



**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)**

Accredited by NAAC&NBA(Under Tier-I), ISO9001:2015 Certified Institution  
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada  
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.  
http://lbrc.ac.in, Phone: 08659-222933, Fax: 08659-222931

**DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**



DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

**COURSE HANDOUT**

**PART-A**

**PROGRAM** :II B. Tech., I-Sem., AI & DS  
**ACADEMIC YEAR** : 2021-22  
**COURSE NAME & CODE** : PROBABILITY AND STATISTICS  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : M. Rami Reddy  
**COURSE COORDINATOR** : M. Rami Reddy  
**PRE-REQUISITES** : None

**COURSE EDUCATIONAL OBJECTIVES (CEO):** The objective of this course is to provide students with the foundations and applications of probabilistic and statistical methods mainly used in varied applications in engineering and science.

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

<b>CO1</b>	Understand various probabilistic situations using the laws of probability and Random variables.	<b>Understand - L2</b>
<b>CO2</b>	Apply probability distributions like Binomial, Poisson, Normal and Exponential distributions in solving engineering problems.	<b>Apply - L3</b>
<b>CO3</b>	Calculate the standard error of sampling distribution and confidence intervals for parameters like mean and proportion based on sample data.	<b>Apply - L3</b>
<b>CO4</b>	Analyze the data scientifically with the appropriate statistical methodologies to apply the suitable test of hypothesis.	<b>Analyze - L4</b>
<b>CO5</b>	Construct the regression lines to predict the dependent variables and calculate the Correlation Coefficient for a bivariate statistical data.	<b>Apply - L3</b>

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

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

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

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

**BOS APPROVED TEXT BOOKS:**

- T1 Jay L.Devore “Probability and Statistics for engineering and the sciences.” , 8th edition, Cengage Learning india, 2012
- T2 S.C.Gupta, V.K.Kapoor, “Fundamentals of Mathematical Statistics”, 11thEdition, Sultan Chand and sons, New Delhi,2014.

**BOS APPROVED REFERENCE BOOKS:**

- R1 Miller & Freund’s “Probability and Statistics for Engineers”,8th edition. PHI, New Delhi,2011.
- R2 B.V. Ramana, “Higher Engineering Mathematics”, 1st Edition, TMH, New Delhi, 2010.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: Probability and Random Variables

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 class, course outcomes	1	25-10-21		TLM1	
2.	Basic concepts of probability	1	27-10-21		TLM1	
3.	problems on basic probability	1	28-10-21		TLM1	
4.	problems on addition theorem	1	30-10-21		TLM1	
5.	Conditional probability	1	01-11-21		TLM1	
6.	Multiplication theorem, examples	1	03-11-21		TLM1&2	
7.	Independent events, theorems	1	05-11-21		TLM1	
8.	Problems	1	06-11-21		TLM1	
9.	Baye's theorem, Examples	1	08-10-21		TLM1&2	
10.	Problems on Baye's theorem	1	10-11-21		TLM1	
11.	Random variables, Expectations	1	11-11-21		TLM1	
12.	Problems on PMF	1	13-11-21		TLM1	
13.	Problems on PDF	1	15-11-21		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

#### UNIT-II: Probability Distributions

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.	Binomial Distribution- mean & variance	1	17-11-21		TLM1&2	
2.	Problems on Binomial distribution	1	18-11-21		TLM1	
3.	Fitting of binomial distribution	1	20-11-21		TLM1	
4.	Poisson distribution, mean and variance	1	22-11-21		TLM1&2	
5.	Problems on Poisson distribution	1	24-11-21		TLM1	
6.	Fitting of Poisson distribution	1	25-11-21		TLM1	
7.	Normal distribution: mean & variance	1	27-11-21		TLM1&2	
8.	Problems on Normal Distribution	1	29-11-21		TLM1	
9.	Problems on Normal Distribution	1	01-12-21		TLM1	
10.	Exponential distribution:	1	02-12-21		TLM1	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

#### UNIT-III: Sampling distribution and Estimation

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.	Sampling distribution ,definitions	1	04-12-21		TLM1&2	
2.	Sampling distribution of mean	1	06-12-21		TLM1	
3.	Sampling distribution of variance	1	08-12-21		TLM1	
4.	Central limit theorem, Examples	1	09-12-21		TLM1&2	
5.	Problems on central limit theorem	1	11-12-21		TLM1	
6.	Point and interval estimation	1	20-12-21		TLM1&2	
7.	Confidence Interval of mean	1	22-12-21		TLM1	
8.	Confidence Interval of proportion	1	23-12-21		TLM1	
9.	Confidence Interval of mean ( $n < 30$ )	1	27-12-21		TLM1	
10.	problems	1	29-12-21		TLM1	
No. of classes required to complete UNIT-III: 10				No. of classes taken:		

#### UNIT-IV: Tests of Hypothesis

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.	Testing of Hypothesis , definitions	1	30-12-21		TLM1&2	
2.	Z-test for single mean	1	03-01-22		TLM1	

3.	Z-test for difference of means	1	05-01-22		TLM 1
4.	Z-test for single Proportion	1	06-01-22		TLM 1
5.	Z-test for difference of Proportions	1	08-01-22		TLM 1
6.	t-test for single mean	1	10-01-22		TLM 1
7.	t-test for difference of means	1	12-01-22		TLM 1
8.	Paired t-test	1	17-01-22		TLM 1
9.	F-test for variances	1	19-01-22		TLM 1
10.	$\chi^2$ -test for goodness of fit	1	20-01-22		TLM 1
11.	$\chi^2$ -test for independence of attributes	1	22-01-22		TLM 1
No. of classes required to complete UNIT-IV: 11				No. of classes taken:	

### UNIT-V :Correlation and 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
1.	Simple Bi-variate Correlation	1	24-01-22		TLM 1&2	
2.	Problems on Pearson's Correlation	1	26-01-22		TLM2	
3.	Regression lines	1	27-01-22		TLM2	
4.	Problems on Regression lines	1	29-01-22		TLM2	
5.	Properties of Regression coefficients	1	31-01-22		TLM 1&2	
6.	Problems on Regression coefficients	1	02-02-22		TLM3	
7.	Problems on rank Correlation	1	03-02-22		TLM2	
8.	Problems on repeated ranks	1	05-02-22		TLM3	
No. of classes required to complete UNIT-V: 8				No. of classes taken:		

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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

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

### Program Educational Objectives (PEOs):

<b>PEO1</b>	To develop intelligent systems with a cutting-edge combination of machine learning, analytics, and visualisation technologies.
<b>PEO2</b>	To adapt the new technologies and develop the solutions to real world problems with ethical practices thereby contributing to the society.
<b>PEO3</b>	To continue education for fulfilling their long-term goals and achieve satisfaction as successful professionals in industry, academia and research.

## Program Outcomes (POs):

<b>PO1 - Engineering Knowledge</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2 - Problem Analysis</b>	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3 - Design / Development of Solutions</b>	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.
<b>PO4 - Conduct Investigations of Complex Problems</b>	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.
<b>PO5 - Modern Tool Usage</b>	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.
<b>PO6 - The Engineer and Society</b>	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.
<b>PO7 - Environment and Sustainability</b>	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8 - Ethics</b>	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9 - Individual and Team Work</b>	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10 - Communication</b>	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.
<b>PO11 - Project Management and Finance</b>	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.
<b>PO12 - Life-long Learning</b>	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):

<b>PSO1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Course Instructor  
(M.Rami Reddy)

Course Coordinator  
(M.Rami Reddy)

Module Coordinator  
(Dr.A.Rami Reddy)

HOD  
(Dr.A.Rami Reddy)



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## DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Dr. V. Bhagya Lakshmi  
 Course Name & Code : Environmental Science & 20MC02  
 L-T-P Structure : 2-0-0 Credits: 0  
 Program/Sem/Sec : B.Tech., AI&DS., III-Sem., A.Y : 2021-22

#### **PRE-REQUISITE:**

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The purpose of this course is to provide a general background on developing an understanding of systems and cycles on the earth and how individual organisms live together in complex communities and how human activities influence our air, water and soil. It also helps in developing an understanding about our use of fossil fuels and effect on climate and sustainable management of natural resources.

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

<b>CO 1</b>	Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.
<b>CO 2</b>	Evaluate local, regional and global environmental issues related to resources and their sustainable management.
<b>CO 3</b>	Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
<b>CO 4</b>	Acknowledge and prevent the problems related to pollution of air, water and soil.
<b>CO5</b>	Identify the significance of implementing environmental laws and abatement devices for environmental management.

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

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

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

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

**TEXT BOOKS:**

- T1** Anubha Kaushik, C.P.Kaushik, “Perspectives in Environmental Studies”, New age international publishers, 5<sup>th</sup> Edition, Delhi, 2016.
- T2** Mahua Basu, S. Xavier, “Fundamentals of Environmental Studies”, Cambridge University Press, 1<sup>st</sup> Edition, Delhi, 2016.

**REFERENCE BOOKS:**

- R1** S. Deswal, A. Deswal, “A Basic course in Environmental Studies”, Educational & Technical Publishers, 2<sup>nd</sup> Edition, Delhi, 2014.
- R2** R. Rajagopalan, “*Environmental Studies (From Crisis to Cure)*”, Oxford University Press, 2<sup>nd</sup> Edition, New Delhi, 2012.
- R3** De, A.K, “Environmental Chemistry”, New Age International (P) Limited, 5<sup>th</sup> Edition, New Delhi, 2003.
- R4** Dr.K.V.S.G. Murali Krishna, “Environmental Studies”, VGS Techno Series, 1<sup>st</sup> Edition, Vijayawada, 2010.
- R5** G. Tyler Miller, Scott Spoolman, “Introduction to Environmental Studies”, Cengage Learning, 13<sup>th</sup> Edition, New Delhi, 2009.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: NATURE AND SCOPE OF ENVIRONMENTAL PROBLEMS**

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 of course and course objectives. Introduction of components of Environment	1	25-10-2021		2	
2.	Population explosion and variations among Nations.	1	29-10-2021		2	
3.	Resettlement and Rehabilitation - Issues and possible solutions	1	08-11-2021		2	
4.	Environmental Hazards	1	12-11-2021		2	
5.	Role of Information Technology in environmental management and human health.	1	15-11-2021		2	
No. of classes required to complete UNIT-I: 5				No. of classes taken:		

**UNIT-II: NATURAL RESOURCES AND CONSERVATION**

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 and classification of Natural resources, Forest Resources,	1	19-11-2021		2	
2.	Water Resources	1	22-11-2021		2	
3.	Mineral Resources	1	26-11-2021		2	
4.	Food Resources	1	29-11-2021		2	
5.	Mineral Resources	1	03-12-2021		2	
No. of classes required to complete UNIT-II: 5				No. of classes taken:		

**UNIT-III: ECOLOGY AND BIODIVERSITY**

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.	Definition, structure and functions of an ecosystem	1	06-12-2021		2	
2.	Food chains and Food webs, Ecological succession, Ecological pyramids, Bio-geo-chemical cycles, Types of ecosystems	1	10-12-2021		2	
3.	I MID EXAMINATION		13-12-2021			
4.	I MID EXAMINATION		17-12-2021			
5.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Assignment in Unit II	1	20-12-2021		2	
6.	Man and wild life conflicts. Endangered and endemic species of India	1	24-12-2021		2,3	
7.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	27-12-2021		2	

No. of classes required to complete UNIT-III: 7	No. of classes taken:
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#### UNIT-IV : ENVIRONMENTAL POLLUTION

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.	Air Pollution	1	31-12-2021		2	
2.	Causes, effects and control measures of: Water Pollution Causes, effects and control measures of: Soil Pollution,	1	03-01-2022		2	
3.	Noise Pollution		07-01-2022			
4.	Solid Waste Management		10-01-2022			
5.	Solid Waste Management	1	14-01-2022		2,3	
6.	Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	17-01-2022		2	
No. of classes required to complete UNIT-IV: 6				No. of classes taken:		

#### UNIT-V : ENVIRONMENTAL MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Sustainable Development	1	21-01-2022		2	
2.	Climate disruption- Greenhouse effect, ozone layer depletion and acid rain. Stockholm conference	1	24-01-2022		2,3	
3.	Environmental Impact Assessment (EIA),	1	28-01-2022		2	
4.	Green building,	1	31-01-2022		2,3	
5.	Environmental Law	1	04-02-2022		2,3	
No. of classes required to complete UNIT-V: 05				No. of classes taken:		

Teaching Learning Methods			
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Demonstration (Lab/Field Visit)
<b>TLM2</b>	PPT	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)
<b>TLM3</b>	Tutorial	<b>TLM6</b>	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	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> 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	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems:</b> 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	<b>Modern tool usage:</b> 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	<b>The engineer and society:</b> 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	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the

	knowledge of and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):**

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr. V. Bhagya Lakshmi</b>	<b>Dr. Shaheda Niloufer</b>	<b>Dr. Shaheda Niloufer</b>	<b>Dr. A. Rami Reddy</b>
<b>Signature</b>				



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## DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

### COURSE HANDOUT

**PROGRAM** : B.Tech., III-SEM

**ACADEMIC YEAR** : 2021-22

**COURSE NAME & CODE** : COMPUTER ARCHITECTURE– 20AD02

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

**COURSE CREDITS** : 3

**COURSE INSTRUCTOR** : Dr.O.Rama Devi

**COURSE COORDINATOR** : Dr.O.Rama Devi

**PRE-REQUISITE:** Fundamentals of computer hardware

**COURSE OBJECTIVE:.** The objective of the course is to learn about the functional blocks and data representation of computer system and understands the design principles of processor and organization and management of memory and peripheral devices.

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

- CO1:** Identify the functional blocks of a computer and Instruction set architecture of CPU. (**Understand-L2**)
- CO2:** Understand Data representation and perform computer arithmetic operations. (**Apply-L3**)
- CO3:** Illustrate the design principles of control unit and pipelining. (**Understand-L2**)
- CO4:** Analyze the memory hierarchy in a computer system. (**Analyze-L4**)
- CO5:** Discuss the working principles of peripheral devices, their interfaces, and characteristics. (**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
CO1	2		2										1	
CO2			3										2	
CO3	2		2										1	
CO4			2										1	
CO5			2										1	

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

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

**TEXT BOOKS:**

- T1** M. Morris Mano, “Computer Systems Architecture”, Pearson Education publishers. [units-1,2]
- T2** Carl Hamacher, Zvonks Vranesic, SafeaZaky, “Computer rganization”, TMHpublications. [units-3,4,5]

**REFERENCE BOOKS:**

- R1** William Stallings, “Computer Organization and Architecture”, Pearson/PHI publishers, 6<sup>th</sup> edition, 2004.
- R2** Andrew S. Tanenbaum, “Structured Computer Organization”, Pearson/PHI publishers, 4<sup>th</sup> edition, 2005.
- R3** Sivarama P. Dandamudi, “Fundamentals or Computer Organization and Design”, Springer publishers, 1<sup>st</sup> edition, 2003.

**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I : Functional blocks of a computer**

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.	Block Diagram of a Computer, Basic Functional Units of a Computer	1	25.10.2021		TLM2	
2.	CPU, memory, input-output subsystems, control unit.	1	26.10.2021		TLM2	
3.	Instruction set architecture of a CPU–registers	2	27.10.2021/ 30.10.2021		TLM2	
4.	Instruction execution cycle	1	01.11.2021		TLM2	
5.	RTL interpretation of instructions	2	02.11.2021/ 03.11.2021		TLM2	
6.	Addressing modes	1	06.11.2021		TLM2	
7.	Instruction set	1	08.11.2021		TLM2	
8.	Case study – instruction sets of some common CPUs.	1	09.11.2021		TLM2	
9.	Tutorial	1	10.11.2021		TLM3	
No. of Classes Required to complete UNIT I: 11				No. of classes taken:		

**UNIT-II: Data representation**

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.	Signed number representation	1	13.11.2021		TLM2	
11.	Computer arithmetic – integer addition	1	15.11.2021		TLM2	
12.	Subtraction	2	16.11.2021/ 17.11.2021		TLM2	
13.	Carry look- a head adder	1	21.11.2021		TLM2	
14.	Multiplication – shift-and add	1	22.11.2021		TLM2	
15.	Booth multiplier	2	23.11.2021/ 24.11.2021		TLM2	
16.	Division restoring and non-restoring techniques	1	27.11.2021		TLM2	
17.	Floating point arithmetic	2	29.11.2021/ 30.11.2021		TLM2	
No. of Classes Required to complete UNIT II :11				No. of classes taken:		

**UNIT-III: CPU control unit design**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Hardwired and micro-programmed design approaches.	2	1.12.2021/ 4.12.2021		TLM2	
19.	Pipelining:Basic concepts of pipelining.	2	6.12.2021/ 7.12.2021		TLM2	
20.	Throughput and speedup	1	8.12.2021		TLM2	
21.	pipeline hazards	2	11.12.2021/ 20.12.2021		TLM2	
22.	<b>Parallel Processors:</b> Introduction to parallel processors	2	21.12.2021/ 22.12.2021		TLM2	
23.	Concurrent access to memory	2	25.12.2021/ 27.12.2021		TLM2	

24.	Cache coherency	2	28.12.2021/ 29.12.2021		TLM2	
No. of Classes Required to complete UNIT III: 13				No. of classes taken:		

#### UNIT-IV: Memory system design

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Semiconductor memory technologies	1	01.01.2022		TLM2	
26.	Memory organization	2	03.01.2022/ 04.01.2022		TLM2	
27.	Memory interleaving	2	05.01.2022/ 08.01.2022		TLM2	
28.	Concept of hierarchical memory organization	2	10.01.2022/ 11.01.2022		TLM2	
29.	Cache memory, cache size vs. block size	1	12.01.2022		TLM2	
30.	Mapping functions, replacement algorithms, write policies	2	15.01.2022/ 17.01.2022		TLM2	
No. of Classes Required to complete UNIT IV : 10				No. of classes taken:		

#### UNIT-V: Peripheral devices and their characteristics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	Input-output subsystems	1	18.01.2022		TLM2	
32.	I/O device interface	2	19.01.2022/ 22.01.2022		TLM2	
33.	I/O transfers—program controlled	2	24.01.2022/ 25.01.2022		TLM2	

			25.01.2022		
34.	Interrupt driven and DMA	2	26.01.2022/ 29.01.2022		TLM2
35.	Privileged and non-privileged instructions	2	31-01-2022/ 01-02-2022		TLM2
36.	Software interrupts and exceptions	2	02-02-2022 05-02-2022		TLM2
No. of Classes Required to complete UNIT V: 11				No. of classes taken:	

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

### 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):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Course Instructor  
(Dr. O Rama Devi)

Course Coordinator  
(Dr. O Rama Devi)

Module Coordinator  
(Dr. O Rama Devi)

HOD  
(Dr. O Rama Devi)





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(AUTONOMOUS)

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Phone: 08659-222933, Fax: 08659-222931

## DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Mr. S. Siva Rama Krishna  
 Course Name & Code : Python Programming (20CS05)  
 L-T-P Structure : 3-0-0 Credits: 3  
 Program/Sem/Sec : B.Tech / III Sem A.Y.: 2021-22

**PREREQUISITE:** Problem Solving Skills

**COURSE EDUCATIONAL OBJECTIVES (CEOs):**

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

<b>C01</b>	Identify basic building blocks of python to solve mathematical problems.(Understand- L2)
<b>C02</b>	Apply the in-built data structures like list, tuple, set and dictionary for solving problems.(Apply - L3)
<b>C03</b>	Use exception-handling mechanism to catch run-time errors (Apply - L3)
<b>C04</b>	Demonstrate compelling concepts about string manipulation, regular expressions, and file handling.(Understand - L2)
<b>C05</b>	Demonstrate object-oriented programming principles of python.(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
<b>C01</b>	3	2	1	-	3	-	-	-	-	1	-	2	3	-
<b>C02</b>	3	2	1	-	3	-	-	-	-	1	-	2	3	-
<b>C03</b>	3	2	1	-	3	-	-	-	-	1	-	2	3	-
<b>C04</b>	3	2	1	-	3	-	-	-	-	1	-	2	3	-
<b>C05</b>	3	1	2	-	3	-	-	-	-	1	-	1	3	2
	<b>1 - Low</b>				<b>2 -Medium</b>				<b>3 - High</b>					

#### **TEXTBOOKS:**

**T1.** Reema Thareja, “Python Programming Using Problem Solving Approach”, Oxford Publications

**T2.** Python for Everybody: Exploring Data In Python 3by Dr. Charles Russell Severance, Sue Blumenberg

#### **REFERENCE BOOKS:**

**R1.** Gowrishankar S and Veena A, “Introduction to Python Programming”, CRC Press, Taylor, and Francis Group – A CHAPMAN & HALLBOOK.

**R2.** R. Nageswara Rao, “Core python programming”, Dreamtech, 2017.

**R3.** Y. Daniel Liang, “Revel for Introduction to Python Programming and Data Structures”, Pearson Publications.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN): Python Programming (20CS05)

#### UNIT-I: Introduction to Python, Operators, and Control Structures

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 introduction	1	26-10-21		TLM1	
2.	History of Python, Usage of Python interpreter	1	27-10-21		TLM1	
3.	Python Shell, Indentation	1	28-10-21		TLM1,4	
4.	Python Built-in types	1	29-10-21		TLM1	
5.	Variables, Assignment, Identifiers and keywords , Input-Output Statements, Literals	1	02-11-21		TLM1,4	
6.	Arithmetic operators, Relational operators, Logical operators,	1	03-11-21		TLM1,4	
7.	Assignment operators, Bit-wise operators, Python Membership Operators (in & not in), Simple Programs.	1	05-11-21		TLM1,4	
8.	Python Identity Operators (is & is not), Operator precedence.	1	09-11-21		TLM1,4	
9.	Conditional Statements - if, if-else, Nested if-else.	1	10-11-21		TLM1,4	
10.	Python Loops – while, for	1	11-11-21		TLM1,4	
11.	Nested loops with Programming Examples,	1	12-11-21		TLM1,4	
12.	Mathematical Functions and Constants (import math), Random Number Functions	1	16-11-21		TLM1,4	
<b>No. of classes required to complete UNIT-I: 13</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Lists, Tuples, Sets, Dictionaries.

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.	<b>Lists:</b> Concept, Creating and Accessing Elements, Updating & Deleting Lists.	1	17-11-21		TLM1,4	
14.	Basic List Operations, Reverse, Indexing, Slicing and Matrices, Built-in List Functions	1	18-11-21		TLM1,4	
15.	Sample Programs on Lists	1	19-11-21		TLM1,4	
16.	<b>Tuples:</b> Introduction, Creating & Deleting Tuples, Accessing values in a Tuple, Updating tuples, Delete Tuple Elements.	1	23-11-21		TLM1,4	
17.	Basic Tuple Operations, Indexing, Slicing and Matrices, built- in tuple Functions.	1	24-11-21		TLM1,4	
18.	Sample Programs on Tuples	1	25-11-21		TLM1,4	
19.	<b>Sets:</b> Concept, Operations	1	26-11-21		TLM1,4	
20.	<b>Dictionaries:</b> Introduction, Accessing values in dictionaries.	1	30-11-21		TLM1,4	

21.	Working with dictionaries, Properties, Functions.	1	01-12-21		TLM1,4	
<b>No. of classes required to complete UNIT-II : 10</b>				<b>No. of classes taken:</b>		

### UNIT-III: Functions, Modular Design, Exception Handling

S No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	<b>Functions:</b> Defining a Function, Calling a Function	1	02-12-21		TLM1,4	
23.	Types of Functions, Function Arguments	1	03-12-21		TLM1,4	
24.	Anonymous functions, Global and Local Variables	1	07-12-21		TLM1,4	
25.	Recursion	1	08-12-21		TLM1,4	
26.	<b>Modular Design:</b> Creating modules	1	09-12-21		TLM1,4	
27.	import statement, from	1	10-12-21		TLM1,4	
28.	Date and Time Module	1	21-12-21		TLM1,4	
29.	<b>Exception Handling:</b> Exception, Exception Handling.	1	22-12-21		TLM1,4	
30.	except clause, Try, finally clause	1	23-12-21		TLM1,4	
31.	User Defined Exceptions.	1	24-12-21		TLM1,4	
<b>No. of classes required to complete UNIT-III : 11</b>				<b>No. of classes taken:</b>		

### UNIT-IV: Python strings, Regular Expression Operations, Files.

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.	<b>Python strings:</b> Concept, Slicing, Escape characters	1	28-12-21		TLM1,4	
33.	String Special Operations, String formatting Operator	1	29-12-21		TLM1,4	
34.	Triple Quotes, Raw String, Unicode Strings.	1	30-12-21		TLM1,4	
35.	Built-in String methods	1	31-12-21		TLM1,4	
36.	<b>Regular Expression Operations:</b> Using Special Characters.	1	04-01-22		TLM1,4	
37.	Regular Expression Methods	1	05-01-22		TLM1,4	
38.	Named Groups in Python Regular Expressions, Regular Expression with glob Module.	1	06-01-22		TLM1,4	
39.	Files: Introduction to files	1	07-01-22		TLM1,4	
40.	file operations- Read, write, search	1	11-01-22		TLM1,4	
<b>No. of classes required to complete UNIT-IV : 10</b>				<b>No. of classes taken:</b>		

## UNIT-V: Object Oriented Programming OOP in Python

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.	Object Oriented Programming OOP in Python introduction	1	18-01-22		TLM1,4	
42.	Classes	1	19-01-22		TLM1,4	
43.	'self-variable', Methods	1	20-01-22		TLM1,4	
44.	Sample Programs	1	21-01-22		TLM1,4	
45.	Constructor Method	1	25-01-22		TLM1,4	
46.	Inheritance	1	27-01-22		TLM1,4	
47.	Sample Programs	1	28-01-22		TLM1,4	
48.	Overriding Methods	1	01-02-22		TLM1,4	
49.	Data hiding	1	02-02-22		TLM1,4	
<b>No. of classes required to complete UNIT-V : 09</b>				<b>No. of classes taken:</b>		

### 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
50	Advanced Topics ( working with Numpy)	1	03-02-22		TLM5	
51	Advanced Topics( Working with Pandas)	1	04-02-22		TLM5	

Teaching Learning Methods			
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Demonstration (Lab/Field Visit)
<b>TLM2</b>	PPT	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)
<b>TLM3</b>	Tutorial	<b>TLM6</b>	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
<b>Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))</b>	<b>M=30</b>
<b>Cumulative Internal Examination (CIE): M</b>	<b>30</b>
<b>Semester End Examination (SEE)</b>	<b>70</b>
<b>Total Marks = CIE + SEE</b>	<b>100</b>

## PART-D

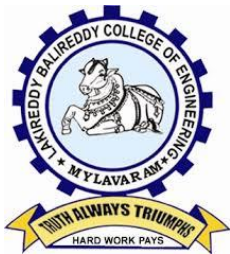
### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
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<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr S. Siva Rama Krishna	Mr S. Siva Rama Krishna	Dr O. Rama Devi	Dr O. Rama Devi



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## DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** K. Venkatesh

**Course Name & Code** : DATABASE MANAGEMENT SYSTEMS & 20CS07

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech III Sem AI & DS

**A.Y.:** 2021-22

#### **PREREQUISITE:**

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The Objective of this course is to know about basic concepts of DBMS, Database Languages, Database Design, Normalization Process, Transaction Processing, Indexing, and Interfacing with NOSQL using MongoDB.

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

<b>CO1</b>	State the Basic Components of Database Management System and data modelling using Entity-Relationship Diagrams. <b>(Understand- L2)</b>
<b>CO2</b>	Examine the relational model using Structured Query Language (SQL). <b>(Apply - L3)</b>
<b>CO3</b>	Employ principles of normalization for effective database design. <b>(Apply - L3)</b>
<b>CO4</b>	Demonstrate the necessity of transaction processing, Concurrency control mechanisms and recovery strategies in DBMS. <b>(Understand- L2)</b>
<b>CO5</b>	Describe file organization, indexing techniques and the competency in selecting NoSQL Database. <b>(Understand- L2)</b>

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3	2	-	-	-	-	-	-	-	-	-	-	3	-
<b>CO2</b>	3	2	-	-	-	-	-	-	-	-	-	-	3	-
<b>CO3</b>	3	2	1	-	-	-	-	-	-	-	-	-	3	-
<b>CO4</b>	-	2	1	-	-	-	-	-	-	-	-	-	3	-
<b>CO5</b>	2	3	1	-	-	-	-	-	-	-	-	-	3	-
	<b>1 - Low</b>			<b>2 - Medium</b>					<b>3 - High</b>					

#### **TEXTBOOKS:**

**T1** Henry F. Korth, Abraham Silberschatz, S.Sudarshan, "Database System Concepts", McGrawHill, 6th edition, 2009.

**T2** Shashank Tiwari, " ProfessionalNoSql", John Wiley & Sons, 2011.

#### **REFERENCE BOOKS:**

**R1** Raghu Ramakrishnan, Johannes Gehrke, –Database Management System||, McGrawHill, 3rd edition, 2000.

**R2** Date C J, –An Introduction to Database System, Pearson Education, 8th edition, 2003.

**R3** Ramez Elmasri, Shamkanth B. Navathe, "Fundamentals of Database Systems", Addison Wesley, 6th edition, 2010.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: DBMS Introduction & Data Modelling using the Entity Relationship Model

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, Introduction: An overview of Database Management System	1	26-10-21		1 & 2	
2.	Database System Vs File System, Database System Concepts	1	27-10-21		1 & 2	
3.	Three Schema Architecture, Data Models	1	29-10-21		1 & 2	
4.	Database Schema and Instances, Data Independence	1	30-10-21		1 & 2	
5.	Database Languages, Database Structure	1	02-11-21		1 & 2	
6.	ER model concepts, Notation for ER Diagram	1	03-11-21		1 & 2	
7.	Mapping Constraints, Keys	1	05-11-21		1 & 2	
8.	Concepts of Super Key, Candidate Key, Primary Key	1	06-11-21		1 & 2	
9.	Generalization, Aggregation	1	09-11-21		1 & 2	
10.	Reduction of an ER Diagrams to Tables, Relationships of Higher Degree.	1	10-11-21		1 & 2	
<b>No. of classes required to complete UNIT-I: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-II: Relational Data Model and Language & Introduction to SQL

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.	Relational Data Model Concepts, Integrity Constraints	1	12-11-21		1 & 2	
12.	Entity Integrity, Referential Integrity	1	16-11-21		1 & 2	
13.	Key Constraints, Domain Constraints	1	17-11-21		1 & 2	
14.	Relational Algebra	1	19-11-21		1 & 2	
15.	Characteristics of SQL, Advantage of SQL	1	20-11-21		1 & 2	
16.	SQL Data types and Literals, Insert, Update and Delete Operations	1	23-11-21		1 & 2	
17.	Tables, Views, and Indexes	1	24-11-21		1 & 2	
18.	Nested Queries, Aggregate Functions	1	26-11-21		1 & 2	
19.	Joins, Unions, Intersection, Minus	1	27-11-21		1 & 2	
20.	Cursors in SQL, Triggers in SQL	1	30-11-21		1 & 2	
<b>No. of classes required to complete UNIT-II: 10</b>				<b>No. of classes taken:</b>		

#### UNIT-III: Normalization

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.	Functional Dependencies	1	01-12-21		1 & 2	
22.	Normal Forms - First, Second	1	03-12-21		1 & 2	
23.	Third Normal Forms, BCNF	1	04-12-21		1 & 2	
24.	Inclusion Dependencies, Loss Less Join Decompositions	1	07-12-21		1 & 2	
25.	Multi Valued Dependencies	1	08-12-21		1 & 2	
26.	Fourth Normal Form	1	10-12-21		1 & 2	
27.	Join Dependencies and Fifth Normal Form	1	21-12-21		1 & 2	

**No. of classes required to complete UNIT-III: 07****No. of classes taken:****UNIT-IV: Transaction Processing Concepts, Concurrency Control Techniques & Crash Recovery**

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.	Transaction System, Testing of Serializability	1	22-12-21		1 & 2	
29.	Serializability of Schedules	1	24-12-21		1 & 2	
30.	Conflict & View Serializability	1	28-12-21		1 & 2	
31.	Recoverability, Deadlock Handling	1	29-12-21		1 & 2	
32.	Concurrency Control	1	31-12-21		1 & 2	
33.	Locking Techniques for Concurrency Control	1	04-01-22		1 & 2	
34.	Time Stamping Protocols for Concurrency Control	1	05-01-22		1 & 2	
35.	Validation Based Protocol	1	07-01-22		1 & 2	
36.	Multiple Granularity	1	08-01-22		1 & 2	
37.	Recovery with Concurrent Transactions	1	11-01-22		1 & 2	
38.	Log Based Recovery, Checkpoints	1	18-01-22		1 & 2	
39.	ARIES Algorithm	1	19-01-22		1 & 2	
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>		

**UNIT-V: Physical Database Design & Interfacing and Interacting with NoSQL**

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.	Storage and file structure	1	21-01-22		1 & 2	
41.	indexed files, hashed files	1	22-01-22		1 & 2	
42.	B+ trees	1	25-01-22		1 & 2	
43.	Files with dense index	1	28-01-22		1 & 2	
44.	files with variable length records	1	29-01-22		1 & 2	
45.	Introduction to NoSQL	1	01-02-22		1 & 2	
46.	Storing and Accessing Data	1	02-02-22		1 & 2	
47.	Storing Data in and Accessing Data from MongoDB	1	04-02-22		1 & 2	
48.	Querying MongoDB	1	05-02-22		1 & 2	
<b>No. of classes required to complete UNIT-V: 09</b>				<b>No. of classes taken:</b>		

**Teaching Learning Methods**

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Demonstration (Lab/Field Visit)
<b>TLM2</b>	PPT	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)
<b>TLM3</b>	Tutorial	<b>TLM6</b>	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):

<b>PO 1</b>	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	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.
<b>PO 3</b>	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.
<b>PO 4</b>	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.
<b>PO 5</b>	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
<b>PO 6</b>	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
<b>PO 7</b>	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.
<b>PO 8</b>	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
<b>PO 11</b>	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.
<b>PO 12</b>	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):**

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>K. Venkatesh</b>	<b>K. Venkatesh</b>	<b>Dr. O. Rama Devi</b>	<b>Dr. O. Rama Devi</b>
<b>Signature</b>				



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(AUTONOMOUS)

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

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

## DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** V. Chandra Kumar

**Course Name & Code** : OBJECT ORIENTED PROGRAMMING & 20CS09

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech/III/

**A.Y.:** 2021-22

**PREREQUISITE:** Programming for Problem Solving using C

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to learn the constructs of the Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. In the process of learning the language, they will be applying knowledge of object-oriented programming; they will get the fundamental knowledge reason collection framework.

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

<b>CO1</b>	Demonstrate the fundamentals of object-oriented programming and basic building blocks of Java. ( <b>Understand- L2</b> )
<b>CO2</b>	Apply object-oriented programming principles to solve problems. ( <b>Apply - L3</b> )
<b>CO3</b>	Demonstrate JAVA built-in API packages and create user-defined packages and interfaces ( <b>Understand- L2</b> )
<b>CO4</b>	Develop multitasking applications using JAVA multithreaded programming and handling runtime errors using Exception Handling. ( <b>Apply – L3</b> )
<b>CO5</b>	Develop GUI applications using AWT (Abstract Window Toolkit). ( <b>Apply- L3</b> )

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3	-	-	-	-	-	-	-	-	-	-	-	3	-
<b>CO2</b>	-	3	-	-	-	-	-	-	-	-	-	-	3	-
<b>CO3</b>	3	-	-	-	-	-	-	-	-	-	-	-	3	-
<b>CO4</b>	-	2	-	-	-	-	-	-	-	-	-	-	3	2
<b>CO5</b>	-	2	1	-	-	-	-	-	-	-	-	-	3	2

#### **TEXTBOOKS:**

**T1** Herbert Schildt, "Java: The complete reference", TMH Publications, 7th edition, 2006

**T2** Cay S. Horstmann, "Core Java Volume I – Fundamentals", Pearson, Eleventh edition, 2018

#### **REFERENCE BOOKS:**

**R1** Dr.R.NageswaraRao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition 2008.

**R2** E. Balaguruswamy, "Programming with JAVA", TMH Publications, 2nd Edition, 2000.

**R3** Patrick Niemeyer & Jonathan Knudsen, "Learning Java", O'REILLY Publications, 3rd Edition, 2005.

**R4** Benjamin J Evans & David Flanagan, "Java-in a Nutshell – A desktop quick reference", O'REILLY Publications, 6th Edition, 2014.

## PART-B

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Programming Paradigms	1	27-10-2021		TLM1	
2.	Difference Between OOP vs POP	1	27-10-2021		TLM1	
3.	Principles of OOP	1	28-10-2021		TLM1	
4.	Java Introduction- History, Buzzwords	1	30-10-2021		TLM1	
5.	Data Types	1	03-11-2021		TLM1	
6.	Keywords, Variables	1	03-11-2021		TLM1	
7.	Operators	1	06-11-2021		TLM1	
8.	Control Statements	1	10-11-2021		TLM1	
9.	Class Definition, Variables and Methods	1	10-11-2021		TLM1	
10.	Declaring Objects, this Keyword	1	11-11-2021		TLM1	
11.	Constructors	1	13-11-2021		TLM1	
<b>No. of classes required to complete UNIT-I: 11</b>				<b>No. of classes taken:</b>		

#### 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
12.	Overloading Methods and Constructors	1	17-11-2021		TLM1	
13.	Parameter Passing and Returning Objects	1	17-11-2021		TLM1	
14.	Recursion and Access Control	1	18-11-2021		TLM1	
15.	Nested and Inner Classes	1	20-11-2021		TLM1	
16.	Final Keyword & Static	1	24-11-2021		TLM1	
17.	Variable and Command Line Arguments	1	24-11-2021		TLM1	
18.	Inheritance Introduction	1	25-11-2021		TLM1	
19.	Types of Inheritance	1	27-11-2021		TLM1	
20.	Super Keyword	1	01-12-2021		TLM1	
21.	Overriding and Dynamic Method Dispatch	1	01-12-2021		TLM1	
22.	Abstract Class and Final with Inheritance	1	02-12-2021		TLM1	
23.	String	1	04-12-2021		TLM1	
24.	StringBuffer and StringTokenizer	1	08-12-2021		TLM1	
<b>No. of classes required to complete UNIT-II: 13</b>				<b>No. of classes taken:</b>		

**UNIT-III:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
25.	Interfaces, Inheritance in interfaces	1	08-12-2021		TLM1		
26.	Packages -Introduction, Creation	1	09-12-2021		TLM1		
27.	Java Built in Packages	1	11-12-2021		TLM1		
28.	Exception Hierarchy	1	22-12-2021		TLM1		
29.	Try,catch,throw	1	22-12-2021		TLM1		
30.	Throws and finally	1	23-12-2021		TLM1		
31.	User Defined Exception	1	29-12-2021		TLM1		
32.	Assertions	1	29-12-2021		TLM1		
<b>No. of classes required to complete UNIT-III: 08</b>				<b>No. of classes taken:</b>			

**UNIT-IV:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
33.	Multi Threading -Introduction	1	30-12-2021		TLM1		
34.	Thread Life Cycle	1	05-1-2022		TLM1		
35.	Creation of Thread	1	05-1-2022		TLM1		
36.	Naming a Thread, Joining a Thread	1	06-1-2022		TLM1		
37.	Thread Priorities, Daemon Thread	1	8-1-2022		TLM1		
38.	Thread Pool, Thread Group	1	12-01-2022		TLM1		
39.	Thread Synchronization	1	12-01-2022		TLM1		
40.	Inter Thread Communications	1	19-01-2022		TLM1		
41.	Collections Framework	1	19-01-2022		TLM1		
42.	Hierarchy, Generics	1	20-01-2022		TLM1		
43.	List, Set	1	22-01-2022		TLM1		
44.	Queue and Map	1	22-01-2022		TLM1		
<b>No. of classes required to complete UNIT-IV: 12</b>				<b>No. of classes taken:</b>			

**UNIT-V:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	AWT Hierarchy	1	23-01-2022		TLM1	
46.	Components & Containers	1	25-01-2022		TLM1	

47.	Button, Label, Text Field	1	29-01-2022		TLM2	
48.	Checkbox, Choice, List	1	29-01-2022		TLM2	
49.	Canvas, Scrollbar, Menus	1	30-01-2022		TLM2	
50.	Layout Managers	1	01-02-2022		TLM2	
51.	Event Delegation Model, Event Classes	1	01-02-2022		TLM2	
52.	Listener Interfaces	1	02-02-2022		TLM2	
53.	Key Listener and Window Listener	1	04-02-2022		TLM2	
54.	Adapter Classes	1	04-02-2022		TLM2	
<b>No. of classes required to complete UNIT-V: 10</b>				<b>No. of classes taken:</b>		

### 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.	Java Arrays	1	22-12-2021		TLM1	
2.	Applets	1	25-1-2022		TLM1	
<b>No. of classes required to complete UNIT-V: 10</b>				<b>No. of classes taken:</b>		

Teaching Learning Methods			
<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Demonstration (Lab/Field Visit)
<b>TLM2</b>	PPT	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)
<b>TLM3</b>	Tutorial	<b>TLM6</b>	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
<b>Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))</b>	<b>M=30</b>
<b>Cumulative Internal Examination (CIE): M</b>	<b>30</b>
<b>Semester End Examination (SEE)</b>	<b>70</b>
<b>Total Marks = CIE + SEE</b>	<b>100</b>

## PART-D

### PROGRAMME OUTCOMES (POs):

PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> 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	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems:</b> 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	<b>Modern tool usage:</b> 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	<b>The engineer and society:</b> 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	<b>Environment and sustainability:</b> 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	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	<b>Communication:</b> 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	<b>Project management and finance:</b> 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	<b>Life-long learning:</b> 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. V.ChandraKumar	Mr.V.ChandraKumar	Dr.O.Rama Devi	Dr. O.Rama Devi
Signature				







# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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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 AND DATA SCIENCE

### COURSE HANDOUT

#### PART-A

Name of Course Instructor : Mr. S Siva Rama Krishna  
Course Name & Code : Python Programming Lab (20CS54)  
L-T-P Structure : 0-0-3 Credits: 1.5  
Program/Sem/Sec : B.Tech / III-Sem. A.Y : 2021-22

**PRE-REQUISITE:** Basic Knowledge of Programming

**COURSE EDUCATIONAL OBJECTIVES (CEOs)** :The objective of Python course leads the students from the basics of writing and running Python scripts in problem solving and to design and implement the modules and understands the working of classes and objects in python.

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

<b>CO 1</b>	Apply building blocks of Python in solving computational problems.( <b>Apply-L3</b> )
<b>CO 2</b>	Implement in-built data structures available in python to solve computational problems.( <b>Apply-L3</b> )
<b>CO 3</b>	Implement modular programming, string manipulations and Object oriented programming in python. ( <b>Apply-L3</b> )
<b>CO 4</b>	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
<b>CO1</b>	3	1	-	-	-	-	-	-	-	-	-	-	3	1
<b>CO2</b>	3	1	-	-	-	-	-	-	-	-	-	-	3	1
<b>CO3</b>	3	1	-	-	-	-	-	-	-	-	-	-	2	1
<b>CO4</b>	-	-	-	-	-	-	-	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).

#### **TEXTBOOKS:**

**T1.** Reema Thareja, “Python Programming Using Problem Solving Approach”, Oxford Publications

**T2.** Python for Everybody: Exploring Data In Python 3by Dr. Charles Russell Severance, Sue Blumenberg

#### **REFERENCE BOOKS:**

**R1.** Gowrishankar S and Veena A, “Introduction to Python Programming”, CRC Press, Taylor, and Francis Group – A CHAPMAN & HALLBOOK.

**R2.** R. Nageswara Rao, “Core python programming”, Dreamtech, 2017.

**R3.** Y. Daniel Liang, “Revel for Introduction to Python Programming and Data Structures”, Pearson Publications.

**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.	Language Basics	3	26-10-21		TLM4	
2.	Example programs	3	02-11-21		TLM4	
3.	Module-1	3	09-11-21		TLM4	
4.	Module-2	3	16-11-21		TLM4	
5.	Module-3	3	23-11-21		TLM4	
6.	Module-4	3	30-11-21		TLM4	
7.	Module-5	3	07-12-21		TLM4	
8.	Module-6	3	21-12-21		TLM4	
9.	Module-7	3	28-12-21		TLM4	
10.	Module-8	3	04-01-22		TLM4	
11.	Module-9	3	11-01-22		TLM4	
12.	Module-10	3	18-01-22		TLM4	
13.	Revision	3	25-01-22		TLM4	
14.	Internal Lab	3	01-02-22		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****EVALUATION PROCESS (R20 Regulations):**

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows

**(a) Continuous Internal Evaluation (CIE):** The Continuous Internal Evaluation (CIE) is based on the following parameters:

Parameter	Marks
Day to Day work	05
Record	05
Internal Test	05
Total	15

**(b) Semester End Examinations (SEE):** The Semester End examinations (SEE) for laboratory courses shall be jointly conducted by internal and external examiners with 3 hours duration and evaluated for 35 marks. The performance of the student shall be evaluated as per the parameters indicated below:

Parameter	Marks
Procedure/Algorithm	05
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	05
Viva voce	05
Total	35

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> 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.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO 5</b>	<b>Modern tool usage:</b> 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
<b>PO 6</b>	<b>The engineer and society:</b> 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
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> 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.
<b>PO 11</b>	<b>Project management and finance:</b> 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.
<b>PO 12</b>	<b>Life-long learning:</b> 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):

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr S Siva Rama Krishna	Mr S Siva Rama Krishna	Dr O. Rama Devi	Dr O. Rama Devi



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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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: K. Venkatesh**

**Course Name & Code** : Database Management Systems Lab (20CS56)

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

**Credits:** 1.5

**Program/Sem/Sec** : B.Tech III Sem AI & DS

**A.Y.:** 2021-22

**PRE-REQUISITE** : Programming language, Discrete Mathematical Structures, and Data Structures.

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The objective of this lab is to provide a strong formal foundation in database concepts, technology, and practice to the participants to groom them into well-informed database application developers.

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

<b>CO 1</b>	Create & manipulate the relational database using SQL. ( <b>Apply- L3</b> )
<b>CO 2</b>	Implement Views, procedures, triggers, and cursors on relational database. ( <b>Apply- L3</b> )
<b>CO 3</b>	Create Unstructured Databases using MongoDB. ( <b>Apply- L3</b> )
<b>CO 4</b>	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
<b>CO1</b>	-	2	2	-	2	-	-	-	-	-	-	-	3	-
<b>CO2</b>	-	1	1	1	1	-	-	-	-	-	-	-	3	-
<b>CO3</b>	3	-	1	1	1	-	-	-	-	-	-	-	3	-
<b>CO4</b>	-	-	-	-	-	-	-	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	Introduction to SQL, syntax	3	28.10.21		TLM4	

2	Experiment - 1	3	11.11.21		TLM4
3	Experiment - 2	3	18.11.21		TLM4
4	Experiment - 3	3	25.11.21		TLM4
5	Experiment - 4	3	27.11.21		TLM4
6	Experiment - 5,6,7,8	3	02.12.21		TLM4
7	Experiment - 9,10,11	3	09.12.21		TLM4
8	Experiment - 12,13	3	23.12.21		TLM4
9	Experiment - 14	3	30.12.21		TLM4
10	Experiment - 15	3	06.01.22		TLM4
11	Design database for Case study	3	20.01.22		TLM4
12	Internal Exam	3	27.02.22		TLM4

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

## **PART-C**

### **EVALUATION PROCESS (R20 Regulations):**

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows

**(a) Continuous Internal Evaluation (CIE):** The Continuous Internal Evaluation (CIE) is based on the following parameters:

<b>Parameter</b>	<b>Marks</b>
Day to Day work	05
Record	05
Internal Test	05
Total	15

**(b) Semester End Examinations (SEE):** The Semester End examinations (SEE) for laboratory courses shall be jointly conducted by internal and external examiners with 3 hours duration and evaluated for 35 marks. The performance of the student shall be evaluated as per the parameters indicated below:

<b>Parameter</b>	<b>Marks</b>
Procedure/Algorithm	05
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	05
Viva voce	05
Total	35

## PART-D

### PROGRAMME OUTCOMES (POs):

PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 7	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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### 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	K. Venkatesh	K. Venkatesh	Dr. O. Rama Devi	Dr. O. Rama Devi
Signature				



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## DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** V. Chandra Kumar  
**Course Name & Code** : OBJECT ORIENTED PROGRAMMING LAB & 20CS57  
**L-T-P Structure** : 0-0-3 **Credits:** 1.5  
**Program/Sem/Sec** : B.Tech /III **A.Y.:**  
2021-22

**PREREQUISITE:** Programming for Problem Solving Using C and Data Structures

#### **COURSE EDUCATIONAL OBJECTIVE(CE0):**

The objective of the course is to learn the constructs of the Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. They will be applying knowledge of object-oriented programming, collection framework to perform all operations on data.

#### **COURSE OUTCOMES (CO):**

**CO1:** Solve basic mathematical problems using fundamentals of Java and its object oriented principles. (**Apply - L3**)

**CO2:** Implement multithreading and exception handling mechanisms. (**Apply - L3**)

**CO3:** Develop GUI applications and basic data structures using collection framework. (**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	P010	P011	P012	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	3	1
CO2	-	3	-	-	-	-	-	-	-	-	-	-	3	1
CO3	-	1	2	-	-	-	-	-	-	-	-	-	3	1
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-

**Note:** 1- Slight (Low), 2 - Moderate (Medium), 3 - Substantial (High)

#### **TEXTBOOKS:**

**T1** Herbert Schildt, "Java: The complete reference", TMH Publications, 7th edition, 2006

**T2** Cay S. Horstmann, "Core Java Volume I – Fundamentals", Pearson, Eleventh edition, 2018

#### **REFERENCE BOOKS:**

**R1** Dr.R.NageswaraRao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition 2008.

**R2** E. Balaguruswamy, "Programming with JAVA", TMH Publications, 2nd Edition, 2000.

**R3** Patrick Niemeyer & Jonathan Knudsen, "Learning Java", O'REILLY Publications, 3rd Edition, 2005.

**R4** Benjamin J Evans & David Flanagan, "Java-in a Nutshell – A desktop quick reference", O'REILLY Publications, 6th Edition, 2014.

**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	HOD Sign
1.	Introduction Lab	3	25-10-2021		
2.	Java Basic Programs	3	01-11-2021		
3.	Classes and Objects	3	08-11-2021		
4.	Constructors & Parameter Passing	3	15-11-2021		
5.	Static Keyword Strings	3	22-11-2021		
6.	Inheritance & Polymorphism	3	29-11-2021		
7.	Dynamic Method Dispatch & Interfaces	3	06-12-2021		
8.	Packages & Exception Handling	3	20-12-2021		
9.	Multithreading Programs	3	27-12-2021		
10.	Collections Framework	3	03-01-2022		
11.	AWT Controls	3	10-01-2022		
12.	AWT Controls	3	17-01-2022		
13.	Event Handling	3	24-01-2022		
14.	Lab Internal Exam	3	31-01-2022		

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

According to Academic Regulations of R20 Distribution and Weightage of Marks For Laboratory Courses is as follows

**(a) Continuous Internal Evaluation (CIE):** The Continuous Internal Evaluation (CIE) is based on the following parameters:

Parameter	Marks
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Record	05
Internal Test	05
Total	15

**(b) Semester End Examinations (SEE):** The Semester End examinations (SEE) for laboratory courses shall be jointly conducted by internal and external examiners with 3 hours duration and



evaluated for 35 marks. The performance of the student shall be evaluated as per the parameters indicated below:

Parameter	Marks
Procedure/Algorithm	05
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	05
Viva voce	05
Total	35

## PART-D

### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> 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.
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<b>PO 12</b>	<b>Life-long learning:</b> 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):**

<b>PSO 1</b>	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
<b>PSO 2</b>	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Mr. V. Chandra Kumar	Mr.V.Chandra Kumar	Dr.O.Rama Devi	Dr. O. Rama Devi
<b>Signature</b>				



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## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor :** Mrs.G.V.Rajya Lakshmi

**Course Name & Code :** Web Application Development using Full Stack - Module-I  
(Frontend Development) & 20CSS1

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

**Credits: 2**

**Program/Sem/Sec :** B.Tech. – AIDS/III-sem

**A.Y.: 2021-22**

**PREREQUISITE: Knowledge of basic Computer hardware & software.**

#### **COURSE EDUCATIONAL OBJECTIVES (CEOs):**

The objective of the course is to understand the design of HTML web pages, Styling of HTML pages using CSS, web forms validation using JavaScript and developing responsive web page using JQuery.

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

<b>CO1</b>	Understand the basic UI/UX design and styling of web pages ( <b>Understand- L2</b> )
<b>CO2</b>	Understand the DOM of web design, markup language and client-side scripting. ( <b>Understand- L2</b> )
<b>CO3</b>	Understand the responsive web design using DHTML. ( <b>Understand- L2</b> )
<b>CO4</b>	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
<b>CO1</b>	-	-	2	-	2	-	-	-	-	-	-	-	3	2
<b>CO2</b>	-	-	2	-	2	-	-	-	-	-	-	-	3	2
<b>CO3</b>	-	-	2	-	2	-	-	-	-	-	-	-	3	2
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-

#### **REFERENCE BOOKS:**

<b>R1</b>	HTML & CSS: The Complete Reference, 5th Edition by Thomas Powell, McGrawHill, 2017.
<b>R2</b>	Beginning HTML, XHTML, CSS, and JavaScript by Jon Duckett, Wiley India, 2010.
<b>R3</b>	jQuery Cookbook by Cody Lindley, O'Reilly Media, 2009
<b>R4</b>	HTML, XHTML, and CSS Bible, 5th Edition by Steven M. Schafer, Wiley India, 2011.
<b>R5</b>	Web Development with jQuery by Richard York, Wiley India, 2015
<b>R6</b>	Head first HTML & CSS 2nd Edition by Elisabeth Robson, Eric Freeman, O'Reilly

## **PART-B**

### **COURSE DELIVERY PLAN (LESSON PLAN):**

<b>S.No.</b>	<b>Topics to be covered</b>	<b>No. of Classes Required</b>	<b>Tentative Date of Completion</b>	<b>Actual Date of Completion</b>	<b>Teaching Learning Methods</b>	<b>HOD Sign Weekly</b>
1.	Lab Cycle-1	3	29-10-2021		<b>DM5</b>	
2.	Lab Cycle-1	3	05-11-2021		<b>DM5</b>	
3.	Lab Cycle-2	3	12-11-2021		<b>DM5</b>	
4.	Lab Cycle-2	3	19-11-2021		<b>DM5</b>	
5.	Lab Cycle-3	3	26-11-2021		<b>DM5</b>	
6.	Lab Cycle-3	3	03-12-2021		<b>DM5</b>	
7.	Lab Cycle-4	3	10-12-2021		<b>DM5</b>	
8.	Lab Cycle-4	3	17-12-2021		<b>DM5</b>	
9.	Lab Cycle-5	3	24-12-2021		<b>DM5</b>	
10.	Lab Cycle-5	3	31-01-2022		<b>DM5</b>	
11.	Lab Cycle-6	3	07-01-2022		<b>DM5</b>	
12.	Lab Cycle-6	3	21-01-2022		<b>DM5</b>	
13.	Lab Cycle-6	3	28-01-2022		<b>DM5</b>	
14.	Revision	3	04-02-2022		<b>DM5</b>	

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

## **PART-C**

### **EVALUATION PROCESS (R20 Regulation):**

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

## PART-D

### PROGRAMME OUTCOMES (POs):

PO 1	<b>Engineering knowledge:</b> 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	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs.G.V.Rajya Lakshmi	Mrs.G.V.Rajya Lakshmi	Dr.O.Rama Devi	Dr.O.Rama Devi
Signature				