FRESHMAN ENGINEERING DEPARTMENT
COURSE HANDOUT
PART-A

PROGRAM   : II B. Tech., III-Sem., AI&DS (B)
ACADEMIC YEAR   : 2023-24
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

CO1	Understand various probabilistic situations using the laws of probability and Random variables.	L2
CO2	Apply probability distributions like Binomial, Poisson, Normal and Exponential distributions in solving engineering problems.	L3
CO3	Calculate the standard error of sampling distribution and confidence intervals for parameters like mean and proportion based on sample data.	L3
CO4	Analyze the data scientifically with the appropriate statistical methodologies to apply the suitable test of hypothesis.	L4
CO5	Construct the regression lines to predict the dependent variables and calculate the Correlation Coefficient for a bivariate statistical data.	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	1	2	-	-	-	-	-	-	-	2	-	-	-
CO2	3	2	2	3	-	-	-	-	-	-	-	2	-	-	-
CO3	3	2	2	2	-	-	-	-	-	-	-	2	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	2	-	-	-
CO5	3	2	2	3	-	-	-	-	-	-	-	2	-	-	-

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

BOS APPROVED TEXTBOOKS:
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	07-08-23		TLM1	
2.	Basic concepts of probability	1	08-08-23		TLM1	
3.	problems on basic probability	1	09-08-23		TLM1	
4.	Addition theorem, problems	1	10-08-23		TLM1	
5.	Problems on Addition theorem	1	14-08-23		TLM1	
6.	Multiplication theorem, examples	1	16-08-23		TLM1&2	
7.	Independent events, theorems	1	17-08-23		TLM1	
8.	Baye's theorem, Examples	1	21-08-23		TLM1	
9.	Problems on Baye's theorem	1	22-08-23		TLM1&2	
10.	Random variables, Expectations	1	23-08-23		TLM1	
11.	Problems on PMF	1	24-08-23		TLM1	
12.	Problems on PDF	1	28-08-23		TLM1	
13.	Problems on PDF	1	29-08-23		TLM1	
14.	Problems	1	30-08-23		TLM1&2	
No. of classes required to complete UNIT-I: 14				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	31-10-23		TLM1&2	
2.	Problems on Binomial distribution	1	04-09-23		TLM1	
3.	Fitting of binomial distribution	1	05-09-23		TLM1	
4.	Poisson distribution, mean and variance	1	06-09-23		TLM1&2	
5.	Problems on Poisson distribution	1	11-09-23		TLM1	
6.	Fitting of Poisson distribution	1	12-09-23		TLM1	
7.	Normal distribution: mean &variance	1	13-09-23		TLM1&2	
8.	Problems on Normal Distribution	1	14-09-23		TLM1	
9.	Problems on Normal Distribution	1	18-09-23		TLM1	
10.	Exponential distribution	1	20-09-23		TLM1	
11.	Problems on Exponential distribution	1	21+09-23		TLM1	
No. of classes required to complete UNIT-II: 11				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	22-09-23		TLM1&2	
2.	Sampling distribution of mean, variance	1	25-09-23		TLM1	
3.	Sampling distribution -problems	1	26-09-23		TLM1&2	
4.	Central limit theorem, Examples	1	27-09-23		TLM1&2	
Mid-I examinations			02-10-23 to 07-10-23			
5.	Problems on central limit theorem	1	09-10-23		TLM1	
6.	Point and interval estimation	1	10-10-23		TLM1&2	
7.	Confidence Interval of mean	1	11-10-23		TLM1	
8.	Problems	1	12-10-23		TLM1	
9.	Confidence Interval of proportion	1	16-10-23		TLM1	
10.	Confidence Interval of mean (n<30)	1	17-10-23		TLM1	
11.	problems	1	18-10-23		TLM1&2	
No. of classes required to complete UNIT-III: 11				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	19-10-23		TLM1&2	
2.	Z-test for single mean	1	25-10-23		TLM1	
3.	Z-test for difference of means	1	26-10-23		TLM1	
4.	Z-test for single Proportion	1	30-10-23		TLM1	
5.	Z-test for difference of Proportions	1	31-10-23		TLM1	
6.	Problems	1	01-11-23		TLM1&2	
7.	t-test for single mean	1	02-11-23		TLM1	
8.	t-test for difference of means	1	06-11-23		TLM1	
9.	Paired t-test	1	07-11-23		TLM1	
10.	problems on means	1	08-11-23		TLM1	
11.	F-test for variances	1	09-11-23		TLM1	
12.	χ^2-test for goodness of fit	1	13-11-23		TLM1	
13.	χ^2-test for independence of attributes	1	14-11-23		TLM1	
14.	Applications	1	15-11-23		TLM1&2	
No. of classes required to complete UNIT-IV: 14				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	16-11-23		TLM1&2	
2.	Problems on Pearson's Correlation	1	20-11-23		TLM1	
3.	Regression lines	1	21-11-23		TLM1	
4.	Problems on Regression lines	1	22-11-23		TLM1	
5.	Properties of Regression coefficients	1	23-11-23		TLM1&2	
6.	Problems on Regression coefficients	1	27-11-23		TLM1	
7.	Problems on rank Correlation	1	28-11-23		TLM1	
8.	Problems on repeated ranks	1	29-11-23		TLM1	
9.	Practice problems	1	30-11-23		TLM1	
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 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):

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

Program Outcomes (POs):

PO1 - Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2 - Problem Analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3 - Design / Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4 - Conduct Investigations of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5 - Modern Tool Usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6 - The Engineer and Society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7 - Environment and Sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8 - Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9 - Individual and Team Work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10 - Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11 - Project Management and Finance	Demonstrate knowledge and understanding of the ring and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12 - Life-long Learning	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
(M.Rami Reddy)	(M.Rami Reddy)	(Dr.A.Rami Reddy)	(Dr.A.Rami Reddy)

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

Accredited by NAAC with 'A' Grade,

ISO 21001:2018, 50001:2018, 14001:2015 Certified Institution

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

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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 & 20MC03
L-T-P Structure	: 2-0-0 Credits : 0
Program/Sem/Sec	: B.Tech., AIDS., III-Sem. SEC-B A.Y : 2023-24

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

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

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	3	3	3	-	-	-	3	-	-	-
CO2	3	3	-	-	-	3	3	-	-	-	-	3	-	-	-
CO3	3	-	3	-	-	-	2	-	-	-	-	2	-	-	-
CO4	3	-	-	-	-	2	3	2	-	-	-	3	-	-	-
CO5	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, 5th Edition, Delhi, 2016.

T2   MahuaBasu, S. Xavier, "Fundamentals of Environmental Studies", Cambridge University Press, 1st Edition, Delhi, 2016.

REFERENCE BOOKS:

R1 S. Deswal, A. Deswal, "A Basic course in Environmental Studies", Educational & Technical Publishers, 2nd Edition, Delhi, 2014.

R2 R. Rajagopalan, "*Environmental Studies (From Crisis to Cure)*", Oxford University Press, 2nd Edition, New Delhi, 2012.

R3 De, A.K, "Environmental Chemistry", New Age International (P) Limited, 5th Edition, New Delhi, 2003.

R4 Dr.K.V.S.G. Murali Krishna, "Environmental Studies", VGS Techno Series, 1st Edition, Vijayawada, 2010.

R5 G. Tyler Miller, Scott Spoolman, "Introduction to Environmental Studies", Cengage Learning, 13th 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	08-08-2023		2	
2.	Population explosion and variations among Nations.	1	10-08-2023		2	
3.	Resettlement and Rehabilitation - Issues and possible solutions	1	17-08-2023		2	
4.	Environmental Hazards	1	22-08-2023		2	
5.	Role of Information Technology in environmental management and human health.	1	24-08-2023		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	28-08-2023		2	
2.	Water Resources	1	31-08-2023		2	
3.	Mineral Resources	1	05-09-2023		2	
4.	Food Resources	1	07-09-2023		2	
5.	Food Resources	1	12-09-2023		2	
6.	Food Resources	1	14-09-2023		2	
7.	Energy Resources	1	19-09-2023		2	
No. of classes required to complete UNIT-II: 7				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	21-09-2023		2	
2.	Food chains and Food webs, Ecological succession, Ecological pyramids,	1	26-09-2023		2	
3.	Major Types of Ecosystems – Forest, Grassland, Desert Land &	1	28-09-2023		2	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation					
4.	Bio-geo-chemical cycles	1	28-09-2023			
5.	**I MID EXAMINATION**	2	03-10-2023 05-10-2023			
6.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Assignment in Unit II	1	10-10-2023		2	
7.	Man and wild life conflicts. Endangered and endemic species of India	1	12-10-2023		2,3	
8.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	17-10-2023		2	

No. of classes required to complete UNIT-III: 7			No. of classes taken:			

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	19-10-2023		2	
2.	Causes, effects and control measures of: Water Pollution	1	26-10-2023		2	
3.	Causes, effects and control measures of: Soil Pollution,	1	31-10-2023			
4.	Noise Pollution		02-11-2023			
5.	Solid Waste Management	1	07-11-2023		2,3	
6.	Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	09-11-2023		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	14-11-2023		2	
2.	Climate disruption-Greenhouse effect, ozone layer depletion and acid rain.	1	16-11-2023		2,3	
3.	Stockholm conference	1	21-11-2023		2	
4.	Environmental Impact Assessment (EIA)		23-11-2023		2	
5.	Green building	1	28-11-2023		2	
6.	Revision	1	30-11-2023			
7.	II MID EXAMINATIONS	1	05-12-2023		5	
8.	II MID EXAMINATIONS	1	07-12-2023		5	

No. of classes required to complete UNIT-V: 06			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 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 theinformation 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 orleader 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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. V. Bhagya Lakshmi	Dr. ShahedaNiloufer	Dr. ShahedaNiloufer	Dr. A. Rami Reddy
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade,
ISO 21001:2018, 50001:2018, 14001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada.
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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT
PART-A

PROGRAM   : B.Tech., III-SEM

ACADEMIC YEAR   : 2023-24

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, 6th edition, 2004.

R2 Andrew S. Tanenbaum, "**Structured Computer Organization**", Pearson/PHI publishers, 4th edition, 2005.

R3 Sivarama P. Dandamudi, "**Fundamentals or Computer Organization and Design**", Springer publishers, 1st edition, 2003.

PART-B
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	07.08.2023		TLM2	
2.	CPU, memory, input-output subsystems, control unit.	1	08.08.2023		TLM2	
3.	Instruction set architecture of a CPU–registers	2	09.08.2023/ 11.08.2023		TLM2	
4.	Instruction execution cycle	1	13.08.2023		TLM2	
5.	RTL interpretation of instructions	2	14.08.2023/ 17.08.2023		TLM2	
6.	Addressing modes	1	21.08.2023		TLM2	
7.	Instruction set	1	22.08.2023		TLM2	
8.	Case study – instruction sets of some common CPUs.	1	23.08.2023		TLM2	
9.	Turorial	1	25.08.2023		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	28.08.2023		TLM2	
11.	Computer arithmetic – integer addition	1	29.08.2023		TLM2	
12.	Subtraction	2	30.08.2023/ 01.09.2023		TLM2	
13.	Carry look- a head adder	1	04.09.2023		TLM2	
14.	Multiplication – shift-and add	1	05.09.2023		TLM2	
15.	Booth multiplier	2	08.09.2023/ 11.09.2023		TLM2	
16.	Division restoring and non- restoring techniques	1	12.09.2023		TLM2	
17.	Floating point arithmetic	2	13.09.2023/ 15.09.2023		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.	H ardwired and micro-programmed design approaches.	2	18.09.2023/ 20.9.2023		TLM2	
19.	Pipelining: Basic concepts of pipelining.	2	22.09.2023/ 25.09.2023		TLM2	
20.	Throughput and speedup	1	26.9.2023		TLM2	
21.	pipeline hazards	2	29.09.2023/ 09.10.2023		TLM2	
22.	**Parallel Processors**: Introduction to parallel processors	2	10.10.2023/ 11.10.2023		TLM2	
23.	Concurrent access to memory	2	13.10.2023/ 16.10.2023		TLM2	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Cache coherency	2	17.10.2023/ 18.10.2023		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	2	20.10.2023		TLM2	
26.	Memory organization	2	25.10.2023/ 27.10.2023		TLM2	
27.	Memory interleaving	2	30.10.2023/ 31.10.2023		TLM2	
28.	Concept of hierarchical memory organization	2	1.11.2023/ 03.11.2023		TLM2	
29.	Cache memory, cache size vs. block size	2	06.11.2023 07.11.2023		TLM2	
30.	Mapping functions, replacement algorithms, write policies	2	08.11.2023/ 10.11.2023		TLM2	

| No. of Classes Required to complete UNIT IV : 12 | | | 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	2	13.11.2023/ 14.11.2023		TLM2	
32.	I/O device interface	2	15.11.2023/ 17.11.2023		TLM2	
33.	I/O transfers– program controlled	2	20.11.2023/		TLM2	

			21.11.2023			
34.	Interrupt driven and DMA	2	22.11.2023/ 24.11.2023		TLM2	
35.	Privileged and non-privileged instructions	2	28-11-2023/ 29-11-2023		TLM2	
36.	Software interrupts and exceptions	1	01-12-2023		TLM2	
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 (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	**Ethic**s: 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 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.

Course Instructor	Course Instructor	Module Coordinator	HOD
(Dr. O. Rama Devi)	(Dr. O. Rama Devi)	(Mr.K.Sudhakar)	(Dr. O. Rama Devi)

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. J Naga Raju
Course Name & Code : Python Programming (20CS05)
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech III Sem AI & DS B-SEC **A.Y.:** 2023-24

PREREQUISITE: Discrete Mathematics and Data structures

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of the course is to learn various algorithm and design techniques and analyze the computing resources of the algorithms, and motivate the students to design new algorithms for various problems Identify basic building blocks of python to solve mathematical problems. (Understand-L2)

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

CO1	Identify basic building blocks of python to solve mathematical problems. (Understand-L2)
CO2	Apply the in-built data structures like list, tuple, set and dictionary for solving problems. (Apply - L3)
CO3	Use exception-handling mechanism to catch run-time errors(Apply– L3)
CO4	Demonstrate compelling concepts about string manipulation, regular expressions, and file handling. (Understand - L2)
CO5	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	PSO3
CO1	3	2	1	-	3	-	-	-	-	1	-	2	3	-	-
CO2	3	2	1	-	3	-	-	-	-	1	-	2	3	-	-
CO3	3	2	1	-	3	-	-	-	-	1	-	2	3	-	-
CO4	3	2	1	-	3	-	-	-	-	1	-	2	3	-	-
CO5	3	2	1	-	3	-	-	-	-	1	-	1	3	2	-
	1 - Low				**2 –Medium**					**3 - High**					

TEXTBOOKS:

T1	ReemaThareja,"PythonProgrammingUsingProblemSolvingApproach", Oxford Publications

REFERENCE BOOKS:

R1	Python for Everybody: Exploring Data In Python 3by Dr. Charles Russell Severance, Sue Blumenberg

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction & Divide and Conquer

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 and DAA syllabus discussion	1	08-08-2023			
2.	Introduction to Python: History of Python	1	08-08-2023			
3.	Usage of Python interpreter	1	09-08-2023			
4.	Python Shell, Indentation	1	11-08-2023			
5.	Python Built-in types, Variables,	1	16-08-2023			
6.	Assignment, Input-Output Statements	1	18-08-2023			
7.	Simple Programs,	1	21-08-2023			
8.	Identifiers and keywords, Literals	1	21-08-2023			
9.	Operators: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Bit-wise operators,	1	22-08-2023			
10.	Python Membership Operators (in & not in), Python Identity Operators (is & is not)	1	24-08-2023			
11.	Operator precedence	1	28-08-2023			
12.	Control Structures: Conditional Statements - if, if-else, Nested if-else	1	28-08-2023			
13.	Jumping Statements - continue, break, and pass	1	29-08-2023			
14.	Python Loops - while, for, Nested loops with Programming Examples,	1	31-08-2023			
15.	Mathematical Functions and Constants (import math), Random Number Functions.	1	01-09-2023			
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Lists,Tuples,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
16.	Lists: Concept, Creating and Accessing Elements, Updating & Deleting Lists	1	05-09-2023		1 & 2	
17.	basic List Operations, Reverse, Indexing,	1	05-09-2023		1 & 2	

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.	Indexing, Slicing and Matrices, Built-in List Functions.	1	06-09-2023		1 & 2	
19.	Tuples: Introduction, Creating & Deleting Tuples, Accessing values in a Tuple, Updating tuples, Delete Tuple Elements	1	08-09-2023		1 & 2	
20.	basic Tuple Operations, Indexing, Slicing and Matrices	1	12-09-2023		1 & 2	
21.	Built- in tuple Functions	1	12-09-2023		1 & 2	
22.	Sets: Concept, Operations.	1	13-09-2023		1 & 2	
23.	Dictionaries: Introduction, Accessing values in dictionaries	1	15-09-2023		1 & 2	
24.	working with dictionaries, Properties	1	19-09-2023		1 & 2	
25.	Functions.	1	19-09-2023		1 & 2	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Functions and Modular 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
26.	Functions: Defining a Function, Calling a Function,	1	20-09-2023		1 & 2	
27.	Types of Functions, Function Arguments,	2	22-09-2023 26-09-2023		1 & 2	
28.	Anonymous functions,	1	26-09-2023		1 & 2	
29.	Global and Local Variables, Recursion	1	27-09-2023		1 & 2	
30.	Modular Design: Creating modules,	2	29-09-2023		1 & 2	
31.	import statement, from, Date and Time Module	2	10-10-2023		1 & 2	
32.	Exception Handling: Exception, Exception Handling	1	10-10-2023		1 & 2	
33.	except clause, Try, finally clause,	1	11-10-2023		1 & 2	
34.	User Defined Exceptions	1	13-10-2023		1 & 2	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Back tracking

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35.	Python strings: Concept, Slicing, Escape characters,	1	17-10-2023		1 & 2	
36.	String Special Operations,	1	17-10-2023		1 & 2	
37.	String formatting Operator, Triple Quotes,	1	27-10-2023		1 & 2	
38.	Raw String, and Built-in String methods.	1	01-11-2023		1 & 2	
39.	Regular Expression Operations: Using Special Characters	1	01-11-2023		1 & 2	

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.	Named Groups in Python Regular Expressions,	2	02-11-2023 04-11-2023			
41.	Regular Expression with global Module.	1	08-11-2023			
42.	Files: Introduction to files	1	08-11-2023			
43.	file operations- Read, write, and search	2	09-11-2023 11-11-2023			

No. of classes required to complete UNIT-IV: 12 **No. of classes taken:**

UNIT-V: Object Oriented Programming 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
44.	Object Oriented Programming OOP in Python: Classes	1	15-11-2023		1 & 2	
45.	Self-variable , Methods,	1	15-11-2023		1 & 2	
46.	Constructor Method,	1	16-11-2023		1 & 2	
47.	Inheritance,	1	18-11-2023		1 & 2	
48.	Overriding Methods	2	25-11-2023 26-11-2023		1 & 2	
49.	Data hiding.	1	30-11-2023		1 & 2	

1No. of classes required to complete UNIT-V: 7 **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	**Mr. J . Naga Raju**	**Mrs.T.S.RajaRajeswari**	**Mr.S.S.Krishna**	**Dr.O.RamaDevi**
Signature				

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. P. MADHAVI
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 – B Section **A.Y.:** 2023-24

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

CO1	State the Basic Components of Database Management System and data modelling using Entity-Relationship Diagrams. (Understand- L2)
CO2	Examine the relational model using Structured Query Language (SQL). (Apply - L3)
CO3	Employ principles of normalization for effective database design. (Apply - L3)
CO4	Demonstrate the necessity of transaction processing, Concurrency control mechanisms and recovery strategies in DBMS. (Understand- L2)
CO5	Describe file organization, indexing techniques and the competency in selecting NoSQL Database. (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
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 Henry F. Korth, Abraham Silberschatz, S.Sudarshan, "Database System Concepts", McGrawHill, 6th edition, 2009.

T2 Shashank Tiwari, " ProfessionalNoSql", John Wiely& Sons, 2011.

REFERENCE BOOKS:

R1 Raghu Ramakrishnan, JohanneseGehrke, —Database Management System‖, McGrawHill, 3rd edition, 2000.

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

R3   RamezElmasri, ShamkanthB.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	07-08-23		1 & 2	
2.	Database System Vs File System, Database System Concepts	1	08-08-23		1 & 2	
3.	Three Schema Architecture, Data Models	1	10-08-23		1 & 2	
4.	Database Schema and Instances, Data Independence	1	11-08-23		1 & 2	
5.	Database Languages, Database Structure	1	14-08-23		1 & 2	
6.	ER model concepts, Notation for ER Diagram	1	17-08-23		1 & 2	
7.	Mapping Constraints, Keys	1	18-08-23		1 & 2	
8.	Concepts of Super Key, Candidate Key, Primary Key	1	21-08-23		1 & 2	
9.	Generalization, Aggregation	1	22-08-23		1 & 2	
10.	Reduction of an ER Diagrams to Tables, Relationships of Higher Degree.	1	24-08-23		1 & 2	
11.	Unit-1 Revision	1	25-08-23		1 & 2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

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
12.	Relational Data Model Concepts, Integrity Constraints	1	28-08-23		1 & 2	
13.	Entity Integrity, Referential Integrity	1	29-08-23		1 & 2	
14.	Key Constraints	1	31-08-23		1 & 2	
15.	Domain Constraints	1	01-09-23			
16.	Relational Algebra	1	04-09-23		1 & 2	
17.	Characteristics of SQL, Advantage of SQL	1	05-09-23		1 & 2	
18.	SQL Data types and Literals, Insert, Update and Delete Operations	1	07-09-23		1 & 2	
19.	Tables, Views and Indexes	1	08-09-23		1 & 2	
20.	Nested Queries, Aggregate Functions	1	11-09-23		1 & 2	
21.	Joins, Unions, Intersection, Minus	1	12-09-23		1 & 2	
22.	Cursors in SQL, Triggers in SQL	1	14-09-23		1 & 2	
23.	Unit-II revision	1	15-09-23		1 & 2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

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
24.	Functional Dependencies	1	18-09-23		1 & 2	
25.	Normal Forms - First, Second	1	19-09-23		1 & 2	
26.	Third Normal Forms, BCNF	1	21-09-23		1 & 2	
27.	Inclusion Dependences	1	22-09-23		1 & 2	
28.	Loss Less Join Decompositions	1	25-09-23		1 & 2	
29.	Multi Valued Dependencies	1	26-09-23		1 & 2	
30.	Fourth Normal Form	1	09-10-23		1 & 2	
31.	Join Dependencies and Fifth Normal Form	1	10-10-23		1 & 2	
32.	Unit-III Revision	1	12-10-23		1 & 2	
No. of classes required to complete UNIT-III: 09				**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
33.	Transaction System, Testing of Serializability	1	13-10-23		1 & 2	
34.	Serializability of Schedules	1	16-10-23		1 & 2	
35.	Conflict Serializability	1	17-10-23		1 & 2	
36.	View Serializability	1	20-10-23		1 & 2	
37.	Recoverability, Deadlock Handling	1	25-10-23		1 & 2	
38.	Concurrency Control	1	26-10-23		1 & 2	
39.	Locking Techniques for Concurrency Control	1	27-10-23		1 & 2	
40.	Time Stamping Protocols for Concurrency Control	1	30-10-23		1 & 2	
41.	Validation Based Protocol	1	31-10-23		1 & 2	
42.	Multiple Granularity	1	02-11-23		1 & 2	
43.	Recovery with Concurrent Transactions	1	03-11-23		1 & 2	
44.	Log Based Recovery, Checkpoints	1	06-11-23		1 & 2	
45.	ARIES Algorithm	1	07-11-23		1 & 2	
46.	Unit-IV revision	1	09-11-23			
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

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
47.	Storage and file structure	1	35-11-23		1 & 2	
48.	indexed files, hashed files	1	14-11-23		1 & 2	
49.	B+ trees	1	17-11-23		1 & 2	
50.	Files with dense index	1	20-11-23		1 & 2	
51.	files with variable length records	1	21-11-23		1 & 2	
52.	Introduction to NoSQL, Storing and Accessing Data	1	23-11-23		1 & 2	
53.	Storing Data In and Accessing Data from MongoDB	1	24-11-23		1 & 2	
54.	Querying MongoDB & Revision	1	27-11-23		1 & 2	
55.	Unit-5 revision	1	29-11-23		1 & 2	
56.	Discussion on External Exam	1	30-12-23		1 & 2	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

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

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	Ms.P.Madhavi	Mrs.V.Sowjanya	Mr. S.S.Rama Krishna	Dr. O. Ramadevi
Signature				

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. S.V.V.D.Jagadeesh
Course Name & Code : Object Oriented Programming (20CS09)
L-T-P Structure : 3-0-0   **Credits:** 3
Program/Sem/Sec : B.Tech III Sem AI & DS - A   **A.Y.:** 2023-24

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.

CO1	Demonstrate the fundamentals of object-oriented programming and basic building blocks of Java. **(Understand- L2)**
CO2	Apply object-oriented programming principles for the development of reusable applications. **(Apply - L3)**
CO3	Understand the importance of abstraction, user defined package creation and handling different exceptions. **(Understand- L2)**
CO4	Develop multitasking applications using JAVA multithreaded programming and perform different operations upon various data structures by using collection framework. **(Apply – L3)**
CO5	Develop GUI applications using AWT (Abstract Window Toolkit). **(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	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	2	-	-	-	-	-	-	-	-	-	-	3	2	-
CO5	-	2	1	-	-	-	-	-	-	-	-	-	3	2	-
	1 - Low			**2 –**Medium				**3 -** 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. Nageswara Rao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition, 2008.
R2 E. Bala Guru Swamy, "Programming with JAVA", TMH Publications, 2nd Edition, 2000.
R3 Patrick Niemeyer & Jonathan Knudsen, "Learning JAVA", O'REILLY Publications, 3rd Edition,
R4 2005.
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: Introduction to OOP:

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 OOP** Programming paradigms	1	07-08-23		1 & 2	
2.	Procedural Programming language, Object Oriented Language	1	10-08-23		1 & 2	
3.	PPL vs OOP, Principles of OOP	1	10-08-23		1 & 2	
4.	**Introduction to JAVA** Java Features	1	14-08-23		1 & 2	
5.	Data types	1	17-08-23		1 & 2	
6.	Variables, Keywords	1	17-08-23		1 & 2	
7.	Operators- Arithmetic, Relational and Logical Operators	1	19-08-23		1 & 2	
8.	Operators- Bitwise, Assignment, Unary and InstanceOf Operators	1	21-08-23		1 & 2	
9.	Control Statements- Conditional Statements	1	24-08-23		1 & 2	
10.	Control Statements- Looping Statements, Nested Loops	1	24-08-23		1 & 2	
11.	**Introduction to Classes and Object** Class Definition, Variables, Declaring Objects	1	26-08-23		1 & 2	
12.	Methods	1	28-08-23		1 & 2	
13.	Constructors and its types, this keyword	1	31-08-23		1 & 2	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: Classes and Objects, Inheritance & Polymorphism

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	**Introduction to classes & objects** Overloading methods, Constructors	1	31-08-23		1 & 2	
15.	Parameter Passing, returning objects	1	02-09-23		1 & 2	
16.	Recursion	1	04-09-23		1 & 2	
17.	Access Control	1	07-09-23		1 & 2	
18.	Nested and inner classes	1	07-09-23		1 & 2	
19.	final keyword	1	09-09-23		1 & 2	
20.	static keyword, Variable, Command line arguments	1	11-09-23		1 & 2	
21.	**Inheritance and Polymorphism** Types of Inheritance	1	14-09-23		1 & 2	
22.	Types of Inheritance with examples	1	14-09-23		1 & 2	
23.	super keyword	1	16-09-23		1 & 2	
24.	Polymorphism(overloading & overriding), Dynamic method dispatch	1	18-09-23		1 & 2	
25.	Abstract class using final with inheritance	1	21-09-23		1 & 2	
26.	**String handling classes** String Class	1	21-09-23		1 & 2	
27.	String Buffer	1	23-09-23		1 & 2	
28.	String Buffer, String Tokenizer	1	25-09-23		1 & 2	
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

UNIT-III: Interfaces and Packages, 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
29.	Interface methods	1	28-09-23		1 & 2	
30.	Inheritance in interfaces	1	28-09-23		1 & 2	
31.	**API: Built-in JAVA packages**	1	30-09-23		1 & 2	
32.	Creating and managing user defined packages	1	09-10-23		1 & 2	
33.	Creating and managing user defined packages	1	12-10-23		1 & 2	
34.	Importance of CLASSPATH.	1	12-10-23		1 & 2	
35.	**Exception Handling Introduction** Exception Handling hierarchy	1	14-10-23		1 & 2	
36.	Importance of try and catch with example	1	16-10-23		1 & 2	
37.	throw, throws	1	19-10-23		1 & 2	
38.	Finally, Block creation of user-defined Exceptions	1	19-10-23		1 & 2	
39.	Block creation of user-defined Exceptions, Assertions.	1	21-10-23		1 & 2	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Multithreading, Collection Framework:

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.	**Introduction of thread** Thread life cycle	1	26-10-23		1 & 2	
41.	creation of threads	1	26-10-23		1 & 2	
42.	Naming a thread	1	28-10-23		1 & 2	
43.	Joining a thread, Thread priorities	1	30-10-23		1 & 2	
44.	Thread priorities	1	02-11-23		1 & 2	
45.	Daemon thread	1	02-11-23		1 & 2	
46.	Thread pool	1	04-11-23		1 & 2	
47.	Thread group	1	06-11-23		1 & 2	
48.	Thread Synchronization	1	09-11-23		1 & 2	
49.	Inter thread communication	1	09-11-23		1 & 2	
50.	**Collection Framework: Introduction**	1	11-11-23		1 & 2	
51.	Generics, Collection framework hierarchy	1	13-11-23		1 & 2	
52.	List, set	1	16-11-23		1 & 2	
53.	Queue and map	1	16-11-23		1 & 2	
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: AWT, Event 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
54.	**AWT Introduction, Hierarchy**	1	18-11-23		1 & 2	
55.	Components & Containers	1	20-11-23		1 & 2	
56.	Button, Label, Text Field	1	23-11-23		1 & 2	
57.	Checkbox, Choice, List	1	23-11-23		1 & 2	
58.	Canvas, Scrollbar, Menus	1	25-11-23		1 & 2	
59.	Layout Managers	1	27-11-23		1 & 2	
60.	**Event Handling:** Event Delegation Model, Event Classes	1	30-11-23		1 & 2	
61.	Listener Interfaces, Key Listener and Window Listener	1	30-11-23		1 & 2	

62.	Adapter Classes, close AWT window	1	02-12-23		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.
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PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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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	Mr. S.V.V.D.Jagadeesh	Mr. S.V.V.D.Jagadeesh	Mr. S.S. Rama Krishna	Dr. O. Rama Devi
Signature				

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Estd: 1998

COURSE HANDOUT
PART-A

Name of Course Instructor   : Mr. J Naga Raju
Course Name & Code   : Python Programming Lab (20CS54)
L-T-P Structure   : 0-0-3   Credits : 1.5
Program/Sem/Sec   : B.Tech / III-Sem./B-Sec   A.Y   : 2023-24

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

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

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	10-08-23		**TLM4**	
2.	Example programs	3	17-08-23		**TLM4**	
3.	Module-1	3	24-08-23		**TLM4**	
4.	Module-2	3	31-08-23		**TLM4**	
5.	Module-3	3	07-09-23		**TLM4**	
6.	Module-4	3	14-09-23		**TLM4**	
7.	Module-5	3	21-09-23		**TLM4**	
8.	Module-6	3	28-09-23		**TLM4**	
9.	Module-7	3	12-10-23		**TLM4**	
10.	Module-8	3	26-10-23		**TLM4**	
11.	Module-9	3	02-11-23		**TLM4**	
12.	Module-10	3	09-11-23		**TLM4**	
13.	Revision	3	16-11-23		**TLM4**	
14.	Internal Lab	3	23-11-23		**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):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Mr J Naga Raju)	(Mrs T.S.R Rajeswari)	(Mr S.S Rama Krishna)	(Dr O. Rama Devi)

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE HANDOUT
PART-A

Name of Course Instructor: Ms. P. MADHAVI
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 – B Section   **A.Y.:** 2023-24

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

CO 1	Create & manipulate the relational database using SQL**. (Apply- L3)**
CO 2	Implement Views, procedures, triggers, and cursors on relational database. **(Apply- L3)**
CO 3	Create Unstructured Databases using MongoDB**. (Apply- L3)**
CO 4	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
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	Introduction to SQL, syntax	3	09-08-23		TLM4	
2	Experiment - 1	3	16-08-23		TLM4	
3	Experiment - 2	3	23-08-23		TLM4	
4	Experiment - 3	3	30-08-23		TLM4	
5	Experiment - 4	3	13-09-23		TLM4	
6	Experiment – 5,6	3	20-09-23		TLM4	
7	Experiment – 7	3	20-09-23		TLM4	
8	Experiment – 8	3	11-10-23		TLM4	
9	Experiment – 9	3	18-10-23		TLM4	
10	Experiment – 10,11	3	25-10-23		TLM4	
11	Experiment – 12	3	01-11-23		TLM4	
12	Experiment – 13	3	08-11-23		TLM4	
13	Experiment – 14	3	15-11-23		TLM4	
14	Experiment – 15	3	22-11-23		TLM4	
15	Design database for Case study	3	29-11-23		TLM4	
16	Internal Exam	3	13-12-23		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 Marksfor 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):

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	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	**Ms. P. Madhavi**	**Mrs. V. Sowjanya**	**Mr. S. S. Rama Krishna**	**Dr. O. Rama Devi**
Signature				

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COURSE HANDOUT
PART-A

Name of Course Instructor : Ms.K. VINAYA SREE BAI
Course Name & Code :Object Oriented Programming Lab (20CS57)
L-T-P Structure : 0-0-3   **Credits:**1.5
Program/Sem/Sec : II B.Tech III Sem AI & DS - B   **A.Y.:** 2023-24

PRE-REQUISITE: Programming for Problem Solving using C and Data structures

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to apply the constructs of 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 (COs): At the end of the course, students are able to

CO 1	Solve basic mathematical problems using fundamentals of Java and its objectoriented principles. **(Apply – L3)**
CO 2	Implement multithreading and exception handling mechanisms. **(Apply – L3)**
CO 3	Develop GUI applications and basic data structures using collection framework. **(Apply – L3)**
CO 4	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	3	2	-	-	-	-	-	-	-	-	-	-	3	1	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-	3	1	-
CO3	-	1	2	-	-	-	-	-	-	-	-	-	3	1	-
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).

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. Nageswara Rao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition, 2008.
R2 E. Bala Guru Swamy, "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): 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 lab on C++	3	7-8-2023		TLM4	
2	Java Basic programs	3	14-8-2023		TLM4	
3	Classes and objects	3	21-8-2023		TLM4	
4	Constructor & Parameter Passing	3	28-8-2023		TLM4	
5	Static keyword, Strings	3	4-9-2023		TLM4	
6	Inheritance & Polymorphism	3	11-9-2023		TLM4	
7	Dynamic method dispatch & Interfaces	3	25-9-2023		TLM4	
8	Packages & Exception Handling	3	9-10-2023		TLM4	
9	Multithreading programs	3	16-10-2023		TLM4	
10	Collections, Framework	3	30-10-2023		TLM4	
11	AWT Controls	3	6-11-2023		TLM4	
12	AWT Controls	3	13-11-2023		TLM4	
13	Event Handling	3	20-11-2023		TLM4	
14	Internal Exam	3	27-11-2023		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

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

Parameter	Marks
Day to Day work	5
Record	5
Internal Test	5
Total	**15**

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

Parameter	Marks
Procedure/Algorithm	5
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	5
Viva voce	5
Total	**35**

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
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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	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	**Ms. K. Vinaya Sree Bai**	**Mr. S V V D Jagadeesh**	**Mr. S. Siva Rama Krishna**	**Dr. O. Rama Devi**
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor K.Sudhakar

Course Name & Code: Web Application Development Using Fullstack-Module-1 (Front End Development), 20CSS1

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

Program/Sem/Sec: B.Tech / III /SEC-B   **A.Y.:** 2023-24

PREREQUISITE: Knowledge of basic Computer hardware & software.

Course Educational Objective: 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 pages using JQuery.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

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

CO1	Understand the basic design and styling of web pages. **(Understand- L2)**
CO2	Understand the DOM of web design, markup language and client-side scripting. **(Understand- L2)**
CO3	Understand the responsive web design using DHTML. **(Understand- L2)**
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	2	-	2	-	-	-	-	-	-	-	3	2	-
CO2	-	-	2	-	2	-	-	-	-	-	-	-	3	2	-
CO3	-	-	2	-	2	-	-	-	-	-	-	-	3	2	-
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
1 - Low 2 –Medium 3 - High														

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REFERENCE BOOKS:

1. HTML & CSS: The Complete Reference, 5thEditionby Thomas Powell, McGrawHill, 2017.
2. Beginning HTML, XHTML, CSS, and JavaScript by Jon Duckett, Wiley India, 2010.
3. jQuery Cookbook by Cody Lindley, O'Reilly Media, 2009
4. HTML, XHTML, and CSS Bible, 5th Edition by Steven M. Schafer, Wiley India, 2011.
5. Web Development with jQuery by Richard York, Wiley India, 2015.
6. Head first HTML & CSS 2nd Edition by Elisabeth Robson, Eric Freeman, O'Reilly.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

Web Application Development Using Fullstack-Module-1 (Front End Development), 20CSS1.

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	Design of web pages (Basic Structure, text formatting tags, heading tags, image tag, marquee tag, hyperlink, paragraph, font, line breaking, types of lists).	4	11.08.2023	4	TLM 4	
2	Design of web pages (Basic Structure, text formatting tags, heading tags, image tag, marquee tag, hyperlink,	4	25.08.2023		TLM 4	

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	paragraph, font, line breaking, types of lists).					
3	Creating Web applications using HTML5 (Table tags, Form elements, Frames concept)	4	01.09.2023		TLM 4	
4	Creating Web applications using HTML5 (Table tags, Form elements, Frames concept)	4	15.09.2023		TLM 4	
5	Styling the web pages using CSS (Types of CSS, CSS Selectors, Properties: Text, backgrounds, font, Links, Borders, Margins, Cell padding, Layouts).	4	22.09.2023		TLM 4	
6	Styling the web pages using CSS (Types of CSS, CSS Selectors, Properties: Text, backgrounds, font, Links, Borders, Margins, Cell padding, Layouts).	4	29.09.2023		TLM 4	
7	Styling the web pages using CSS (Types of CSS, CSS Selectors, Properties: Text, backgrounds, font, Links, Borders, Margins, Cell padding, Layouts).	4	13.10.2023		TLM 4	
7	Validating the web forms using JavaScript (JavaScript Introduction, JavaScript DOM, Form	4	20.10.2023		TLM 4	

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	validation).					
8	Validating the web forms using JavaScript (JavaScript Introduction, JavaScript DOM, Form validation).	4	27.10.2023		TLM 4	
	Validating the web forms using JavaScript (JavaScript Introduction, JavaScript DOM, Form validation).	4	03.11.2023			
9	Handling and validating semi-structured data a. XML document validation using DTD & Schema b. JSON	4	10.11.2023		TLM 4	
10	Handling and validating semi-structured data a. XML document validation using DTD & Schema b. JSON	4	17.11.2023		TLM 4	
	jQuery a. selectors b. validation c. hide d. slide e. fades f. animation	4	24.11.2023			
11	**jQuery** a. selectors b. validation c. hide d. slide e. fades f. animation	4	01.12.2023		TLM 4	

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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
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 analyse 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.

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PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics, 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, 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.

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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.
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	**K.Sudhakar**			**Dr.O.RamaDevi**
Signature				