		TLM1	
32.	Properties of fuzzy sets	2	08.10.2025 09.10.2025		TLM1	
33.	Fuzzy and Crisp relations	2	11.10.2025 13.10.2025		TLM1	
34.	Fuzzy to Crisp conversion	1	14.10.2025		TLM1	
35.	Fuzzy relations	2	15.10.2025 16.10.2025		TLM1	
36.	rules, propositions	2	18.10.2025 20.10.2025		TLM1	

37.	implications, and inferences	1	22.10.2025		TLM1	
38.	Defuzzification techniques.	1	23.10.2025		TLM1	
39.	Applications of Fuzzy logic	1	25.10.2025		TLM1	
40	Revision	1	27.10.2025		TLM3	
No.of classes required to complete UNIT-III:18				**No.of classes taken:**		

UNIT-IV:FuzzyLogic– II

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41	Introduction	1	28.10.2025		TLM1	
42.	Membership functions	1	29.10.2025		TLM1	
43.	Interference in fuzzy logic	1	30.10.2025		TLM1	
44.	Fuzzy if-then rules	1	31.10.2025		TLM1	
45.	Fuzzy implications and Fuzzy Algorithms	1	01.11.2025		TLM1	
46.	Fuzzifications & Defuzzification.	1	03.11.2025		TLM6	
47.	Fuzzy wuzzy Python library	1	04.11.2025		TLM6	
48.	String Pattern Matching using Levenste in Algorithm	1	05.11.2025		TLM1	
49	Revision	1	06.11.2025		TLM3	
No.of classes required to complete UNIT-IV:09				**No.of classes taken:**		

UNIT-V: Genetic Algorithms and Genetic Operators.

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50	Introduction	1	08.11.2025		TLM1	
51.	Concept of "Genetics" and "Evolution"	1	10.11.2025		TLM1	
52.	Application to probabilistic Search techniques	1	11.11.2025		TLM2	
53.	Basic GA framework	1	12.11.2025		TLM2	
54.	Different GA architectures	1	13.11.2025		TLM2	
55.	Encoding	1	15.11.2025		TLM2	
56.	Crossover	1	15.11.2025		TLM2	
57.	Selection	1	17.11.2025		TLM2	
58.	Mutation	1	17.11.2025		TLM2	

59.	Solving single-objective optimization problems using Gas	1	18.11.2025		TLM2	
60	Revision	1	19.11.2025		TLM3	
No.of classes required to complete UNIT-V:11				**No.of classes taken:**		

CONTENT BEYOND THE SYLLABUS:

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.	Nature Inspired Algorithms	1	20.11.2025		TLM2	
2.	Use case on neural networks.	1	22.11.2025		TLM2	

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

PART-C

PEVALUATION PROCESS (R20Regulation):

Evaluation Task	**Marks**
Assignment-I(Units-I,II&UNIT-III(Half of the Syllabus))	A1=5
I-Descriptive Examination(Units-I,II&UNIT-III(Half of the Syllabus))	M1=15
I-Quiz Examination(Units-I,II&UNIT-III(Half of the Syllabus))	Q1=10
Assignment-II(Unit-III(Remaining Half of the Syllabus),IV&V)	A2=5
II-Descriptive Examination(UNIT-III(Remaining Half of the Syllabus),IV&V)	M2=15
II-Quiz Examination(UNIT-III(Remaining Half of the Syllabus),IV&V)	Q2=10
MidMarks=80%ofMax((M1+Q1+A1),(M2+Q2+A2))+20%ofMin((M1+Q1+A1),(M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):M	30
Semester End Examination (SEE)	70
Total Marks=CIE+SEE	100

PART-D

PROGRAMME OUTCOMES(POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**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.
PO3	**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.
PO4	**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.
PO5	**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.
PO6	**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.
PO7	**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.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and Responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**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.
PO11	**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 multi-disciplinary environments.
PO12	**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):

PSO1	The ability to apply Software Engineering practices and strategies in software project Development using open-source programming environment for the success of Organization.
PSO2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs
PSO3	To inculcate anability to analyze, design and implement database applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Nameof the Faculty	**Dr.Ch. Malathi**	**Dr.Ch. Malathi**	**Mrs. M.HEMALATHA**	**Dr. D.RATNAKISHORE**
Signature				

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L.B.REDDYNAGAR,MYLAVARAM,KRISHNADIST.,A.P.-521230.

DEPARTMENT OF INFORMATIONTECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : **Mrs. P. Padmini**
Course Name & Code : SOFT COMPUTING & 20CS26
L-T-P Structure : **3-0-0** **Credits:**3
Program/Sem/Sec : B.Tech/VII/B **A.Y.:**2025-26

PREREQUISITE: Linear Algebra and Python

COURSE EDUCATIONAL OBJECTIVES(CEOs):

The objective of the course is to make students learn the frameworks of deep learning and their application

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

CO1	Describe the preliminaries of Artificial intelligence and Neural networks.(Understand- L2)
CO2	Map the issues to AI-based solutions.(Apply-L3)
CO3	Apply Soft computing techniques to solve real world problems.(Apply–L3)
CO4	Implement systems based on fuzzy logic. (Apply–L3)
CO5	Use Genetic algorithms to develop evolutionary approaches for solving real-world problems. (Apply–L3)

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	-	-	-	-	-	-	-	-	-	2	-
CO2	3	2	-	2	-	-	-	-	-	-	-	-	1	2	-
CO3	2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO4	2	2	-	2	-	-	-	-	-	-	-	-	2	2	-
CO5	2	2	2	2	-	-	-	-	-	-	-	-	2	2	-
1-Low				**2 –**Medium									**3-**High		

TEXTBOOKS:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, John Wiley & Sons,3rd Edition 2010.
2. S,Rajasekaran & G.A.VijayalakshmiPai,“NeuralNetworks,FuzzyLogic&GeneticAlgorithms, Synthesis & applications”, PHI Publication, 1st Edition, 2009.
3. David E.Goldberg, "Genetic Algorithms",Pearson Education India,2006.REFERENCE

BOOKS:

R1	Laurene Fauseett,”Fundamentals of Neural Networks”,Prentice Hall India,NewDelhi, 1994.
R2	B.Yagna Narayana,"Artificial Neural Networks",PHI,3rdEdition,2009
R3	SimonO.Haykin,"Neural Networks and Learning Machines", Prentice Hall,3rd Edition,2009.
R4	https://pypi.org/project/fuzzywuzzy/

PART-B

COURSE DELIVERY PLAN(LESSONPLAN):

UNIT-I: **Introduction & Architecture:**

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	30.06.2025		TLM2	
2.	Architecture: Neuron, Nerve Structure and synapse	1	01.07.2025		TLM2	
3.	Artificial Neuron and its model	1	02.07.2025		TLM2	
4.	Activation functions	2	04.07.2025 05.07.2025		TLM1	
5.	Neural network architecture: Single layer and multi-layer feed forward networks,	1	07.07.2025		TLM1	
6.	Recurrent networks	1	08.07.2025		TLM1	
7.	Various learning techniques; perception rule	1	09.07.2025		TLM1	
8.	Convergence rule	1	11.07.2025		TLM1	
9.	Associative Memory	1	14.07.2025		TLM2	
10.	Auto-associative	1	15.07.2025		TLM2	
11.	Hetero-associative memory.	1	16.07.2025		TLM1	
12.	Derivative of Activation Functions.	2	18.07.2025 19.07.2025		TLM1	
13.	Numericals on Activation Functions.	2	21.07.2025 22.07.2025		TLM1	
14.	Numericals on Neural Networks.	1	23.07.2025		TLM1	
15	Revision	2	25.07.2025 28.07.2025		TLM3	
No.of classes required to complete UNIT-I:19				**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	HOD Sign Weekly
16	Introduction	1	29.07.2025		TLM1	
17.	Perceptron model, solution.	1	30.07.2025		TLM1	
18.	Single layer artificial neural network,	1	01.08.2025		TLM1	
19.	multi-layer perception model	1	02.08.2025		TLM1	
20.	Backpropagation learning Methods	2	04.08.2025 05.08.2025		TLM1	
21.	Effect of learning rule co-Efficient	1	06.08.2025		TLM1	
22.	backpropagation algorithm,	2	08.08.2025 11.08.2025		TLM1	
23.	Factors affecting back Propagation training	1	12.08.2025		TLM1	
24.	Applications	1	13.08.2025		TLM2	
25.	Numericals on back Propagation algorithm	2	18.08.2025 19.08.2025		TLM1	
26.	Revision	1	20.08.2025		TLM3	
No.of classes required to complete UNIT-II:14				**No.of classes taken:**		

UNIT-III: Fuzzy Logic-I

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27	Introduction	1	22.08.2025		TLM1	
28.	Basic concepts of fuzzy logic	1	23.08.2025		TLM1	
29.	Fuzzy sets and Crisp sets	1	06.10..2025		TLM1	
30.	Fuzzy set theory	1	07.10.2025		TLM1	
31.	Operations	1	08.10.2025		TLM1	
32.	Properties of fuzzy sets	2	10.10.2025 11.10.2025		TLM1	
33.	Fuzzy and Crisp relations	2	13.10.2025 14.10.2025		TLM1	
34.	Fuzzy to Crisp conversion	1	15.10.2025		TLM1	
35.	Fuzzy relations	2	17.10.2025 18.10.2025		TLM1	
36.	rules, propositions	2	20.10.2025 22.10.2025		TLM1	

37.	implications, and inferences	1	24.10.2025		TLM1	
38.	Defuzzification techniques.	1	25.10.2025		TLM1	
39.	Applications of Fuzzy logic	1	27.10.2025		TLM1	
40	Revision	1	28.10.2025		TLM3	
No.of classes required to complete UNIT-III:18				**No.of classes taken:**		

UNIT-IV:FuzzyLogic– II

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41	Introduction	1	29.10.2025		TLM1	
42.	Membership functions	1	29.10.2025		TLM1	
43.	Interference in fuzzy logic	1	31.10.2025		TLM1	
44.	Fuzzy if-then rules	1	31.10.2025		TLM1	
45.	Fuzzy implications and Fuzzy Algorithms	1	01.11.2025		TLM1	
46.	Fuzzifications & Defuzzification.	1	03.11.2025		TLM6	
47.	Fuzzy wuzzy Python library	1	04.11.2025		TLM6	
48.	String Pattern Matching using Levenste in Algorithm	1	05.11.2025		TLM1	
49	Revision	1	05.11.2025		TLM3	
No.of classes required to complete UNIT-IV:09				**No.of classes taken:**		

UNIT-V: Genetic Algorithms and Genetic Operators.

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50	Introduction	1	07.11.2025		TLM1	
51.	Concept of "Genetics" and "Evolution"	1	08.11.2025		TLM1	
52.	Application to probabilistic Search techniques	1	10.11.2025		TLM2	
53.	Basic GA framework	1	11.11.2025		TLM2	
54.	Different GA architectures	1	11.11.2025		TLM2	
55.	Encoding	1	12.11.2025		TLM2	
56.	Crossover	1	12.11.2025		TLM2	
57.	Selection	1	14.11.2025		TLM2	
58.	Mutation	1	14.11.2025		TLM2	

59.	Solving single-objective optimization problems using Gas	2	15.11.2025 17.11.2025		TLM2	
60	Revision	2	18.11.2025 19.11.2025		TLM3	
No.of classes required to complete UNIT-V:13				**No.of classes taken:**		

CONTENT BEYOND THE SYLLABUS:

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.	Nature Inspired Algorithms	1	21.11.2025		TLM2	
2.	Use case on neural networks.	1	22.11.2025		TLM2	

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

PART-C

PEVALUATION PROCESS (R20Regulation):

Evaluation Task	**Marks**
Assignment-I(Units-I,II&UNIT-III(Half of the Syllabus))	A1=5
I-Descriptive Examination(Units-I,II&UNIT-III(Half of the Syllabus))	M1=15
I-Quiz Examination(Units-I,II&UNIT-III(Half of the Syllabus))	Q1=10
Assignment-II(Unit-III(Remaining Half of the Syllabus),IV&V)	A2=5
II-Descriptive Examination(UNIT-III(Remaining Half of the Syllabus),IV&V)	M2=15
II-Quiz Examination(UNIT-III(Remaining Half of the Syllabus),IV&V)	Q2=10
MidMarks=80%ofMax((M1+Q1+A1),(M2+Q2+A2))+20%ofMin((M1+Q1+A1),(M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):M	30
Semester End Examination (SEE)	70
Total Marks=CIE+SEE	100

PART-D

PROGRAMME OUTCOMES(POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**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.
PO3	**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.
PO4	**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.
PO5	**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.
PO6	**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.
PO7	**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.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and Responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**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.
PO11	**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 multi-disciplinary environments.
PO12	**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):

PSO1	The ability to apply Software Engineering practices and strategies in software project Development using open-source programming environment for the success of Organization.
PSO2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs
PSO3	To inculcate anability to analyze, design and implement database applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Nameof the Faculty	**P.Padmini**	**Dr.Ch. Malathi**	**Mrs. M.HEMALATHA**	**Dr. D.RATNAKISHORE**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. Rehana Begum
Course Name & Code : NATURAL LANGUAGE PROCESSING, 20AD09
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / VII SEM/A
A.Y. : 2025-26

PRE-REQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of the course is to make learn the basic elements of C programming, control structures, derived data types, Modular programming, user defined structures, basics of files and its I/O operations.

CO1	Familiar with the basic components of NLP. **(Understand - L2)**
CO2	Applying N-gram models to predict a sequence of text. **(Apply - L3)**
CO3	Build a basic language understanding system using preliminary concepts of NLTK library. **(Apply - L3)**
CO4	Exposure on advanced techniques for understanding patterns in text **(Apply-L3)**
CO5	Understand the semantics of linguistic components in a natural dialogue **(Understand - L2)**

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

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	2	-	-	3	-	-	-	-	-	-	2	2	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO4	2	-	3	-	3	-	-	-	-	-	-	-	2	-	-
CO5	-	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).

TEXTBOOKS:

1. Daniel Jurafsky, James H. Martin ,"Speech and Language Processing" , Third Edition, PHI, 2020.
2. https://realpython.com/nltk-nlp-python/#getting-text-to-analyze

REFERENCE BOOKS:

1. Natural Language Processing with Python: Analysing Text with the Natural Language Toolkit, Steven Bird, Ewan Klein, 2011

2. Applied Text Analysis with Python: Enabling Language-Aware Data Products with Machine Learning, Benjamin Bengfort, Rebecca Bilbro, 2018

3. Speech and Language Processing, 2nd Edition, Daniel Jurafsky, James H. Martin, 2009

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Introduction to NLP	1	30-06-2025		**TLM1,2**	CO1	
2	Knowledge in Speech and Language Processing	2	02-07-2025 03-07-2025		**TLM1,2**	CO1	
3	Ambiguity; Models and Algorithms	2	04-07-2025 05-07-2025		**TLM1,2**	CO1	
4	Language, Thought and Understanding;	2	07-07-2025 09-07-2025		**TLM1,2**	CO1	
5	History Regular Expressions Regular Expression	2	10-07-2025 11-07-2025		**TLM1,3**	CO1	
6	Words; Corpora;	2	12-07-2025 14-07-2025		**TLM1,2**	CO1	
7	Text Normalization	2	16-07-2025 17-07-2025		**TLM1,2,5**	CO1	
8	Minimum Edit Distance	2	18-07-2025 19-07-2025		**TLM1,4**	CO1	
9	Unit-I Assignment Test	1	21-07-2025		**TLM1,3**	CO1	
No. of classes required to complete UNIT-I		16	No. of classes taken:				

UNIT-II: N-gram Language Models

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
10	N-Grams; Evaluating Language Models	2	23-07-2025 24-07-2025		**TLM1,2**	CO2	
11	Generalization and Zeros.	2	25-07-2025 28-07-2025		**TLM1,2**	CO2	
12	Smoothing: Laplace Smoothing	2	30-07-2025 31-07-2025		**TLM1,3**	CO2	

13	Add-k Smoothing	2	01-08-2025 02-08-2025		**TLM1,2**	CO2	
14	Backoff and Interpolation	2	04-08-2025 06-08-2025		**TLM1,2**	CO2	
15	Kneser-Ney Smoothing	2	07-08-2025 08-08-2025		**TLM1,2**	CO2	
16	Unit-II Assignment Test	1	09-08-2025		**TLM1,6**	CO2	
No. of classes required to complete UNIT-2		13	No. of classes taken:				

UNIT – III: Natural language processing tools in Python (NLTK Package)

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
17	Part-I: Introduction to NLTK	2	11-08-2025 13-08-2025		**TLM1,2**	CO3	
18	Tokenizing; Filtering Stop words; Stemming	2	14-08-2025 08-08-2025		**TLM1,4,6**	CO3	
19	Tagging parts of speech; Lemmatizing;	2	20-08-2025 21-08-2025		**TLM1,2**	CO3	
20	Chunking	2	22-08-2025 23-08-2025		**TLM1,2**	CO3	
21	Chinking Part-II: Using Named Entity Recognition (NER)	2	15-09-2025 17-09-2025		**TLM1,2**	CO3	
22	Getting Text to Analyze	2	18-09-2025 19-09-2025		**TLM1,2**	CO3	
23	Using a Concordance	2	20-09-2025 06-10-2025		**TLM1,2**	CO3	
24	Making a Dispersion Plot.	2	08-10-2025 09-10-2025		**TLM1,2**	CO3	
25	Unit-III Assignment Test	1	10-10-2025		**TLM1,2**	CO3	
No. of classes required to complete UNIT-3		17	No. of classes taken:				

UNIT-IV: Information Extraction

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
26	Relation Extraction Algorithms	2	13-10-2025 15-10-2025		**TLM1,2**	CO4	
27	Using Patterns to extract relations	2	16-10-2025 17-10-2025		**TLM1,2**	CO4	
28	Relation extraction via	2	18-10-2025		**TLM1,3**	CO4	

	supervised learning		22-10-2025				
29	Semi supervised relation extraction via bootstrapping	2	23-10-2025 24-10-2025		**TLM1,3**	CO4	
30	Distant Supervision for Relation Extraction	2	25-10-2025 27-10-2025		**TLM1,2**	CO4	
31	Evaluation of Relation Extraction	2	29-10-2025 30-10-2025		**TLM1,2**	CO4	
32	Extracting Times	2	31-10-2025 01-11-2025		**TLM1,2**	CO4	
33	Extracting Events and their Times; Template Filling	2	03-11-2025 06-11-2025		**TLM1,2**	CO4	
34	Unit-IV Assignment Test	1	07-11-2025		**TLM1,3**	CO4	
No. of classes required to complete UNIT-4		17	No. of classes taken:				

UNIT-V: Word Senses and WordNet

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
35	Defining Word Senses, how many senses do words have	3	08-11-2025 10-11-2025 12-11-2025		**TLM1,3**	CO5	
36	Relations between senses	3	13-11-2025 30-11-2025 31-11-2025		**TLM1,6**	CO5	
37	WordNet: Sense relations in WordNet	2	01-11-2025 03-11-2025		**TLM1,2**	CO5	
38	Word Sense Disambiguation	3	05-11-2025 06-11-2025 07-11-2025		**TLM1,2**	CO5	
39	Alternate WSD algorithms and Tasks	3	10-11-2025 12-11-2025 13-11-2025		**TLM1,2**	CO5	
40	Alternate WSD algorithms and Tasks	2	14-11-2025 15-11-2025		**TLM1,2**	CO5	
41	Unit-V Assignment Test	1	17-11-2025		**TLM1**	CO5	
No. of classes required to complete UNIT-5		17	No. of classes taken:				

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Large Language Models (LLMs)	**1**	**24-07-2025**			**CO2**	
2	Advanced Text Applications	**1**	**19-09-2025**			**CO3**	

TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SWAYAM/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
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	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An Ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mrs. Rehana Begum	Mrs. B. Swathi	Mrs. M. Hema Latha	Dr. B. Srinivasa Rao
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. Phaneendra Kanakamedala
Course Name & Code : Blockchain Technologies, 20CS29
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / VII SEM/ B-Sec
A.Y. : 2025-26

PRE-REQUISITE: Information Security

COURSE EDUCATIONAL OBJECTIVES (CEOs): To understand block chain technology and Crypto currency works

CO1	Demonstrate the block chain basics, Crypto currency **(Understand-L2)**
CO2	Compare and contrast the use of different private vs. public block chain and use cases **(Understand-L2)**
CO3	Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins **(Apply-L3)**
CO4	Classify Permission Block chain and use cases – Hyper ledger, Corda **(Analyze-L4)**
CO5	Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others **(Apply-L3)**

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

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	2	1	1	-	-	-	-	-	-	-	1	-	2	-
CO3	2	3	1	1	-	-	-	-	-	-	-	-	-	2	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	2	-
CO5	1	3	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).

TEXT BOOKS:

1. Block chain Blue print for Economy by Melanie Swan

REFERENCE BOOKS:

1. Block chain Basics: A Non-Technical Introduction in 25 Steps 1st Edition, by Daniel Drescher

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Information on CO's and PO's of the Course & Syllabus	1	30-06-2025		**TLM2**	CO1	
2	Introduction to Blockchain	2	01-07-2025 02-07-2025		**TLM2**	CO1	
3	Basic Ideas Behind Blockchain	2	03-07-2025 05-07-2025		**TLM2/ TLM3**	CO1	
4	How Blockchain is changing the Landscape of Digitization	2	07-07-2025 08-07-2025		**TLM2**	CO1	
5	Introduction to Cryptography concepts required for Bolckchain	2	09-07-2025 10-07-2025		**TLM2**	CO1	
6	Blockchain and Distributed Trust	2	12-07-2025 14-07-2025		**TLM2/ TLM3**	CO1	
7	Currency and Cryptocurrency, How Cryptocurrency Works	2	15-07-2025 16-07-2025		**TLM2**	CO1	
8	Financial Services and Bitcoin Prediction Markets	2	17-07-2025 19-07-2025		**TLM2**	CO1	
9	Unit-I Assignment Test	1	21-07-2025		**TLM3**	CO1	
No. of classes required to complete UNIT-I		16	No. of classes taken:				

UNIT-II: Types of Blockchain

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
10	Hashing	2	22-07-2025 23-07-2025		**TLM2**	CO2	
11	Public key Cryptosystems	2	24-07-2025 28-07-2025		**TLM2**	CO2	
12	Private Vs Public Blockchain and Usecases	2	29-07-2025 30-07-2025		**TLM2**	CO2	
13	Hash Puzzles	2	31-07-2025 02-08-2025		**TLM2/ TLM3**	CO2	
14	Extensibility of Blockchain Concepts, Digital Identity Verification	2	04-08-2025 05-08-2025		**TLM2**	CO2	
15	Blockchain Neutrality, Digital Art	2	06-08-2025 07-08-2025		**TLM2**	CO2	
16	Unit-II Assignment Test	1	09-08-2025		**TLM3**	CO2	
No. of classes required to complete UNIT-2		13	No. of classes taken:				

UNIT – III: Introduction to Bitcoin

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
17	Bitcoin Blockchain	2	11-08-2025 12-08-2025		**TLM1**	CO3	
18	Scripts of Bitcoin Blockchain	2	13-08-2025 14-08-2025		**TLM1**	CO3	
19	Use cases of Bitcoin Blockchain scripting language	2	18-08-2025 19-08-2025		**TLM1**	CO3	
20	Micropayments and escrow	2	20-08-2025 21-08-2025		**TLM1**	CO3	
21	Downside of Bitcoin Mining	1	23-08-2025		**TLM3**	CO3	
22	Blockchain Science: Gridcoin	1	06-10-2025		**TLM2**	CO3	
23	Folding Coin, Blockchain Genomics	1	07-10-2025		**TLM2**	CO3	
24	Bitcoin MOOC's	1	08-10-2025		**TLM2/ TLM3**	CO3	
25	Unit-III Assignment Test	1	09-10-2025		**TLM3**	CO3	
No. of classes required to complete UNIT-3		13	No. of classes taken:				

UNIT-IV: Ethereum & HyperLedger

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
26	Introduction to Ethereum	2	13-10-2025 14-10-2025		**TLM2**	CO4	
27	IoTA	1	15-10-2025		**TLM3/ TLM2**	CO4	
28	Need of Mining, Consensus	1	16-10-2025		**TLM2/ TLM3**	CO4	
29	Byzantine Generals Problem	1	18-10-2025		**TLM2**	CO4	
30	Consensus as a Distributed Coordination problem	2	20-10-2025 22-10-2025		**TLM2**	CO4	
31	Private or permissioned Blockchain	1	23-10-2025		**TLM2**	CO4	
32	Introduction to Hyper ledger, Currency,, Token, Campus coin	2	25-10-2025 27-10-2025		**TLM2**	CO4	
33	Coin drop as strategy for public adoption, Currency Multiplicity	2	28-10-2025 29-10-2025		**TLM2/ TLM3**	CO4	
34	Unit-III Assignment Test	1	30-10-2025		**TLM2**	CO4	
No. of classes required to complete UNIT-4		13	No. of classes taken:				

UNIT-V: Applications of Blockchain

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
35	Challenges of Blockchain	2	01-11-2025 03-11-2025		**TLM2/ TLM3**	CO5	
36	Business Model Challenges	2	04-11-2025 05-11-2025		**TLM2**	CO5	
37	Scandals and Public Perception	2	06-11-2025 08-11-2025		**TLM2**	CO5	
38	Government Regulation	1	10-11-2025		**TLM3/ TLM2**	CO5	
39	Use of Blockchain in E-Governance	1	15-11-2025		**TLM2**	CO5	
40	Land Registration, Medical Information System.	2	17-11-2025 18-11-2025		**TLM2/ TLM3**	CO5	
41	Revision	1	19-11-2025		**TLM2**	CO5	
No. of classes required to complete UNIT-5		10	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	HOD Sign
1.	Blockchain Sustainability	1	20-11-2025		**TLM2**	
2.	Quantum-Resistant Blockchain	1	22-11-2025		**TLM2**	

TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SWAYAM/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
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	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An Ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Dr. K. Phaneendra	Dr. K. Phaneendra	Dr. K. Phaneendra	Dr. D. Ratna Kishore
Signature				

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http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., VII-Sem., IT A-Section,

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : RENEWABLE ENERGY SOURCES- 20ME81

L-T-P STRUCTURE : 4-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.P.Vijaya Kumar**

COURSE COORDINATOR : **Dr.P.Vijaya Kumar**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): To provide the insights on different non-conventional energy sources, potential, salient features and utilization of solar, wind, geothermal, ocean thermal energy, bio energy and direct energy conversion systems.

COURSE OUTCOMES (COs)

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

CO1: Compute the performance of solar energy harnessing devices and its energy scenario. **(Applying– L3)**

CO2: Apply the principles of energy conversion for wind and geothermal power generating plants. **(Applying - L3)**

CO3: Compare the power generating capacities of tidal energy, wave energy and ocean thermal energy plants. **(Understanding - L2)**

CO4: Illustrate the various biomass power generation system technologies. **(Understanding - L2)**

CO5: Comprehend the direct energy power generation systems. **(Understanding - L2)**

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	-	-	-	3	3	-	-	-	-	2	2	-	-
CO2	2	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO3	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO4	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO5	1	1	-	-	-	3	3	-	-	-	-	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 G.D.Rai, Non-Conventional Energy Sources, 5th Edition 2011, Khanna Publishers, New Delhi, India.

T2 Kreith, F and Kreider, J. F., Principles of Solar Engineering, McGraw-Hill, 1978.

BOS APPROVED REFERENCE BOOKS:

R1 John Twidell&Tony Weir, Renewable Energy Resources – 2nd Edition, Taylor & Francis

R2 G.N.Tiwari, Solar Energy – Fundamentals, Design, Modelling and Applications –Narosa Publication Ltd.,2000.

R3 Ashok V Desai, Non-Conventional Energy- Wiley Eastern, 2000.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : GLOBAL AND NATIONAL ENERGY SCENARIO & SOLAR ENERGY HARNESSING DEVICES

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.	Course Outcomes & Blooms Taxonomy Levels	1	30-06-2025		TLM1/ TLM2	CO1	T1	
2.	Over view of conventional & renewable energy sources	1	01-07-2025		TLM1/ TLM2	CO1	T1	
3.	Need & Development of renewable energy sources	1	02-07-2025		TLM1/ TLM2	CO1	T1	
4.	Types of renewable energy systems.	1	03-07-2025		TLM1/ TLM2	CO1	T1	
5.	Energy available from Sun	1	07-07-2025		TLM1/ TLM2	CO1	T1	
6.	Solar radiation data,	1	08-07-2025		TLM1/ TLM2	CO1	T1	
7.	Flat plate and Concentrating collectors	1	09-07-2025		TLM1/ TLM2	CO1	T1	
8.	Mathematical analysis of Flat plate collectors	1	10-07-2025		TLM1/ TLM2	CO1	T1	
9.	collector efficiency	1	14-07-2025		TLM1/ TLM2	CO1	T1	
10.	Solar water Heating, Space Heating	1	15-07-2025		TLM1/ TLM2	CO1	T1	
11.	Active and Passive heating	1	16-07-2025		TLM1/ TLM2	CO1	T1	
12.	solar stills and ponds	1	17-07-2025		TLM1/ TLM2	CO1	T1	
13.	basic principle of power generation in photovoltaic cell	1	21-07-2025		TLM1/ TLM2	CO1	T1	
14.	Problems	1	22-07-2025		TLM1/ TLM2	CO1	T1	
15.	**Quiz/Assignment**	1	23-07-2025					
No. of classes required to complete UNIT-I		15			No. of classes taken:			

UNIT-II : WIND ENERGY & GEOTHERMAL ENERGY

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
16.	Wind – characteristics – wind energy conversion systems	1	24-07-2025		**TLM1/ TLM2**	CO2	T1	
17.	Types of wind energy	1	28-07-2025		**TLM1/ TLM2**	CO2	T1	
18.	Betz model & Interference factor	1	29-07-2025		**TLM1/ TLM2**	CO2	T1	
19.	Power Coefficient Torque Coefficient and thrust coefficient	1	30-07-2025		**TLM1/ TLM2**	CO2	T1	
20.	site selection requirements.	1	31-07-2025		**TLM1/ TLM2**	CO2	T1	
21.	GEOTHERMAL ENERGY: Structure of Earth, Geothermal sources	1	04-08-2025		**TLM1/ TLM2**	CO2	T1	
22.	Hot springs, Hot Rocks& Hot Aquifers	1	05-08-2025		**TLM1/ TLM2**	CO2	T1	
23.	Interconnection of geothermal fossil systems	1	06-08-2025		**TLM1/ TLM2**	CO2	T1	
24.	Problems	1	07-08-2025		**TLM1/ TLM2**	CO1	T1	
25.	**Quiz/Assignment**		11-08-2025					
No. of classes required to complete UNIT-II		10			No. of classes taken:			

UNIT-III : TIDAL ENERGY, WAVE ENERGY and OCEAN THERMAL ENERGY

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
26	**Tidal Energy**- Introduction, Origin of Tides	1	12-08-2025		**TLM1/ TLM2**	CO3	T1, R8	
27	Tidal Power generation	1	13-08-2025		**TLM1/ TLM2**	CO3	T1, R8	
28	Classification of Tidal Power Plant,	1	14-08-2025		**TLM1/ TLM2**	CO3	T1	
29	Site requirements	1	18-08-2025		**TLM1/ TLM2**	CO3	T1	
30	**WAVE ENERGY**: Introduction, Wave energy and Power	1	19-08-2025		**TLM1/ TLM2**	CO3	T1	
31	Wave Energy devices – Merits and Demerits	1	20-08-2025		**TLM1/ TLM2**	CO3	T1	
32	**OCEAN THERMAL ENERGY**: Introduction	1	21-08-2025		**TLM1/ TLM2**	CO3	T1	
33	Working principle of Ocean Thermal Energy Conversion	1	06-10-2025		**TLM1/ TLM2**	CO3	T1	
34	OTEC Systems,	1	07-10-2025		**TLM1/**	CO3	T1	

					TLM2			
35	Advantages and Disadvantages of OTEC plants.	1	08-10-2025		**TLM1/ TLM2**	CO3	T1	
36	**Quiz/Assignment**		09-10-2025			CO3		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV : BIO – ENERGY

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
37.	**BIO – ENERGY**: Introduction	1	13-10-2025		**TLM1/ TLM2**	CO4	T1	
38.	Biomass Energy Sources	1	14-10-2025		**TLM1/ TLM2**	CO4	T1	
39.	Aerobic and Anaerobic bio-conversion processes	1	15-10-2025		**TLM1/ TLM2**	CO4	T1	
40.	Types of Biogas plants	1	16-10-2025		**TLM1/ TLM2**	CO4	T1	
41.	Raw Materials and properties of Biogas	1	20-10-2025		**TLM1/ TLM2**	CO4	T1	
42.	Bio-gas plant Technology and Status	1	22-10-2025		**TLM1/ TLM2**	CO4	T1	
43.	Biomass gasification	1	23-10-2025		**TLM1/ TLM2**	CO4	T1	
44.	Types and application of gasifier	1	27-10-2025		**TLM1/ TLM2**	CO4	T1	
45.	**Quiz/Assignment**		28-10-2025			CO4		
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

UNIT-V : DIRECT ENERGY CONVERSION 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
46.	DIRECT ENERGY CONVERSION SYSTEMS: Introduction	1	29-10-2025		**TLM1/ TLM2**	CO5	T1	
47.	Peltier effect, seebeck effect, Thomson effect,	1	30-10-2025		**TLM1/ TLM2**	CO5	T1	
48.	Fuel Cells-Types.	2	03-11-2025		**TLM1/ TLM2**	CO5	T1	
49.	Efficiency of Fuel Cells.	1	04-11-2025		**TLM1/ TLM2**	CO5	T1	
50.	Thermoelectric power Generation	1	05-11-2025		**TLM1/ TLM2**	CO5	T1	
51.	Thermionic electro power Generation	1	06-11-2025		**TLM1/ TLM2**	CO5	T1	
52.	MHD Generator	1	10-11-2025		**TLM1/ TLM2**	CO5	T1	
53.	Open and closed systems	1	11-11-2025		**TLM1/ TLM2**	CO5	T1	
54.	applications of direct energy conversion systems	1	12-11-2025		**TLM1/ TLM2**	CO5	T1	

55.	**Quiz/Assignment**		13-11-2025			CO5		
No. of classes required to complete UNIT-V		10			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

Academic Calender-A.Y-2025-26

Description	From	To	Weeks
B Tech V Semester			
Commencement of class work	30.06.2025		
I phase of Instructions	30.06.2025	23.08.2025	8
Technical Training	25.08.2025	20.09.2025	4
I Mid Examinations	22.09.2025	27.09.2025	**1**
II phase of Instructions	29.09.2025	22.11.2025	8
II Mid Examinations	24.11.2025	29.11.2025	**1**
Preparation and Practicals	01.12.2025	06.12.2025	1
Semester End Examinations	08.12.2025	20.12.2025	**2**

Part - C

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment 1	1	A1=5
Assignment 2	2	A2=5
I-Mid Examination	1,2,3	B1=15
Quiz – 1	1,2,3	Q1=10
Assignment 3	3	A3=5
Assignment 4	4	A4=5
Assignment 5	5	A5=5
II-Mid Examination	3,4,5	B2=15
Quiz – 2	3,4,5	Q2=10
Evaluation of Assignment: 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=15
Evaluation of Quiz Marks: Q=75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	1,2,3,4,5	Q=10
Cumulative Internal Examination: A+B+Q	**1,2,3,4,5**	**CIE=30**
Semester End Examinations	**1,2,3,4,5**	**SEE=70**
Total Marks: CIE+SEE	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
2. To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
3. To apply the basic principles of mechanical engineering design or evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. P. Vijay Kumar	Dr. P. Vijay Kumar	Dr. P. Vijay Kumar	Dr. M. B. S. Sreekara Reddy

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., VII-Sem., IT B-Section,

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : RENEWABLE ENERGY SOURCES- 20ME81

L-T-P STRUCTURE : 4-0-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.P.Vijaya Kumar**

COURSE COORDINATOR : **Dr.P.Vijaya Kumar**

PRE-REQUISITES: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): To provide the insights on different non-conventional energy sources, potential, salient features and utilization of solar, wind, geothermal, ocean thermal energy, bio energy and direct energy conversion systems.

COURSE OUTCOMES (COs)

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

CO1: Compute the performance of solar energy harnessing devices and its energy scenario. **(Applying– L3)**

CO2: Apply the principles of energy conversion for wind and geothermal power generating plants. **(Applying - L3)**

CO3: Compare the power generating capacities of tidal energy, wave energy and ocean thermal energy plants. **(Understanding - L2)**

CO4: Illustrate the various biomass power generation system technologies. **(Understanding - L2)**

CO5: Comprehend the direct energy power generation systems. **(Understanding - L2)**

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	-	-	-	3	3	-	-	-	-	2	2	-	-
CO2	2	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO3	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO4	1	1	-	-	-	3	3	-	-	-	-	2	2	-	-
CO5	1	1	-	-	-	3	3	-	-	-	-	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 G.D.Rai, Non-Conventional Energy Sources, 5th Edition 2011, Khanna Publishers, New Delhi, India.

T2 Kreith, F and Kreider, J. F., Principles of Solar Engineering, McGraw-Hill, 1978.

BOS APPROVED REFERENCE BOOKS:

R1 John Twidell&Tony Weir, Renewable Energy Resources – 2nd Edition, Taylor & Francis

R2 G.N.Tiwari, Solar Energy – Fundamentals, Design, Modelling and Applications –Narosa Publication Ltd.,2000.

R3 Ashok V Desai, Non-Conventional Energy- Wiley Eastern, 2000.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : GLOBAL AND NATIONAL ENERGY SCENARIO & SOLAR ENERGY HARNESSING DEVICES

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.	Course Outcomes & Blooms Taxonomy Levels	1	30-06-2025		TLM1/ TLM2	CO1	T1	
2.	Over view of conventional & renewable energy sources	1	01-07-2025		TLM1/ TLM2	CO1	T1	
3.	Need & Development of renewable energy sources	1	03-07-2025		TLM1/ TLM2	CO1	T1	
4.	Types of renewable energy systems.	1	05-07-2025		TLM1/ TLM2	CO1	T1	
5.	Energy available from Sun	1	07-07-2025		TLM1/ TLM2	CO1	T1	
6.	Solar radiation data,	1	08-07-2025		TLM1/ TLM2	CO1	T1	
7.	Flat plate and Concentrating collectors	1	10-07-2025		TLM1/ TLM2	CO1	T1	
8.	Mathematical analysis of Flat plate collectors	1	12-07-2025		TLM1/ TLM2	CO1	T1	
9.	collector efficiency	1	14-07-2025		TLM1/ TLM2	CO1	T1	
10.	Solar water Heating, Space Heating	1	15-07-2025		TLM1/ TLM2	CO1	T1	
11.	Active and Passive heating	1	17-07-2025		TLM1/ TLM2	CO1	T1	
12.	solar stills and ponds	1	19-07-2025		TLM1/ TLM2	CO1	T1	
13.	basic principle of power generation in photovoltaic cell	1	21-07-2025		TLM1/ TLM2	CO1	T1	
14.	Problems	1	22-07-2025		TLM1/ TLM2	CO1	T1	
15.	**Quiz/Assignment**	1	24-07-2025					
No. of classes required to complete UNIT-I		15			No. of classes taken:			

UNIT-II : WIND ENERGY & GEOTHERMAL ENERGY

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
16.	Wind – characteristics – wind energy conversion systems	1	28-07-2025		**TLM1/ TLM2**	CO2	T1	
17.	Types of wind energy	1	29-07-2025		**TLM1/ TLM2**	CO2	T1	
18.	Betz model & Interference factor	1	31-07-2025		**TLM1/ TLM2**	CO2	T1	
19.	Power Coefficient Torque Coefficient and thrust coefficient	1	02-08-2025		**TLM1/ TLM2**	CO2	T1	
20.	site selection requirements.	1	04-08-2025		**TLM1/ TLM2**	CO2	T1	
21.	GEOTHERMAL ENERGY: Structure of Earth, Geothermal sources	1	05-08-2025		**TLM1/ TLM2**	CO2	T1	
22.	Hot springs, Hot Rocks& Hot Aquifers	1	07-08-2025		**TLM1/ TLM2**	CO2	T1	
23.	Interconnection of geothermal fossil systems	1	09-08-2025		**TLM1/ TLM2**	CO2	T1	
24.	Problems	1	11-08-2025		**TLM1/ TLM2**	CO1	T1	
25.	**Quiz/Assignment**		12-08-2025					
No. of classes required to complete UNIT-II		10			No. of classes taken:			

UNIT-III : TIDAL ENERGY, WAVE ENERGY and OCEAN THERMAL ENERGY

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
26.	**Tidal Energy**- Introduction, Origin of Tides	1	14-08-2025		**TLM1/ TLM2**	CO3	T1, R8	
27.	Tidal Power generation	1	18-08-2025		**TLM1/ TLM2**	CO3	T1, R8	
28.	Classification of Tidal Power Plant,	1	19-08-2025		**TLM1/ TLM2**	CO3	T1	
29.	Site requirements	1	21-08-2025		**TLM1/ TLM2**	CO3	T1	
30.	**WAVE ENERGY**: Introduction, Wave energy and Power	1	23-08-2025		**TLM1/ TLM2**	CO3	T1	
31.	Wave Energy devices – Merits and Demerits	1	06-10-2025		**TLM1/ TLM2**	CO3	T1	
32.	**OCEAN THERMAL ENERGY**: Introduction	1	07-10-2025		**TLM1/ TLM2**	CO3	T1	
33.	Working principle of Ocean Thermal Energy Conversion	1	09-10-2025		**TLM1/ TLM2**	CO3	T1	
34.	OTEC Systems,	1	11-10-2025		**TLM1/ TLM2**	CO3	T1	

35.	Advantages and Disadvantages of OTEC plants.	1	13-10-2025		**TLM1/ TLM2**	CO3	T1	
36.	**Quiz/Assignment**		14-10-2025			CO3		
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV : BIO – ENERGY

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
37.	**BIO – ENERGY**: Introduction	1	16-10-2025		**TLM1/ TLM2**	CO4	T1	
38.	Biomass Energy Sources	1	18-10-2025		**TLM1/ TLM2**	CO4	T1	
39.	Aerobic and Anaerobic bio-conversion processes	1	20-10-2025		**TLM1/ TLM2**	CO4	T1	
40.	Types of Biogas plants	1	23-10-2025		**TLM1/ TLM2**	CO4	T1	
41.	Raw Materials and properties of Biogas	1	25-10-2025		**TLM1/ TLM2**	CO4	T1	
42.	Bio-gas plant Technology and Status	1	27-10-2025		**TLM1/ TLM2**	CO4	T1	
43.	Biomass gasification	1	28-10-2025		**TLM1/ TLM2**	CO4	T1	
44.	Types and application of gasifier	1	30-10-2025		**TLM1/ TLM2**	CO4	T1	
45.	**Quiz/Assignment**		01-11-2025			CO4		
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

UNIT-V : DIRECT ENERGY CONVERSION 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
46.	DIRECT ENERGY CONVERSION SYSTEMS: Introduction	1	04-11-2025		**TLM1/ TLM2**	CO5	T1	
47.	Peltier effect, seebeck effect, Thomson effect,	1	06-11-2025		**TLM1/ TLM2**	CO5	T1	
48.	Fuel Cells-Types.	2	08-11-2025		**TLM1/ TLM2**	CO5	T1	
49.	Efficiency of Fuel Cells.	1	10-11-2025		**TLM1/ TLM2**	CO5	T1	
50.	Thermoelectric power Generation	1	11-11-2025		**TLM1/ TLM2**	CO5	T1	
51.	Thermionic electro power Generation	1	13-11-2025		**TLM1/ TLM2**	CO5	T1	
52.	MHD Generator	1	15-11-2025		**TLM1/ TLM2**	CO5	T1	
53.	Open and closed systems	1	17-11-2025		**TLM1/ TLM2**	CO5	T1	
54.	applications of direct energy conversion systems	1	18-11-2025		**TLM1/ TLM2**	CO5	T1	
55.	**Quiz/Assignment**		20-11-2025			CO5		

No. of classes required to complete UNIT-V	10	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

Academic Calender-A.Y-2025-26

Description	From	To	Weeks
B Tech V Semester			
Commencement of class work	30.06.2025		
I phase of Instructions	30.06.2025	23.08.2025	8
Technical Training	25.08.2025	20.09.2025	4
I Mid Examination	22.09.2025	27.09.2025	**1**
II phase of Instructions	29.09.2025	22.11.2025	8
II Mid Examinations	24.11.2025	29.11.2025	**1**
Preparation and Practicals	01.12.2025	06l.12.2025	1
Semester End Examinations	08.12.2025	20.12.2025	**2**

Part - C

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment 1	1	A1=5
Assignment 2	2	A2=5
I-Mid Examination	1,2,3	B1=15
Quiz – 1	1,2,3	Q1=10
Assignment 3	3	A3=5
Assignment 4	4	A4=5
Assignment 5	5	A5=5
II-Mid Examination	3,4,5	B2=15
Quiz – 2	3,4,5	Q2=10
Evaluation of Assignment: 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=15
Evaluation of Quiz Marks: Q=75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	1,2,3,4,5	Q=10
Cumulative Internal Examination: A+B+Q	**1,2,3,4,5**	**CIE=30**
Semester End Examinations	**1,2,3,4,5**	**SEE=70**
Total Marks: CIE+SEE	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
2. To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
3. To apply the basic principles of mechanical engineering design or evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr. P. Vijay Kumar	Dr. P. Vijay Kumar	Dr. P. Vijay Kumar	Dr. M. B. S. Sreekara Reddy

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT
PART-A

Name of Course Instructor : P MOHANAGANGA RAJU
Course Name & Code : ENVIRONMENTAL SANITATION & 20CE84
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., VII-Sem., IT/A A.Y : 2025-26

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course teaches the basic terminology of Environmental sanitation, different methods for control of Communicable and non-communicable diseases, the control techniques for rodent and vectors, sanitation measures that are required in few Institutions, sanitation management aspects due to rural and refuse wastes.

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

CO 1	Recognize the basic terminology of Environmental sanitation.
CO 2	Interpret the control approaches of Communicable and non-communicable diseases.
CO 3	Identify and assess the control approaches for rodent and vectors.
CO 4	Classify the appropriate sanitation measures for several institutions.
CO 5	Categorize the sanitation aspects for rural and refuse 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	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO5	3	-	-	-	-	1	1	-	-	-	-	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 Joseph. A. Salvato, Nelson N. Nemerow, Frankiln J. Agardy, "Environmental Engineering", John Wiley & Sons, 5th Edition, 2003.

T2 I.M. Prahlad Edited, "Environmental Sanitation - Reflections from Practice, A Module for Community Health Practitioners", Society For Community Health Awareness Research and Action, 2015.

REFERENCE BOOKS:

R1 S.K. Garg, "Sewage Disposal and Air pollution engineering", Khanna Publishers, New Delhi, 2009.

R2 K.V.S.G. Muralikrishna, "Environmental Sanitation", Reem Publications, Kakinada, 2003.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: ENVIRONMENTAL SANITATION BASICS

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	30-06-2025			
2.	Introduction of sanitation practices	1	02-07-2025			
3.	History sanitation practices	1	03-07-2025			
4.	Evolution of sanitation practices	1	05-07-2025			
5.	Role of Sanitary Engineer	1	07-07-2025			
6.	Sanitation management aspects for liquid wastes	1	09-07-2025			
7.	Sanitation management aspects for solid wastes	1	10-07-2025		**TLM2**	
8.	Basic Definitions	1	14-07-2025		**TLM2**	
9.	Types of diseases- Communicable diseases	1	16-07-2025		**TLM2**	
10.	Non-communicable diseases	1	17-07-2025		**TLM2**	
11.	Water borne diseases	1	19-07-2025		**TLM2**	
12.	Mortality rates	1	21-07-2025		**TLM2**	
No. of classes required to complete UNIT-I:12				No. of classes taken:		

UNIT-II: CONTROL OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES

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.	**Communicable Diseases:** Impacts,	1	23-07-2025		**TLM2**	
2.	Control of Source (Agent Factors)	1	24-07-2025		**TLM2**	
3.	Control of Mode of Transmission Factor (Environmental Factors)	1	26-07-2025		**TLM2**	
4.	Control of Mode of Transmission Factor (Environmental Factors)	1	28-07-2025		**TLM2**	
5.	Control of Susceptibles (Host Factors)	1	30-07-2025		**TLM2**	
6.	Epidemic Control	1	31-07-2025		**TLM2**	
7.	Respiratory Diseases- Types, Impacts, Characteristics	1	02-08-2025		**TLM2**	
8.	Respiratory Diseases- Control	1	04-08-2025		**TLM2**	
9.	Water borne Diseases- Types, Impacts, Characteristics	1	06-08-2025		**TLM2**	
10.	Water borne Diseases- Control	1	07-08-2025		**TLM2**	
11.	Food borne Diseases- Types, Impacts, Characteristics	1	11-08-2025		**TLM2**	

12.	Food borne Diseases- Control	1	13-08-2025		**TLM2**	
No. of classes required to complete UNIT-II:12				No. of classes taken:		

UNIT-III: INSECT VECTOR AND RODENT CONTROL

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.	Mosquitoes as carriers of diseases	1	14-08-2025		**TLM2**	
2.	Mosquito control	1	18-08-2025		**TLM2**	
3.	Larvae control	1	20-08-2025		**TLM2**	
4.	Adult control	1	21-08-2025		**TLM2**	
5.	Man-made mosquito breeding centres	1	23-08-2025		**TLM2**	
6.	Outdoor control of mosquitoes	1	29-09-2025		**TLM2**	
7.	Housefly as disease carrier	1	01-10-2025		**TLM2**	
8.	Fly control	1	02-10-2025		**TLM2**	
9.	Rodent control	1	04-10-2025		**TLM2**	
10.	Control Diseases transmitted from Animals.	1	06-10-2025		**TLM2**	
No. of classes required to complete UNIT-III:10				No. of classes taken:		

UNIT- IV: INSTITUTIONAL SANITATION

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.	Sanitation measures in hotels	1	08-10-2025		**TLM2**	
2.	Sanitation measures in Restaurants	1	09-10-2025		**TLM2**	
3.	Sanitation measures in public bathing ghats	1	13-10-2025		**TLM2**	
4.	Sanitation measures in Schools	1	15-10-2025		**TLM2**	
5.	Sanitation measures in Schools	1	16-10-2025		**TLM2**	
6.	Sanitation measures in Hospitals	1	18-10-2025		**TLM2**	
7.	Sanitation measures in Hospitals	1	22-10-2025		**TLM2**	
8.	Sanitation measures in Swimming pools	1	23-10-2025		**TLM2**	
9.	Sanitation measures in Swimming pools	1	25-10-2025		**TLM2**	
10.	Sanitation measures in Prisons.	1	27-10-2025		**TLM2**	
11.	Revision	1	29-10-2025		**TLM2**	
12.	Revision	1	30-10-2025		**TLM2**	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V : RURAL AND REFUSE SANITATION

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 sanitation**: Aqua privy, Septic tank, Soak pit and sulabh mode of sanitation	1	01-11-2025		**TLM2**	
2.	**Rural sanitation**: Appropriate low-cost rural sanitation techniques	1	03-11-2025		**TLM2**	
3.	**Rural sanitation**: Biogas generation from toilet	1	05-11-2025		**TLM2**	
4.	**Refuse Sanitation:** Municipal garbage – sources, generation and collection	1	06-11-2025		**TLM2**	
5.	**Refuse Sanitation:** Municipal garbage – recovery and disposal options	1	10-11-2025		**TLM2**	
6.	**Refuse Sanitation:** Sanitation problems with regard to: Dumping and sanitary landfilling	1	12-11-2025		**TLM2**	
7.	**Refuse Sanitation:** Sanitation problems with regard to: Mass firing of waste and incineration	1	15-11-2025		**TLM2**	
8.	**Refuse Sanitation:** Mosquito breeding, Leachate, Management issues	1	17-11-2025		**TLM2**	
9.	**Ecological Sanitation:** Principle, Eco-sanitation as a sustainable approach	1	19-11-2025		**TLM2**	
10.	**Occupational health hazards:** Concept, Types, Safety aspects of sanitation workers	1	20-11-2025		**TLM2**	
11.	**Revision**	1	22-11-2025		**TLM2**	
No. of classes required to complete UNIT-V:10				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

EVALUATION PROCESS

Evaluation Task	**Marks**
Assignment – 1	A1=5
Assignment – 2	A2=5
I-Mid Examination	M1=15
I-Quiz Examination	Q1=10
Assignment – 3	A3=5
Assignment – 4	A4=5
Assignment – 5	A5=5
II-Mid Examination	M2=15
II-Quiz Examination	Q2=10
Assignment Marks	A=5
Mid Marks	M=15
Quiz Marks	Q=10
Cumulative Internal Examination: A+ +M+Q	**30**
Semester End Examinations	**70**
Total Marks	**100**

PROGRAM OUTCOMES:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural, sciences and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components, 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 teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively with the engineering community and with society at large such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

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 test required for the professional demands

PSO3: Possesses basic technical skills to pursue higher studies and professional practice n civil engineering domain

Course Instructor	Course Coordinator	Module Coordinator	HOD
(P MOHANAGANGA RAJU)	(P MOHANAGANGA RAJU)	(J RANGAIAH)	(Dr. K. V. RAMANA)

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT
PART-A

Name of Course Instructor : EESHWAR RAM J
Course Name & Code : ENVIRONMENTAL SANITATION & 20CE84
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., VII-Sem., IT/B A.Y : 2025-26

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course teaches the basic terminology of Environmental sanitation, different methods for control of Communicable and non-communicable diseases, the control techniques for rodent and vectors, sanitation measures that are required in few Institutions, sanitation management aspects due to rural and refuse wastes.

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

CO 1	Recognize the basic terminology of Environmental sanitation.
CO 2	Interpret the control approaches of Communicable and non-communicable diseases.
CO 3	Identify and assess the control approaches for rodent and vectors.
CO 4	Classify the appropriate sanitation measures for several institutions.
CO 5	Categorize the sanitation aspects for rural and refuse 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	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	1	1	-	-	-	-	1	1	-	1
CO5	3	-	-	-	-	1	1	-	-	-	-	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 Joseph. A. Salvato, Nelson N. Nemerow, Frankiln J. Agardy, "Environmental Engineering", John Wiley & Sons, 5th Edition, 2003.

T2 I.M. Prahlad Edited, "Environmental Sanitation - Reflections from Practice, A Module for Community Health Practitioners", Society For Community Health Awareness Research and Action, 2015.

REFERENCE BOOKS:

R1 S.K. Garg, "Sewage Disposal and Air pollution engineering", Khanna Publishers, New Delhi, 2009.

R2 K.V.S.G. Muralikrishna, "Environmental Sanitation", Reem Publications, Kakinada, 2003.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: ENVIRONMENTAL SANITATION BASICS

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	30-06-2025		**TLM2**	
2.	Introduction of sanitation practices	1	03-07-2025		**TLM2**	
3.	History sanitation practices	1	04-07-2025		**TLM2**	
4.	Evolution of sanitation practices	1	06-07-2025		**TLM2**	
5.	Role of Sanitary Engineer	1	08-07-2025		**TLM2**	
6.	Sanitation management aspects for liquid wastes	1	10-07-2025		**TLM2**	
7.	Sanitation management aspects for solid wastes	1	11-07-2025		**TLM2**	
8.	Basic Definitions	1	15-07-2025		**TLM2**	
9.	Types of diseases- Communicable diseases	1	17-07-2025		**TLM2**	
10.	Non-communicable diseases	1	18-07-2025		**TLM2**	
11.	Water borne diseases	1	19-07-2025		**TLM2**	
12.	Mortality rates	1	20-07-2025		**TLM2**	
No. of classes required to complete UNIT-I:12				No. of classes taken:		

UNIT-II: CONTROL OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES

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.	**Communicable Diseases:** Impacts,	1	23-07-2025		**TLM2**	
2.	Control of Source (Agent Factors)	1	24-07-2025		**TLM2**	
3.	Control of Mode of Transmission Factor (Environmental Factors)	1	26-07-2025		**TLM2**	
4.	Control of Mode of Transmission Factor (Environmental Factors)	1	28-07-2025		**TLM2**	
5.	Control of Susceptibles (Host Factors)	1	30-07-2025		**TLM2**	
6.	Epidemic Control	1	31-07-2025		**TLM2**	
7.	Respiratory Diseases- Types, Impacts, Characteristics	1	02-08-2025		**TLM2**	
8.	Respiratory Diseases- Control	1	04-08-2025		**TLM2**	
9.	Water borne Diseases- Types, Impacts, Characteristics	1	06-08-2025		**TLM2**	
10.	Water borne Diseases- Control	1	07-08-2025		**TLM2**	
11.	Food borne Diseases- Types, Impacts, Characteristics	1	11-08-2025		**TLM2**	

12.	Food borne Diseases- Control	1	13-08-2025		**TLM2**	
No. of classes required to complete UNIT-II:12				No. of classes taken:		

UNIT-III: INSECT VECTOR AND RODENT CONTROL

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.	Mosquitoes as carriers of diseases	1	14-08-2025		**TLM2**	
2.	Mosquito control	1	18-08-2025		**TLM2**	
3.	Larvae control	1	20-08-2025		**TLM2**	
4.	Adult control	1	21-08-2025		**TLM2**	
5.	Man-made mosquito breeding centres	1	23-08-2025		**TLM2**	
6.	Outdoor control of mosquitoes	1	15-09-2025		**TLM2**	
7.	Housefly as disease carrier	1	17-09-2025		**TLM2**	
8.	Fly control	1	18-09-2025		**TLM2**	
9.	Rodent control	1	20-09-2025		**TLM2**	
10.	Control Diseases transmitted from Animals.	1	22-09-2025		**TLM2**	
No. of classes required to complete UNIT-III:10				No. of classes taken:		

UNIT- IV: INSTITUTIONAL SANITATION

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.	Sanitation measures in hotels	1	24-09-2025		**TLM2**	
2.	Sanitation measures in Restaurants	1	25-09-2025		**TLM2**	
3.	Sanitation measures in public bathing ghats	1	27-09-2025		**TLM2**	
4.	Sanitation measures in Schools	1	29-09-2025		**TLM2**	
5.	Sanitation measures in Schools	1	04-10-2025		**TLM2**	
6.	Sanitation measures in Hospitals	1	06-10-2025		**TLM2**	
7.	Sanitation measures in Hospitals	1	08-10-2025		**TLM2**	
8.	Sanitation measures in Swimming pools	1	09-10-2025		**TLM2**	
9.	Sanitation measures in Swimming pools	1	13-10-2025		**TLM2**	
10.	Sanitation measures in Prisons.	1	15-10-2025		**TLM2**	
11.	Revision	1	16-10-2025		**TLM2**	
12.	Revision	1	18-10-2025		**TLM2**	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V : RURAL AND REFUSE SANITATION

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 sanitation**: Aqua privy, Septic tank, Soak pit and sulabh mode of sanitation	1	22-10-2025		**TLM2**	
2.	**Rural sanitation**: Appropriate low-cost rural sanitation techniques	1	23-10-2025		**TLM2**	
3.	**Rural sanitation**: Biogas generation from toilet	1	25-10-2025		**TLM2**	
4.	**Refuse Sanitation:** Municipal garbage – sources, generation and collection	1	27-10-2025		**TLM2**	
5.	**Refuse Sanitation:** Municipal garbage – recovery and disposal options	1	29-10-2025		**TLM2**	
6.	**Refuse Sanitation:** Sanitation problems with regard to: Dumping and sanitary landfilling	1	30-10-2025		**TLM2**	
7.	**Refuse Sanitation:** Sanitation problems with regard to: Mass firing of waste and incineration	1	01-11-2025		**TLM2**	
8.	**Refuse Sanitation:** Mosquito breeding, Leachate, Management issues	1	03-11-2025		**TLM2**	
9.	**Ecological Sanitation:** Principle, Eco-sanitation as a sustainable approach	1	05-11-2025		**TLM2**	
10.	**Occupational health hazards:** Concept, Types, Safety aspects of sanitation workers	1	06-11-2025		**TLM2**	
11.	**Revision**	1	10-11-2025		**TLM2**	
12.	**Revision**	1	12-11-2025		**TLM2**	
13.	**Revision**	1	13-11-2025		**TLM2**	
14.	**Revision**	1	15-11-2025		**TLM2**	
No. of classes required to complete UNIT-V:10				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

EVALUATION PROCESS

Evaluation Task	**Marks**
Assignment – 1	A1=5
Assignment – 2	A2=5
I-Mid Examination	M1=15
I-Quiz Examination	Q1=10
Assignment – 3	A3=5
Assignment – 4	A4=5
Assignment – 5	A5=5
II-Mid Examination	M2=15
II-Quiz Examination	Q2=10
Assignment Marks	A=5
Mid Marks	M=15
Quiz Marks	Q=10
Cumulative Internal Examination: A+ +M+Q	**30**
Semester End Examinations	**70**
Total Marks	**100**

PROGRAM OUTCOMES:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural, sciences and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components, 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 teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively with the engineering community and with society at large such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

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 test required for the professional demands

PSO3: Possesses basic technical skills to pursue higher studies and professional practice n civil engineering domain

Course Instructor	Course Coordinator	Module Coordinator	HOD
(EESHWAR RAM J)	(EESHWAR RAM J)	(J RANGAIAH)	(Dr. K. V. RAMANA)

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE HANDOUT
PART - A

PROGRAM : B.Tech. - VII-Sem. – IT – A Section
ACADEMIC YEAR : 2025-26
COURSE NAME & CODE : Management Science for Engineers – 20HS02
L-T-P STRUCTURE : 4-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Dr. A.Dhanunjay Kumar Sr. Assistant Professor
COURSE COORDINATOR : Dr. A.Nageswara Rao, Sr. Assistant Professor
PER-REQUISITE : NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand management, its principles, contribution to management, organization, and its basic issues and types.
2. To make students understand the concept of plant location and its factors and plant layout and types, method of production and work study importance.
3. To understand the purpose and function of statistical quality control. And understand the material management techniques.

COURSE OUTCOMES:

After completion of the course student will be able to:
CO1: Understand management principles to practical situations based on the organization structures. **(L2)**
CO2: Design Effective plant Layouts by using work study methods. **(L2)**
CO3: Apply quality control techniques for improvement of quality and materials management. **(L3)**
CO4: Develop best practices of HRM in corporate Business to raise employee productivity. **(L2)**
CO5: Identify critical path and project completion time by using CPM and PERT techniques. **(L3)**

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	3	2	3				3			3		3	
CO2	3	3	1	2	1				3			3		3	
CO3	3	3	3	2	1				3			3		3	
CO4	3	2	3	2	3				1			3		3	
CO5	2	3	3	2	1				1			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:

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

References:

1. Koontz & weihrich – Essentials of management, TMH, 10th edition, 2015
2. Stoner, Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004
3. O.P. Khana, Industrial engineering and Management L.S.Srinath, PERT & CPM

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I: INTRODUCTION

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 Management	1	30.06.2025		TLM1	CO1	T1	
2.	Definition, Nature, Importance of management	1	03.07.2025		TLM1	CO1	T1	
3.	Functions of Management	1	04.07.2025		TLM1	CO1	T1	
4.	Taylor's scientific management theory	1	05.07.2025		TLM1	CO1	T1	
5.	Fayal's principles of management	1	07.07.2025		TLM3	CO1	T1	
6.	Contribution of Elton mayo, Maslow	1	10.07.2025		TLM1	CO1	T1	
7.	Herzberg, Douglas MC Gregor principles of management	1	11.07.2025		TLM1	CO1	T1	
8.	Basic Concepts of Organization, Authority, Responsibility	1	12.07.2025		TLM1	CO1	T1	
9.	Delegation of Authority, Span of control	1	14.07.2025		TLM1	CO1	T1, R1	
10.	Departmentation and Decentralization, Organization structures	1	17.07.2025		TLM1	CO1	T1, R1	
11.	Line and Functional staff organization,	1	18.07.2025		TLM1	CO1	T1, R1	
12.	Committee and Matrix organization	1	19.07.2025		TLM1	CO1	T1	
No. of classes required to complete UNIT-I		**12**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
13.	Introduction	1	21.07.2025		TLM1	CO2	T1, R3	
14.	Plant location	1	24.07.2025		TLM1	CO2	T1, R3	
15.	Factors influencing location	1	25.07.2025		TLM1	CO2	T1, R3	
16.	Principles of plant layouts	1	28.07.2025		TLM1	CO2	T1, R3	
17.	Types of plant layouts	1	31.07.2025		TLM1	CO2	T1, R3	
18.	Methods of production	1	01.08.2025		TLM3	CO2	T1, R3	
19.	Work study	1	02.08.2025		TLM1	CO2	T1	

20.		1	04.08.2025		TLM1	CO2	T1	
21.	Basic procedure involved in method study	1	07.08.2025		TLM1	CO2	T1	
22.	Work measurement	1	08.08.2025		TLM3	CO2	T1	
No. of classes required to complete UNIT-II		**10**			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
23.	Introduction, Concept of Quality	1	09.08.2025		TLM1	CO3	T1	
24.	Quality Control functions	1	11.08.2025		TLM1	CO3	T1, R1	
25.	Meaning of SQC, Variables and attributes	1	14.08.2025		TLM1	CO3	T1, R1	
26.	X chart, R Chart	1	18.08.2025		TLM1	CO3	T1	
27.	C Chart, P Chart	1	21.08.2025		TLM3	CO3	T1, R1	
28.	Simple problems	1	22.08.2025		TLM1	CO3	T1, R1	
29.	Acceptance sampling	1	23.08.2025		TLM1	CO3	T1	
Technical Training Classes 25.08.2025 to 20.09.2025 & MID-I 22.09.2025 to 27.09.2025								
30.	Sampling plans	1	29.09.2025		TLM1	CO3	T1, R1	
31.	Deming's contribution to quality	1	03.10.2025		TLM1	CO3	T1, R1	
32.	Materials management Meaning and objectives	1	04.10.2025		TLM1	CO3	T1	
33.	Inventory control	1	06.10.2025		TLM3	CO3	T1	
34.	Need for inventory control	1	09.10.2025		TLM1	CO3	T2	
35.	Purchase procedure, Store records	1	10.10.2025		TLM1	CO3	T1	
36.	EOQ, ABC analysis	1	11.10.2025		TLM1	CO3	T1, R2	
37.	Stock levels	1	13.10.2025		TLM1	CO3	T1, R2	
No. of classes required to complete UNIT-III		**15**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
38.	Introduction	1	16.10.2025		TLM1	CO4	T1	
39.	Concepts of HRM	1	17.10.2025		TLM1	CO4	T1	
40.	Basic functions of HR manager	1	18.10.2025		TLM1	CO4	T1, R2	
41.	Man power planning	1	20.10.2025		TLM3	CO4	T1, R2	

42.	Recruitment	1	23.10.2025		TLM1	CO4	T1, R2	
43.	Selection,	1	24.10.2025		TLM1	CO4	T1, R1	
44.	Training & developmemt	1	25.10.2025		TLM1	CO4	T1, R1	
45.	Placement	1	27.10.2025		TLM1	CO4	T1	
46.	Wage and salary administration	1	30.10.2025		TLM3	CO4	T1, R1	
47.	Promotion, Transfers Separation	1	31.10.2025		TLM1	CO4	T1, R1	
48.	Performance appraisal	1	01.11.2025		TLM1	CO4	T1	
49.	Job evaluation and merit rating	1	03.11.2025		TLM3	CO4	T1	
No. of classes required to complete UNIT-IV		**12**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
50.	Introduction	1	06.11.2025		TLM1	CO5	T1,R2	
51.	Early techniques in project management	1	07.11.2025		TLM1	CO5	T1, R2	
52.	Network analysis	1	08.11.2025		TLM1	CO5	T1,R2	
53.	Programme Evaluation and Review Technique (PERT)	1	10.11.2025		TLM1	CO5	T1,R2	
54.	Problems	1	13.11.2025		TLM1	CO5	T1,R2	
55.	Critical path method (CPM)	1	14.11.2025		TLM1	CO5	T1, R2	
56.	Identifying critical path	1	15.11.2025		TLM1	CO5	T1,R2	
57.	Probability of completing project within given time	1	17.11.2025		TLM1	CO5	T1,R2	
58.	Project cost analysis	1	20.11.2025		TLM1	CO5	T1,R2	
59.	project crashing	1	21.11.2025		TLM1	CO5	T1, R2	
60.	Beyond Syllabus	1	22.11.2025					
No. of classes required to complete UNIT-V		**10**			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

Part – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment 1	1	A1=5
Assignment 2	2	A2=5
I-Mid Examination	1,2,3	B1=15
Quiz – 1	1,2,3	Q1=10
Assignment 3	3	A3=5
Assignment 4	4	A4=5
Assignment 5	5	A5=5
II-Mid Examination	3,4,5	B2=15
Quiz – 2	3,4,5	Q2=10
Evaluation of Assignment: 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=15
Evaluation of Quiz Marks: Q=75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	1,2,3,4,5	Q=10
Cumulative Internal Examination: A+B+Q	**1,2,3,4,5**	**CIE=30**
Semester End Examinations	**1,2,3,4,5**	**SEE=70**
Total Marks: CIE+SEE	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Pursue higher education, entrepreneurship and research to compete at global level.
PEO2: Design and develop products innovatively in the area of computer science and engineering and in Other allied fields.
PEO3: Function effectively as individuals and as members of a team in the conduct of interdisciplinary Projects and even at all the levels with ethics and necessary attitude.
PEO4: Serve ever-changing needs of the society with a pragmatic perception.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2 - 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.
PO3 - 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.

PO4 - 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.
PO5 - 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.

PO6 - 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.

PO7 - 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.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - 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.

PO11 - Project Management and Finance: Demonstrate knowledge and understanding of the ring 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.

PO12 - Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Dr. A.Dhanunjay Kumar	Dr. A.Nageswara Rao	Mr. J. Subba Reddy	Dr. M.B.S.Sreekara Reddy
Course Instructor	Course Coordinator	Module Coordinator	HoD

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DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE HANDOUT
PART - A

PROGRAM : B.Tech. - VII-Sem. – IT – B Section
ACADEMIC YEAR : 2025-26
COURSE NAME & CODE : Management Science for Engineers – 20HS02
L-T-P STRUCTURE : 4-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Dr. A.Nageswara Rao Sr. Assistant Professor
COURSE COORDINATOR : Dr. A.Nageswara Rao, Sr. Assistant Professor
PER-REQUISITE : NIL

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand management, its principles, contribution to management, organization, and its basic issues and types.
2. To make students understand the concept of plant location and its factors and plant layout and types, method of production and work study importance.
3. To understand the purpose and function of statistical quality control. And understand the material management techniques.

COURSE OUTCOMES:

After completion of the course student will be able to:
CO1: Understand management principles to practical situations based on the organization structures. **(L2)**
CO2: Design Effective plant Layouts by using work study methods. **(L2)**
CO3: Apply quality control techniques for improvement of quality and materials management. **(L3)**
CO4: Develop best practices of HRM in corporate Business to raise employee productivity. **(L2)**
CO5: Identify critical path and project completion time by using CPM and PERT techniques. **(L3)**

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	3	2	3				3			3		3	
CO2	3	3	1	2	1				3			3		3	
CO3	3	3	3	2	1				3			3		3	
CO4	3	2	3	2	3				1			3		3	
CO5	2	3	3	2	1				1			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:

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

References:

1. Koontz & weihrich – Essentials of management, TMH, 10th edition, 2015
2. Stoner, Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004
3. O.P. Khana, Industrial engineering and Management L.S.Srinath, PERT & CPM

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I: INTRODUCTION

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 Management	1	30.06.2025		TLM1	CO1	T1	
2.	Definition, Nature, Importance of management	1	03.07.2025		TLM1	CO1	T1	
3.	Functions of Management	1	04.07.2025		TLM1	CO1	T1	
4.	Taylor's scientific management theory	1	05.07.2025		TLM1	CO1	T1	
5.	Fayal's principles of management	1	07.07.2025		TLM3	CO1	T1	
6.	Contribution of Elton mayo, Maslow	1	10.07.2025		TLM1	CO1	T1	
7.	Herzberg, Douglas MC Gregor principles of management	1	11.07.2025		TLM1	CO1	T1	
8.	Basic Concepts of Organization, Authority, Responsibility	1	12.07.2025		TLM1	CO1	T1	
9.	Delegation of Authority, Span of control	1	14.07.2025		TLM1	CO1	T1, R1	
10.	Departmentation and Decentralization, Organization structures	1	17.07.2025		TLM1	CO1	T1, R1	
11.	Line and Functional staff organization,	1	18.07.2025		TLM1	CO1	T1, R1	
12.	Committee and Matrix organization	1	19.07.2025		TLM1	CO1	T1	
No. of classes required to complete UNIT-I		**12**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
13.	Introduction	1	21.07.2025		TLM1	CO2	T1, R3	
14.	Plant location	1	24.07.2025		TLM1	CO2	T1, R3	
15.	Factors influencing location	1	25.07.2025		TLM1	CO2	T1, R3	
16.	Principles of plant layouts	1	28.07.2025		TLM1	CO2	T1, R3	
17.	Types of plant layouts	1	31.07.2025		TLM1	CO2	T1, R3	
18.	Methods of production	1	01.08.2025		TLM3	CO2	T1, R3	
19.	Work study	1	02.08.2025		TLM1	CO2	T1	

20.		1	04.08.2025		TLM1	CO2	T1	
21.	Basic procedure involved in method study	1	07.08.2025		TLM1	CO2	T1	
22.	Work measurement	1	08.08.2025		TLM3	CO2	T1	
No. of classes required to complete UNIT-II		**10**			No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
23.	Introduction, Concept of Quality	1	09.08.2025		TLM1	CO3	T1	
24.	Quality Control functions	1	11.08.2025		TLM1	CO3	T1, R1	
25.	Meaning of SQC, Variables and attributes	1	14.08.2025		TLM1	CO3	T1, R1	
26.	X chart, R Chart	1	18.08.2025		TLM1	CO3	T1	
27.	C Chart, P Chart	1	21.08.2025		TLM3	CO3	T1, R1	
28.	Simple problems	1	22.08.2025		TLM1	CO3	T1, R1	
29.	Acceptance sampling	1	23.08.2025		TLM1	CO3	T1	
Technical Training Classes 25.08.2025 to 20.09.2025 & MID-I 22.09.2025 to 27.09.2025								
30.	Sampling plans	1	29.09.2025		TLM1	CO3	T1, R1	
31.	Deming's contribution to quality	1	03.10.2025		TLM1	CO3	T1, R1	
32.	Materials management Meaning and objectives	1	04.10.2025		TLM1	CO3	T1	
33.	Inventory control	1	06.10.2025		TLM3	CO3	T1	
34.	Need for inventory control	1	09.10.2025		TLM1	CO3	T2	
35.	Purchase procedure, Store records	1	10.10.2025		TLM1	CO3	T1	
36.	EOQ, ABC analysis	1	11.10.2025		TLM1	CO3	T1, R2	
37.	Stock levels	1	13.10.2025		TLM1	CO3	T1, R2	
No. of classes required to complete UNIT-III		**15**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
38.	Introduction	1	16.10.2025		TLM1	CO4	T1	
39.	Concepts of HRM	1	17.10.2025		TLM1	CO4	T1	
40.	Basic functions of HR manager	1	18.10.2025		TLM1	CO4	T1, R2	
41.	Man power planning	1	20.10.2025		TLM3	CO4	T1, R2	

42.	Recruitment	1	23.10.2025		TLM1	CO4	T1, R2	
43.	Selection,	1	24.10.2025		TLM1	CO4	T1, R1	
44.	Training & developmemt	1	25.10.2025		TLM1	CO4	T1, R1	
45.	Placement	1	27.10.2025		TLM1	CO4	T1	
46.	Wage and salary administration	1	30.10.2025		TLM3	CO4	T1, R1	
47.	Promotion, Transfers Separation	1	31.10.2025		TLM1	CO4	T1, R1	
48.	Performance appraisal	1	01.11.2025		TLM1	CO4	T1	
49.	Job evaluation and merit rating	1	03.11.2025		TLM3	CO4	T1	
No. of classes required to complete UNIT-IV		**12**			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
50.	Introduction	1	06.11.2025		TLM1	CO5	T1,R2	
51.	Early techniques in project management	1	07.11.2025		TLM1	CO5	T1, R2	
52.	Network analysis	1	08.11.2025		TLM1	CO5	T1,R2	
53.	Programme Evaluation and Review Technique (PERT)	1	10.11.2025		TLM1	CO5	T1,R2	
54.	Problems	1	13.11.2025		TLM1	CO5	T1,R2	
55.	Critical path method (CPM)	1	14.11.2025		TLM1	CO5	T1, R2	
56.	Identifying critical path	1	15.11.2025		TLM1	CO5	T1,R2	
57.	Probability of completing project within given time	1	17.11.2025		TLM1	CO5	T1,R2	
58.	Project cost analysis	1	20.11.2025		TLM1	CO5	T1,R2	
59.	project crashing	1	21.11.2025		TLM1	CO5	T1, R2	
60.	Beyond Syllabus	1	22.11.2025					
No. of classes required to complete UNIT-V		**10**			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

Part – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment 1	1	A1=5
Assignment 2	2	A2=5
I-Mid Examination	1,2,3	B1=15
Quiz – 1	1,2,3	Q1=10
Assignment 3	3	A3=5
Assignment 4	4	A4=5
Assignment 5	5	A5=5
II-Mid Examination	3,4,5	B2=15
Quiz – 2	3,4,5	Q2=10
Evaluation of Assignment: 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=15
Evaluation of Quiz Marks: Q=75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	1,2,3,4,5	Q=10
Cumulative Internal Examination: A+B+Q	**1,2,3,4,5**	**CIE=30**
Semester End Examinations	**1,2,3,4,5**	**SEE=70**
Total Marks: CIE+SEE	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Pursue higher education, entrepreneurship and research to compete at global level.
PEO2: Design and develop products innovatively in the area of computer science and engineering and in Other allied fields.
PEO3: Function effectively as individuals and as members of a team in the conduct of interdisciplinary Projects and even at all the levels with ethics and necessary attitude.
PEO4: Serve ever-changing needs of the society with a pragmatic perception.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2 - 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.
PO3 - 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.

PO4 - 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.
PO5 - 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.

PO6 - 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.

PO7 - 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.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - 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.

PO11 - Project Management and Finance: Demonstrate knowledge and understanding of the ring 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.

PO12 - Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Dr. A.Nageswara Rao	Dr. A.Nageswara Rao	Mr. J. Subba Reddy	Dr. M.B.S.Sreekara Reddy
Course Instructor	Course Coordinator	Module Coordinator	HoD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
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Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Program / Sem /Sec : B.Tech, VII-Sem, IT – R20 Regulation

Academic Year : 2025-26

Course Name & Code : NLP Tool Kit (20ITS4)

L-T-P Structure : 1-0-2

Course Credits : 2

Course Instructor : **Mr. Rehana Begum**

Course Educational Objective: This course also covers basis of semantic analysis and discourse analysis and drives it to machine translation. This NLP course will boost student knowledge to research level where they can conduct new level of research. It really helpful for undergraduate students.

Course Outcomes (CO): At the end of this course, the student will be able to:

CO1:	Apply the appropriate pre-processing techniques on text. (Apply – L3)
CO2:	Implement algorithm for Semantics and Sentiment analysis using NLP. (Apply –L3)
CO3:	Explore various application of NLP (Understanding – L2)
CO4:	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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	-	-	-	-	-	-	2	2	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	2	-	3	3	-	-	-	-	-	-	-	-	2	-	-
CO4	-	2	3	-	3	-	-	2	1	-	-	-	2	-	-

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S. NO	Topic to be covered	No. of Hours	Tentative Date of Completion	Actual Date of Completion	HOD Signature
1.	Introduction about the NLP tool kit	1	30-06-2025		
2.	Installation and Downloading of NLTK on Windows/Mac.	3	01-07-2025		
3.	Tokenizers and its types	1	07-07-2025		
4.	NLTK Tokenize: Words and Sentences Tokenizer with Example	3	08-07-2025		
5.	Preprocessing steps of text	1	14-07-2025		
6.	Pre-processing of text (Tokenization, Filtration, Script Validation, Stop Word Removal, Lower case conversion, Stemming).	3	15-07-2025		
7.	Preprocessing steps of text	1	21-07-2025		
8.	Pre-processing of text (Tokenization, Filtration, Script Validation, Stop Word Removal, Lower case conversion, Stemming).	3	22-07-2025		
9.	Word analysis	1	28-07-2025		
10.	Word Analysis. Virtual Lab Experiments	3	29-07-2025		
11.	Intro about word generation	1	04-08-2025		
12.	Word Generation. Virtual Lab Experiments	3	05-08-2025		
13.	Introduction to generation of trees	1	11-08-2025		
14.	Parse tree or Syntax Tree generation	3	12-08-2025		
15.	Introduction of N-gram model	1	18-08-2025		
16.	N-gram model, Virtual Lab Experiments	3	19-08-2025		
17.	Introduction of POS tagging	1	06-10-2025		
18.	POS tagging. Virtual Lab Experiments	3	07-10-2025		
19.	Introduction of Chunking	1	13-10-2025		
20.	Chunking. Virtual Lab Experiments	3	14-10-2025		
21.	Introduction of Named Entity Recognition.	1	27-10-2025		
22.	Named Entity Recognition. Virtual Lab Experiments	3	28-10-2025		
23.	Introduction of Implement text processing with neural network,	1	03-10-2025		
24.	Implement text processing with neural network, Virtual Lab	6	04-10-2025 11-11-2025		
25.	Introduction of Implement text processing with LSTM.	1	17-11-2025		
26.	Implement text processing with LSTM. Virtual Lab Experiments	3	18-11-2025		
27.	Revision	1	24-11-2025		
28.	**Lab Internal Test**	3	25-11-2025		

S. No	Topic to be covered	No. of Hours	Tentative Date of Completion	Actual Date of Completion	HOD Signature
1	Write a python program to find all unigrams, bigrams and trigrams present in the given corpus.	3	12-08-2025		
2	Write the python code to develop Spam Filter using NLP	3	28-10-2025		

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries (Viva-voce)	10
Total Marks	50

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	Pursue a successful career in the area of Information Technology or its allied fields.
PEO 2	Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.
PEO 3	Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.
PEO 4	Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication and team work and leadership skills in their job.

PROGRAMME OUTCOMES (POs):

PO1	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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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mrs. Rehana Begum**	**Mrs. B. Swathi**	**Mrs.M.Hemalatha**	**Dr. D. Ratna Kishore**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Program / Sem /Sec : B. Tech /VII / B

Academic Year : 2025-26

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L-T-P Structure : 1-0-2

Course Credits : 2

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CO2	3	2	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	2	-	3	3	-	-	-	-	-	-	-	-	2	-	-
CO4	-	2	3	-	3	-	-	2	1	-	-	-	2	-	-

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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27.	Revision	1	17-11-2025		
28.	**Lab Internal Test**	3	20-11-2025		

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries (Viva-voce)	10
Total Marks	50

PART-D

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PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. V. V. Krishna Reddy**	**Mr. V. V. Krishna Reddy**	**Mrs. M. Hemalatha**	**Dr. D. Ratna Kishore**
Signature				