



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P. SUNIL KUMAR

Course Name & Code : Machine Learning(20AD04)

L-T-P Structure : 3-0-0

Program/Sem/Sec : B.Tech V Sem AI & DS

Credits: 3

A.Y.: 2022-23

PREREQUISITE: Probability and Statistics

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to provide the basic concepts and techniques of Machine Learning and help to use recent machine learning approaches for solving practical problems. It enables students to gain experience to do independent study and research.

CO1	Identify the characteristics of machine learning.(Understand- L2)
CO2	Understand the Model building and evaluation approaches.(Understand- L2)
CO3	Apply regression algorithms for real-world Problems.(Apply- L3)
CO4	Handle classification problems via supervised learning algorithms.(Apply- L3)
CO5	Learn advanced learning techniques to deal with complex data.(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	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	3
CO3	3	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO4	-	2	1	-	-	-	-	-	-	-	-	-	-	-	3
CO5	2	3	1	-	-	-	-	-	-	-	-	-	-	-	3
	1 - Low			2 -Medium						3 - High					

TEXTBOOKS:

T1 Subramanian Chandramouli, Saikat Dutt, Amit Kumar Das, "Machine Learning", Pearson Education India ,1st edition,2015

T2 Tom M. Mitchell, "Machine Learning", MGH, 1997

REFERENCE BOOKS:

R1 Shai Shalev-Shwartz, ShaiBen David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge.

R2 Peter Harington, "Machine Learning in Action", Cengage, 1st edition, 2012.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction To Machine 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.	Introduction to Machine Learning - Introduction	1	18/07/2022	18/07/2022	1 & 2	
2.	Types of Machine Learning	1	21/07/2022	21/07/2022	1 & 2	
3.	Applications of Machine Learning	1	25/07/2022	25/07/2022	1 & 2	
4.	Issues in Machine Learning	1	26/07/2022	26/07/2022	1 & 2	
5.	Preparing to Model- Introduction	1	28/07/2022	28/07/2022	1 & 2	
6.	Machine Learning Activities	1	29/07/2022	29/07/2022	1 & 2	
7.	Basic Types of Data in Machine Learning	1	01/08/2022	01/08/2022	1 & 2	
8.	Exploring Structure of Data,	1	02/08/2022	02/08/2022	1 & 2	
9.	Data Quality and Remediation	1	04/08/2022	04/08/2022	1 & 2	
10.	Data Pre-Processing	1	05/08/2022	05/08/2022	1 & 2	
No. of classes required to complete UNIT-I: 10				No. of classes taken:10		

UNIT-II: Modeling & Evaluation, Basics of Feature Engineering

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Modeling & Evaluation- Introduction,	1	08/08/2022	08/08/2022	1 & 2	
12.	Selecting a Model	1	10/08/2022	10/08/2022	1 & 2	
13.	Training a Model (for Supervised Learning)	1	18/08/2022	18/08/2022	1 & 2	
14.	Model Representation and Interpretability	1	20/08/2022	20/08/2022	1 & 2	
15.	Evaluating Performance of a Model.	1	22/08/2022	22/08/2022	1 & 2	
16.	Basics of Feature Engineering- Introduction	1	27/08/2022	27/08/2022	1 & 2	
17.	Feature Transformation – Feature Construction	1	01/09/2022	01/09/2022	1 & 2	
18.	Feature Extraction, Principal Component Analysis (PCA)	1	08/09/2022	08/09/2022	1 & 2	
19.	Singular Value Decomposition (SVD),	1	18/09/2022	18/09/2022	1 & 2	
20.	Linear Discriminate Analysis (LDA), Feature Subset Selection	1	19/09/2022	19/09/2022	1 & 2	
No. of classes required to complete UNIT-II: 10				No. of classes taken:10		

UNIT-III: Regression

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.	Improving Accuracy of the linear regression model	1			1 & 2	
22.	Improving Accuracy of the linear regression model	1			1 & 2	
23.	Improving Accuracy of the linear regression model	1			1 & 2	
24.	Improving Accuracy of the linear regression model,	1			1 & 2	
25.	Polynomial Regression Model	1			1 & 2	
26.	Logistic Regression, Regularization,	1			1 & 2	

27.	Regularized Linear Regression, Regularized Logistic Regression	1			1 & 2	
No. of classes required to complete UNIT-III: 07				No. of classes taken:		

UNIT-IV: Supervised Learning: Classification

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.	Supervised Learning: Classification- Introduction	1			1 & 2	
29.	Example of Supervised Learning	1			1 & 2	
30.	Example of Supervised Learning	1			1 & 2	
31.	Classification Model	1			1 & 2	
32.	Classification Model	1			1 & 2	
33.	Classification Learning Steps.	1			1 & 2	
34.	Classification Learning Steps.	1			1 & 2	
35.	Common Classification Algorithms	1			1 & 2	
36.	Common Classification Algorithms	1			1 & 2	
37.	k-Nearest Neighbor (kNN),	1			1 & 2	
38.	Support vector Machines (SVM),	1			1 & 2	
39.	Random Forest model	1			1 & 2	
No. of classes required to complete UNIT-IV: 12				No. of classes taken:		

UNIT-V: Other Types of 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
40.	Other Types of Learning	1	21-01-22		1 & 2	
41.	Ensemble Learning	1	22-01-22		1 & 2	
42.	Bagging, Boosting	1	25-01-22		1 & 2	
43.	Stacking and its impact on bias and variance	1	28-01-22		1 & 2	
44.	AdaBoost	1	29-01-22		1 & 2	
45.	Gradient Boosting Machines	1	01-02-22		1 & 2	
46.	XGBoost	1	02-02-22		1 & 2	
47.	Reinforcement Learning	1	04-02-22		1 & 2	
48.	Introduction, Q Learning	1	05-02-22		1 & 2	
No. of classes required to complete UNIT-V: 09				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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 modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	P. SUNIL KUMAR	P. SUNIL KUMAR	P. SUNIL KUMAR	O. RAMA DEVI
Signature				



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P.SUNIL KUMAR

Course Name & Code : Machine Learning Lab (20AD54)

L-T-P Structure : 0-0-3

Program/Sem/Sec : B.Tech V Sem AI & DS

Credits: 1.5

A.Y.: 2022-23

PRE-REQUISITE: Probability and Statistics, Python Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to Make use of Data sets in implementing the machine learning algorithms in any suitable language of choice.

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

CO 1	Apply the appropriate pre-processing techniques on data set. (Apply – L3)
CO 2	Implement supervised Machine Learning algorithms. (Apply – L3)
CO 3	Implement advanced Machine Learning algorithms (Apply – L3)
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	Basic statistical functions for data exploration	3	20.07.22		TLM4	

2	Data Visualization: Box plot, scatter plot, histogram	3	27.07.22	TLM4
3	Data Pre-processing: Handling missing values, outliers, normalization, Scaling	3	03.08.22	TLM4
4	Principal Component Analysis (PCA)	3	10.08.22	TLM4
5	Singular Value Decomposition (SVD)	3	17.08.22	TLM4
6	Linear Discriminant Analysis (LDA)	3	07.09.22	TLM4
7	Regression Analysis: Linear regression, Logistic regression, Polynomial regression	3	14.09.22	TLM4
8	Regularized Regression	3	21.09.22	TLM4
9	K-Nearest Neighbour (kNN) Classifier	3	04.10.22	TLM4
10	Support Vector Machines (SVMs)	3	11.10.22	TLM4
11	Random Forest model	3	02.11.22	TLM4
12	AdaBoost Classifier and XGBoost	3	15.11.22	TLM4
13	Internal Exam	3	22.11.22	TLM4

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

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and

	research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: 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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	P. SUNIL KUMAR	P. SUNIL KUMAR	P. SUNIL KUMAR	O.RamaDevi
Signature				



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. T.S.RAJARAJESWARI

Course Name & Code : Computer Networks Lab (20CS60)

L-T-P Structure : 0-0-3

Program/Sem/Sec : B.Tech V Sem AI & DS

Credits: 1.5

A.Y.: 2022-23

PRE-REQUISITE : Data Structures, and Operating Systems

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of the course is to prepare students to write programs to illustrate communication in networks, configure different networks (LAN,WAN) and prepare students to differentiate various protocols and their performance.

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

CO 1	Implement Network layer functionalities using NS3 simulator.(Apply-L3)
CO 2	Demonstrate Transport Layer functionalities.(Understand-L2)
CO 3	Analyze Application layer protocols using Wire shark.(Analyze-L4)
CO 4	Improve individual / team work 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	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
CO2	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
CO3	1	2	3	3	-	-	-	-	-	-	-	1	-	-	-
CO4	-	-	-	-	-	-	-	1	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).

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	To gain familiarity with the basic network commands & utilities available	3	22.07.22		TLM4	

	in the Linux OS.				
2	To learn about network layer tools and analyze captures for congestion.	3	29.07.22		TLM4
3	To learn about queue management techniques, and global routing inns3.	3	05.08.22		TLM4
4	To learn about broadcasting, multicasting, and bridging in a Local Area Network using ns3.	3	12.08.22		TLM4
5	To learn about Wifi and Mobile Adhoc topologies with ns3.	3	26.08.22		TLM4
6	To introduce Socket Programming in TCP and UDP.	3	02.09.22		TLM4
7	Observations of Transmission Control Protocol(TCP) Connection states, Flags and Flow control.	3	09.09.22		TLM4
8	To learn Transmission Control Protocol(TCP) Flow Control, ErrorControl, and Congestion.	3	07.10.22		TLM4
9	To introduce Wire shark & tcp dump, and observation of packets in a LAN network.	3	21.10.22		TLM4
10	To analyze HTTP packets using Wire shark tool, and understand the records returned by a DNS server.	3	04.11.22		TLM4
11	Internal Exam	3	18.11.22		TLM4

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

PROGRAMME OUTCOMES (POs):

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

	with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and teamwork: 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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	T.S.RajaRajeswari	T.S.RajaRajeswari	T.S.RajaRajeswari	O.RamaDevi
Signature				



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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. T.S.RAJARAJESWARI

Course Name & Code : Computer Networks (20CS12)

L-T-P Structure : 3-0-0

Program/Sem/Sec : B.Tech V Sem AI & DS

Credits: 3

A.Y.: 2022-23

PREREQUISITE: Data Structures and Operating Systems

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of the course is to provide a foundation to understand computer networks using layered architectures. It also helps students to understand the various network models, addressing concept, routing protocols and design aspects of computer networks.

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

CO1	Demonstrate the modern network architectures from a design perspective (Understand-L2)
CO2	Apply various Data Link layer design issues and error detection & correction techniques to solve collisions problems.(Apply-L3)
CO3	Demonstrate the network Layer functionalities (Understand-L2)
CO4	Outline the functions of transport layer protocols (Understand-L2)
CO5	Examine different application layer protocols (Understand-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	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
	1 - Low			2 -Medium						3 - High					

TEXTBOOKS:

T1 BehrouzA. Forouzan, , “Data Communication andNetworking”,McGraw-Hill,4thEdition,2011.

T2 AndrewS.Tanenbaum, “Computer Networks”, Pearson New InternationalEdition,8thEdition,2013.

REFERENCE BOOKS:

R1 WilliamStallings,“DataandComputerCommunication”,PearsonPrenticeHallIndia,8th Edition.

R2 Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1,6thEdition,2009. Richard Stevens, “TCP/IP Illustrated”, Addison-Wesley

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Data Communication Components

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	CEOs and COs discussion, Computer Networks Syllabus Discussion	1	18-07-2022		1 & 2	
2.	Data Communication components :Representation of data	1	19-07-2022		1 & 2	
3.	Data Flow	1	21-07-2022		1 & 2	
4.	Network	1	22-07-2022		1 & 2	
5.	Connection in topology	1	22-07-2022		1 & 2	
6.	Protocols and standards	1	26-07-2022		1 & 2	
7.	OSI Model	1	28-07-2022		1 & 2	
8.	Transmission Media	1	29-07-2022		1 & 2	
9.	LAN :Wired LAN, Wireless LANs	1	01-08-2022		1 & 2	
10.	Connecting LAN and Virtual LAN	1	02-08-2022		1 & 2	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Data Link Layer and Medium Access Sub Layer

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Error Detection and Error Correction - Fundamentals,	1	04-08-2022		1 & 2	
12.	Block coding, Hamming Distance,	1	05-08-2022		1 & 2	
13.	CRC	1	08-08-2022		1 & 2	
14.	Flow Control and Error control protocols - Stop and Wait	1	11-08-2022		1 & 2	
15.	Go back - N ARQ	1	12-08-2022		1 & 2	
16.	Selective Repeat ARQ,	1	16-08-2022		1 & 2	
17.	Sliding Window, Piggybacking	1	18-08-2022		1 & 2	
18.	Random Access, Multiple access protocols -Pure ALOHA	1	22-08-2022		1 & 2	
19.	Slotted ALOHA,	1	23-08-2022		1 & 2	
20.	CSMA/CD,CDMA/CA	1	25-08-2022		1 & 2	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: Network Layer

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.	Switching	1	26-08-2022		1 & 2	
22.	Logical addressing - IPV4	2	29,30-08-2022		1 & 2	
23.	IPV6	1	01-09-2022		1 & 2	
24.	Address mapping -ARP,RARP	1	02-09-2022		1 & 2	
25.	BOOTP	1	05-09-2022		1 & 2	
26.	DHCP-Delivery	1	06-09-2022		1 & 2	
27.	Forwarding protocols	1	08-09-2022		1 & 2	
28.	and Unicast Routing protocols	1	09-09-2022			
No. of classes required to complete UNIT-III: 09				No. of classes taken:		

UNIT-IV: Transport Layer

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Process to Process Communication	1	06-10-22		1 & 2	
30.	User Datagram Protocol(UDP),	1	07-10-22		1 & 2	
31.	Transmission Control Protocol (TCP)	2	10-10-22 11-10-22		1 & 2	
32.	SCTP	1	13-10-22		1 & 2	
33.	Congestion Control	2	14-10-22 17-10-22		1 & 2	
34.	Quality of Service	1	18-10-22		1 & 2	
35.	QoS improving techniques: Leaky Bucket	1	20-10-22		1 & 2	
36.	Token Bucket algorithm	1	21-10-22		1 & 2	
No. of classes required to complete UNIT-IV: 10				No. of classes taken:		

UNIT-V: Application layer

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Domain Name Space(DNS)	2	25-10-22 27-10-22		1 & 2	
38.	DDNS	1	28-10-22		1 & 2	
39.	TELNET	1	31-10-22		1 & 2	
40.	EMAIL,	1	01-11-22		1 & 2	
41.	File Transfer Protocol (FTP)	1	03-11-22		1 & 2	
42.	WWW ,HTTP	1	04-11-22		1 & 2	
43.	SNMP	1	07-11-22		1 & 2	
44.	Bluetooth,	1	10-11-22		1 & 2	
45.	Firewalls	2	11-11-22 14-11-22		1 & 2	
No. of classes required to complete UNIT-V: 12				No. of classes taken:		

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

PART-C**EVALUATION PROCESS (R20 Regulation):**

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 modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty				

Signature				
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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor:

Course Name & Code : AUTOMATA AND COMPILER DESIGN & 20AD05

L-T-P Structure : 3-0-0

Credits: 3

Program/Sem/Sec : B.Tech V Sem AI & DS

A.Y.: 2022-23

PREREQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): To introduce students to the mathematical foundations of computation like automata theory, the theory of formal languages and grammars, the notion of algorithm, decidability, complexity, and computability. Understand the theory and practice of compiler implementation.

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

CO1	Design Finite Automata and Regular expression for regular languages. (Understand- L2)
CO2	Design Context free grammar and push down automata for CFL. (Apply - L3)
CO3	Design and implement lexical analyzer and syntax analyzer. (Apply - L3)
CO4	Create framework for syntax directed translation schemes and understand the runtime organization of the program. (Understand- L2)
CO5	Analyze various code optimization techniques and code generation algorithms. (Understand- 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	3	2	3										1		
CO2	3	2	3									1	1		
CO3	2	1	3									1	1		
CO4	2	1	2									1	1		
CO5	2	3	1									1	1		
	1 - Low			2 -Medium						3 - High					

BOS APPROVED TEXT BOOKS:

T1 John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.

Alfred V.Aho,Jeffery Ullman,Ravi sethi,"Compiler Principles, Techniques and Tools",Pearson Education,2nd Edition,2008.

BOS APPROVED REFERENCE BOOKS:

- 1.Sipser —Introduction to Theory of Computation, Thomson,2nd Edition
- 2.Mishra and Chandrashekar, Theory of Computer Science –Automata languages and computation —2nd edition, PHI
- 3.ParagH.Dave, HimanshuB.Dave —Compilers Principles and Practicel , Person Education, First Edition, 2012.
- 4.Andrew W.appel —Modern compiler implementation in C Cambridge, Revised Edition, 2010.
- 5.<http://nptel.ac.in/courses/111103016/> (Video lectures for Automata theory and formal languages)
- 6.<http://nptel.ac.in/courses/106108052/> (Video lectures for Compiler design)

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: Introduction to Automata and formal language theory & Regular Expressions**

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.	Basic Mathematical notations and techniques	1	19-07-22	19-07-22	1 & 2	
2.	Classification of Automata, definitions and its applications.	1	20-07-22	20-07-22	1 & 2	
3.	Deterministic Finite state Automaton (DFA)	1	20-07-22	20-07-22	1 & 2	
4.	Nondeterministic Finite state Automaton (NFA), Equivalence of NFA and DFA	1	22-07-22	22-07-22	1 & 2	
5.	Minimization of DFA, examples.	1	26-07-22	26-07-22	1 & 2	
6.	Equivalence of Regular expressions and Finite Automata	1	27-07-22	27-07-22	1 & 2	
7.	Pumping lemma	1	27-07-22	27-07-22	1 & 2	
8.	Closure properties.	1	29-07-22	29-07-22	1 & 2	

9.	TUTORIAL – 1	1	02-08-22	02-08-22	1 & 2	
10.	Assignment / Quiz – 1	1	03-08-22	03-08-22	1 & 2	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: Introduction to Grammar, Pushdown Automata

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Context free Grammar (CFG)	1	03-08-22	03-08-22	1 & 2	
12.	Derivation, parse tree, ambiguity	1	05-08-22	05-08-22	1 & 2	
13.	Simplification of CFG,	1	09-08-22	10-08-22	1 & 2	
14.	Chomsky Normal Form (CNF) and Greibach Normal Form (GNF)	1	10-08-22	10-08-22	1 & 2	
15.	Push Down Automata-Definition	1	10-08-22	12-08-22	1 & 2	
16.	Equivalence of Context Free Languages.	1	12-08-22	16-08-22	1 & 2	
17.	Deterministic Pushdown Automaton.	1	16-08-22	17-08-22	1 & 2	
18.	Pumping lemma of Context Free languages.	1	17-08-22	17-08-22	1 & 2	
19.	Properties of Context Free languages.	1	19-08-22	23-08-22	1 & 2	
20.	TUTORIAL – 2	1	23-08-22	24-08-22	1 & 2	
21.	Assignment / Quiz – 2	1	24-08-22	24-08-22	1 & 2	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Introduction to compiler, Lexical Analysis, Syntax 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
22.	Basic Language processing system, phases of a compiler	1	26-08-22	26-08-22	1 & 2	
23.	Bootstrapping.	1	30-08-22	30-08-22	1 & 2	
24.	The role of a Lexical analyser, input buffering	1	02-09-22	02-09-22	1 & 2	
25.	Specification and Recognition of tokens	1	06-09-22	06-09-22	1 & 2	
26.	LEX tool	1	07-09-22	07-09-22	1 & 2	
27.	The role of a Parser top down	1	07-09-22	07-09-22	1 & 2	

	parsing-recursive descent and predictive parsing					
28.	Bottom -up parsing-Handle pruning, shift-reduce parsing	1	13-09-22	13-09-22	1 & 2	
29.	LR parsers-SLR, CLR and LALR, YACC tool.	1	14-09-22	14-09-22	1 & 2	
30.	TUTORIAL – 3	1	16-09-22	16-09-22	1 & 2	
31.	Assignment / Quiz – 3	1	20-09-22	21-09-22	1 & 2	
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

UNIT-IV: Syntax-Directed translation (SDT), Intermediate Code Representations, Run-time Environment

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Attribute grammar, Syntax-Directed Definitions (SDD), and Translation schemes	1	21-09-22		1 & 2	
33.	Applications of SDT's.	1	23-09-22		1 & 2	
34.	Syntax tree, three-address code and static single-Assignment.	1	27-09-22		1 & 2	
35.	Translation of expressions and statements.	1	28-09-22		1 & 2	
36.	Storage organization	1	30-09-22		1 & 2	
37.	Storage allocation strategies	1	04-10-22		1 & 2	
38.	Access to non-local data	1	05-10-22		1 & 2	
39.	Parameter passing techniques.	1	07-10-22		1 & 2	
40.	TUTORIAL – 4	1	11-10-22		1 & 2	
41.	Assignment / Quiz – 4	1	14-10-22		1 & 2	
No. of classes required to complete UNIT-IV: 12				No. of classes taken:		

UNIT-V: Basics of Code optimization, Code generation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Basic blocks and flow graphs.	1	19-10-22		1 & 2	
43.	The principal sources of optimization	1	25-10-22		1 & 2	
44.	Optimization of Basic blocks	1	26-10-22		1 & 2	

45.	Loops in flow graph	1	28-10-22		1 & 2
46.	Issues in the design of a code generator	1	01-11-22		1 & 2
47.	Generic code generation algorithm	1	04-11-22		1 & 2
48.	Register allocation and assignment	1	08-11-22		1 & 2
49.	DAG representation of basic blocks	1	11-11-22		1 & 2
50.	DAG representation of basic blocks	1	15-11-22		1 & 2
51.	Peep hole optimization Generating code from DAG.	1	16-11-22		1 & 2
52.	Peep hole optimization Generating code from DAG.	1	22-11-22		1 & 2
53.	TUTORIAL – 5	1	23-11-22		1 & 2
54.	Assignment / Quiz – 5	1	25-11-22		1 & 2
No. of classes required to complete UNIT-V: 12				No. of classes taken:	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

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 modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
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	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for Employment and Higher studies in Artificial Intelligence and Data science with ethical values.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty				
Signature				



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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: K Lakshmi Prasad

Course Name & Code : Renewable Energy Sources & 20ME81

L-T-P Structure : 3-0-0

Credits: 3

Program/Sem/Sec : B.Tech., AI & DS., V-Sem., Sections-A

A.Y.: 2022-23

PREREQUISITE: 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): At the end of the course, 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	-	-
			1 - Low			2 -Medium			3 - High						

TEXTBOOKS:

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.

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):

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	HOD Sign Weekly
1.	Course Outcomes & Blooms Taxonomy Levels	2	19.07.22 20.07.22		TLM1/ TLM2	
2.	Over view of conventional & renewable energy sources	2	21.07.22 23.07.22		TLM1/ TLM2	
3.	Need & Development of renewable energy sources	2	26.07.22 27.07.22		TLM1/ TLM2	
4.	Types of renewable energy systems.	2	28.07.22 30.07.22		TLM1/ TLM2	
5.	Energy available from Sun, Solar radiation data,	1	02.08.22		TLM1/ TLM2	
6.	Flat plate and Concentrating collectors	1	03.08.22		TLM1/ TLM2	
7.	Mathematical analysis of Flat plate collectors and collector efficiency	2	04.08.22 06.08.22		TLM1/ TLM2	
8.	Solar water Heating, Space Heating – Active and Passive heating	1	10.08.22		TLM1/ TLM2	
9.	solar stills and ponds	1	11.08.22		TLM1/ TLM2	
10.	basic principle of power generation in photovoltaic cell	1	13.08.22		TLM1/ TLM2	
11.	Problems	1	16.08.22		TLM1/ TLM2	
12.	Quiz/Assignment					
No. of classes required to complete UNIT-I: 14				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	HOD Sign Weekly
13.	Wind – characteristics – wind energy conversion systems – types	2	17.08.22 18.08.22		TLM1/ TLM2	
14.	Betz model & Interference factor, Power Coefficient Torque Coefficient and thrust coefficient	3	20.08.22 23.08.22 24.08.22		TLM1/ TLM2	
15.	site selection requirements.	1	25.08.22		TLM1/ TLM2	
16.	GEOTHERMAL ENERGY: Structure of Earth, Geothermal sources	1	27.08.22		TLM1/ TLM2	
17.	Hot springs, Hot Rocks& Hot Aquifers	1	30.08.22		TLM1/ TLM2	
18.	Interconnection of geothermal fossil systems	1	01.09.22		TLM1/ TLM2	

19.	Problems	1	03.09.22		TLM1/ TLM2	
20.	Quiz/Assignment					
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	HOD Sign Weekly
21.	Tidal Energy- Introduction, Origin of Tides, Tidal Power generation	2	06.09.22 07.09.22		TLM1/ TLM2	
22.	Classification of Tidal Power Plant,	1	08.09.22		TLM1/ TLM2	
23.	Site requirements	1	10.09.22		TLM1/ TLM2	
24.	WAVE ENERGY: Introduction, Wave energy and Power	2	04.10.22 06.10.22		TLM1/ TLM2	
25.	Wave Energy devices – Merits and Demerits	2	08.10.22 11.10.22		TLM1/ TLM2	
26.	OCEAN THERMAL ENERGY: Introduction	1	12.10.22		TLM1/ TLM2	
27.	Working principle of Ocean Thermal Energy Conversion	1	13.10.22		TLM1/ TLM2	
28.	OTEC Systems, Advantages and Disadvantages of OTEC plants.	2	15.10.22 18.10.22		TLM1/ TLM2	
29.	Quiz/Assignment					
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: IOT PHYSICAL DEVICES & ENDPOINTS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	BIO – ENERGY: Introduction	1	19.10.22		TLM1/ TLM2	
31.	Biomass Energy Sources	1	20.10.22		TLM1/ TLM2	
32.	Aerobic and Anaerobic bio-conversion processes	1	22.10.22		TLM1/ TLM2	
33.	Types of Biogas plants	2	25.10.22 26.10.22		TLM1/ TLM2	
34.	Raw Materials and properties of Bio-gas	1	27.10.22		TLM1/ TLM2	
35.	Bio-gas plant Technology and Status	1	29.10.22		TLM1/ TLM2	
36.	Biomass gasification	1	01.11.22		TLM1/ TLM2	
37.	Types and application of gasifier	2	02.11.22 03.11.22		TLM1/ TLM2	
38.	Quiz/Assignment					
No. of classes required to complete UNIT-IV: 10				No. of classes taken:		

UNIT-V: IOT PHYSICAL SERVERS AND CLOUD OFFERINGS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	DIRECT ENERGY CONVERSION SYSTEMS: Introduction	1	05.11.22		TLM1/ TLM2	
40.	Peltier effect, seebeck effect, Thomson effect,	1	08.11.22		TLM1/ TLM2	
41.	Fuel Cells-Types.	1	09.11.22		TLM1/ TLM2	
42.	Efficiency of Fuel Cells.	1	10.11.22		TLM1/ TLM2	
43.	Thermoelectric power Generation	2	15.11.22 16.11.22		TLM1/ TLM2	
44.	Thermionic electro power Generation	1	17.11.22		TLM1/ TLM2	
45.	MHD Generator	1	19.11.22		TLM1/ TLM2	
46.	Open and closed systems	2	22.11.22 23.11.22		TLM1/ TLM2	
47.	applications of direct energy conversion systems	1	24.11.22		TLM1/ TLM2	
48.	Quiz/Assignment					
No. of classes required to complete UNIT-V: 11				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

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	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 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.
PSO 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. K Lakshmi Prasad	Mr. K. Lakshmi Prasad	Dr. P. Vijay Kumar	Dr. S. Pichi Reddy
Signature				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. AMANATULLA MOHAMMAD

Course Name & Code : Mean Stack Technologies - 20CSS3

L-T-P Structure : 1-0-3

Credits: 2

Program/Sem/Sec : B.Tech. - AI&DS/V/A

A.Y.: 2022-23

PREREQUISITE: Full Stack Development

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

CO1	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles (Apply-L3)
CO2	Build a basic web server using Node.js , Express.js and also working with Node Package Manager (NPM) (Apply-L3)
CO3	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking. (Apply-L3)
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	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
CO2	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
CO3	1	-	2	-	2	-	-	-	-	-	-	2	-	3	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
			1 - Low			2 -Medium			3 - High						

Text Books & REFERENCE BOOKS:

T1	Programming the World Wide Web, 7th Edition, Robert W Sebesta, Pearson
T2	Pro Mean Stack Development, 1st Edition, ELadElrom, Apress O'Reilly.
T3	Budi Kurniawan, "Struts 2 Design and Programming: A Tutorial", BrainySoftware, 2nd Edition, 2008.
R1	Web Technologies, HTML, JavaScript, PHP, Java, JSP, XML and AJAX, Black book, 1st Edition, Dream Tech.
R2	An Introduction to Web Design, Programming, 1st Edition, Paul S Wang, Sanda S Katila, Cengage Learning.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

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.	Cycle-1(HTML)	4	18-07-22		DM5/ DM6	
2.	Cycle -2(HTML)	4	25-07-22		DM5/ DM6	
3.	Cycle-3(JS)	4	01-08-22		DM5/ DM6	
4.	Cycle-4(JS)	4	08-08-22		DM5/ DM6	
5.	Cycle-5(JS)	4	22-08-22		DM5/ DM6	
6.	Cycle-6(Node.JS)	4	29-08-22		DM5/ DM6	
7.	Cycle-7(Express.js)	4	05-09-22		DM5/ DM6	
8.	Cycle-8(Express.js)	4	10-10-22		DM5/ DM6	
9.	Cycle-9 (Typescript)	4	17-10-22		DM5/ DM6	
10.	Cycle-10 (Typescript)	4	31-10-22		DM5/ DM6	
11.	Cycle-11 (Typescript)	4	07-11-22		DM5/ DM6	
12.	Cycle-12 (Typescript)	4	14-11-22		DM5/ DM6	
13.	Assessment	4	21-11-22		DM5/ DM6	

Teaching Learning Methods			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	(Mr.MD.Amanatulla)			(Dr. O.Rama Devi)
Signature				