LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., IV-Sem., CSE (A)

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : PROBABILITY AND STATISTICS - 17FE08

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : M.RAMI REDDY

COURSE COORDINATOR : M.RAMI REDDY

PRE-REQUISITES: None

COURSE EDUCATIONAL OBJECTIVES (CEOs) : In this course the students are able to understand the applications of probability distributions. They also learn various sample tests in testing the hypothesis and correlation, regression of a bi-variate data.

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

CO1: Predict various probabilistic situations based on various laws of probability and random variables.
CO2: Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Exponential distributions.
CO3: Estimate the point and interval estimators of mean and proportion for the given Sample data.
CO4: Apply various sample tests like Z-test, t-test, F-test and $\chi 2$ -test for decision making regarding the population based on sample data.
CO5: Estimate the level of correlation, the linear relationship using the regression lines for the given bivariate data.

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

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

T1 Miller & Freund's "Probability and Statistics for Engineers",8th edition. PHI, New Delhi,2011.

T2 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics", 11thEdition, Sultan Chand and sons, New Delhi,2014.

BOS APPROVED REFERENCE BOOKS:

R1 Jay L.Devore "Probability and Statistics for engineering and the sciences." , 8th edition, Cengage Learning india, 2012.

R2 B.V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, syllabus course outcomes	1	18-08-20		TLM5	---	---	
2.	Introduction to probability	1	19-08-20		TLM5	CO1	T1	
3.	Basic definitions, simple problems	1	20-08-20		TLM5	CO1	T1	
4.	Axioms, simple examples	1	21-08-20		TLM5	CO1	T1, ,T2	
5.	Problem on addition Rule	1	25-08-20		TLM5	CO1	T1	
6.	Conditional probability	1	26-08-20		TLM5	CO1	T1	
7.	Multiplication rule, examples	1	27-08-20		TLM5	CO1	T1	
8.	Independent events, problems	1	28-08-20		TLM5	CO1	T1, ,T2	
9.	Baye's rule	1	01-09-20		TLM5	CO1	T1	
10.	Problems on baye's rule	1	02-09-20		TLM5	CO1	T1, ,T2	
11.	Random variables, Mathematical	1	03-09-20		TLM5	CO1	T1	

	Expections							
12.	Problems on PMF	1	04-09-20		TLM5	CO1	T1,T2	
13.	Problems on PDF	1	08-09-20		TLM5	CO1	T1,T2	
14.	Unit summary, Tutorial	1	09-09-20		TLM3,5	CO1	T1	
No. of classes as per schedule for 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
15.	Binomial Distribution : mean and variance	1	10-09-20		TLM5	CO2	T1	
16.	Problems on Binomial distribution	1	11-09-20		TLM5	CO2	T1,T2	
17.	Fitting of binomial distribution	1	15-09-20		TLM5	CO2	T1,T2	
18.	Poisson distribution, mean and variance	1	16-09-20		TLM5	CO2	T1	
19.	Problems on Poisson distribution	1	17-09-20		TLM5	CO2	T1,T2	
20.	Fitting of poisson distributions	1	18-09-20		TLM5	CO2	T1,T2	
21.	Normal distribution, problems	1	22-09-20		TLM5	CO2	T1	
22.	Problems on Normal Distribution	1	23-09-20		TLM5	CO2	T1,T2	
23.	Exponential distribution	1	24-09-20		TLM5	CO2	T1,T2	
24.	Unit summary, Tutorial	1	25-09-20		TLM3, 5	CO2	T1,T2	
No. of classes as per schedule for UNIT-II		10			No. of classes taken:			

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

25.	Sampling distribution ,definitions	1	06-10-20		TLM5	CO3	T1	
26.	Sampling distribution of mean	1	07-10-20		TLM5	CO3	T1	
27.	problems	1	08-10-20		TLM5	CO3	T1,T2	
28.	Problems on central limit theorem	1	09-10-20		TLM5	CO3	T1,T2	
29.	Problems on central limit theorem	1	13-10-20		TLM5	CO3	T1	
30.	Point and interval estimation	1	14-10-20		TLM5	CO3	T1	
31.	Interval estimation of mean	1	15-10-20		TLM5	CO3	T1,T2	
32.	Interval estimation of proportion	1	16-10-20		TLM5	CO3	T1,T2	
33.	interval estimation of small samples	1	20-10-20		TLM5	CO3	T1,T2	
34.	Unit summary, Tutorial	1	21-10-20		TLM3, 5	CO3	T1,T2	
No. of classes as per schedule for UNIT-III		10			No. of classes taken:			

UNIT-III : Sampling Distribution & Estimation

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
35.	Testing of Hypothesis , definitions	1	22-10-20		TLM5	CO4	T1	
36.	Z-test for single mean	1	23-10-20		TLM5	CO4	T1,T2	
37.	Z-test for difference of means	1	27-10-20		TLM5	CO4	T1,T2	
38.	Z-test for single proportion	1	28-10-20		TLM5	CO4	T1,T2	
39.	Z-test for difference of proportions	1	29-10-20		TLM5	CO4	T1	
40.	t-test for single mean	1	30-10-20		TLM5	CO4	T1,T2	
41.	t-test for difference of means	1	03-11-20		TLM5	CO4	T1,T2	
42.	Paired t-test	1	04-11-20		TLM5	CO4	T1,T2	
43.	F-test for population	1	05-11-20		TLM5	CO4	T1,T2	

	variances							
44.	χ^2 test for goodness of fit	1	06-11-20		TLM5	CO4	T1,T2	
45.	χ^2 test for independence of attributes	1	10-11-20		TLM5	CO4	T1,T2	
46.	Unit summary, Tutorial	1	11-11-20		TLM3,5	CO4	T1,T2	
No. of classes as per schedule for UNIT-IV		12			No. of classes taken:			

UNIT-V : Correlation & Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
47.	Simple Bi-variate Correlation	1	12-11-20		TLM5	CO5	T1	
48.	Problems on Pearson's Correlation	1	13-11-20		TLM5	CO5	T1,T2	
49.	Regression lines	1	17-11-20		TLM5	CO5	T1	
50.	Problems on Regression lines	1	18-11-20		TLM5	CO5	T1,T2	
51.	Properties of Regression coefficients	1	19-11-20		TLM5	CO5	T1,T2	
52.	Problems on Regression coefficients	1	20-11-20		TLM5	CO5	T1,T2	
53.	Rank correlation	1	24-11-20		TLM5	CO5	T1,T2	
54.	Problems on rank Correlation	1	25-11-20		TLM5	CO5	T1	
55.	Problems on repeated ranks	1	26-11-20		TLM5	CO5	T1	
56.	Unit summary, Tutorial	1	27-11-20		TLM3,5	CO5	T1,T2	
No. of classes as		10			No. of classes taken:			

per schedule for UNIT-V		

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
57.	Axioms of probability, results	1	21-08-20		TLM5	CO1	T1	
58.	Bivariate correlation	1	13-11-20		TLM5	CO5	T1	

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

Part - C

EVALUATION PROCESS:

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any

Other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:-

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

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.

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.

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.

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.

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.

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.

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

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

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.

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.

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

PROGRAM SPECIFIC OUTCOMES(PSOs):-

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

M.RAMI REDDY	M.RAMI REDDY	Dr.A.RAMI REDDY	Dr.A.RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

COURSE HANDOUT

PART-A

Program/Sem/Sec : B.Tech., CSE., III-Sem, Section- A,
ACADEMIC YEAR **:** 2020-21
Course Name & Code : Environmental Science & 17FE03
L-T-P Structure : 3-0-0
Credits : 3
Name of Course Instructor : V. Bhagya Lakshmi
Name of Course Coordinator **:** Dr. Shaheda Niloufer

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 Mahua Basu, 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	17-08-2020		2	
2.	Scope and importance of environmental studies	1	19-08-2020		2	
3.	Population explosion and variations among Nations.	1	24-08-2020		2	
4.	Resettlement and Rehabilitation - Issues and possible solutions	1	26-08-2020		2	
5.	Environment	1	31-08-2020		2	

	and human health					
6.	HIV-AIDS, Environmental ethics **Assignment in UNIT I**	1	02-09-2020		2,3	
7.	Role of Information Technology in environmental management and human health **Tutorial -1**	1	07-09-2020		2,3	
No. of classes required to complete UNIT-I: 9				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, Assignment in Unit II	1	09-09-2020		2	
2.	Water Resources	1	14-09-2020		2	
3.	Mineral Resources	1	16-09-2020		2	
4.	Food Resources	1	21-09-2020		2	
5.	Energy Resources **Tutorial-2**	1	23-09-2020		2,3	
6.	I MID EXAMINATION	1	28-09-2020			
7.	I MID EXAMINATION	1	30-09-2020			
No. of classes required to complete UNIT-II: 10				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 Food chains and Food webs, Ecological succession, Ecological pyramids	1	5-10-2020		2	
2.	Biogeochemical cycles, Major Types	1	7-10-2020		2	

	of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation					
3.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Man and wild life conflicts. Endangered and endemic species of India	1	12-10-2020		2	
4.	Conservation of biodiversity: In-situ and Ex-situ conservation methods **Tutorial-3**	1	14-10-2020		2,3	
No. of classes required to complete UNIT-III: 9				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.	Causes, effects and control measures of: Water Pollution	1	19-10-2020		2	
2.	Causes, effects and control measures of: Soil Pollution, Causes, effects and control measures of: Noise Pollution	1	21-10-2020		2	
3.	Causes, effects and control measures of: Nuclear Pollution **Tutorial-4**	1	26-10-2020		2,3	
4.	Solid Waste Management, Disaster Management-	1	28-10-2020		2	

	Floods, Cyclones, Earthquakes, Landslides and Tsunamis.					
5.	Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion. Sustainable development and un-sustainability. **Assignment in Unit IV**	1	04-11-2020		2,3	
No. of classes required to complete UNIT-IV: 9				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.	Stockholm and Rio Summit	1	09-11-2020		2	
2.	Green building **Tutorial-5**	1	11-11-2020		2,3	
3.	Environmental Impact Assessment (EIA), Environmental Law	1	16-11-2020		2	
4.	Consumerism and Waste products. Carbon credits and carbon trading. **Assignment in UNIT- V**	1	18-11-2020		2,3	
5.	**II Mid Examination**	1	23-11-2020			
6.	**II Mid Examination**	1	25-11-2020			
No. of classes required to complete UNIT-V: 8				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

V. Bhagya Lakshmi	**Dr. Shaheda Niloufer**	**Dr. Shaheda Niloufer**	**Dr. A. Rami Reddy**
Course Instructor (Name)	Course Coordinator (Name)	Module Coordinator (Name)	HOD (Name)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., III-SEM, CSE-A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : **DISCRETE MATHEMATICAL STRUCTURES**– 17CI03

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.V. Siva Krishna**

COURSE COORDINATOR : **Mr.D. Srinivasa Rao**

PRE-REQUISITE: Basic Mathematical Knowledge

COURSE OBJECTIVE:. Perform the operations associated with relations and functions. Relate practical examples to the functions and relations and interpret the associated operations and terminology used in the context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behaviour of software or to solve problems such as puzzles.

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

CO1: Construct mathematical arguments using logical connectives and quantifiers and verify them.
CO2: Demonstrate the basic terminology of functions, relations, lattices and their operations through examples
CO3: Apply the properties of graphs to solve the graph theory problems.
CO4: Apply basic principles/techniques to solve different algebraic structures & combinatorial problems.
CO5: Solve linear recurrence relations by recognizing homogeneity using constant coefficients and characteristic roots and Generating functions.

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

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

1. Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH Publications.
2. Mott, Kandel, Baker,Discrete Mathematics for Computer Scientists & Mathematicians, PHI,2/e.

REFERENCE BOOKS:

1. Thomas Koshy,Discrete Mathematics with Applications, Elsevier
2. JK Sharma ,Macmillan Discrete Mathematics,2nd edition,
3. Chandrasekaran,Umaparvathi,Discrete Mathematics,PHI, 2010
4. Ralph. P.Grimaldi, Ramana, Discrete and Combinational Mathematics,Pearson,5th edition.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A
UNIT-I : Mathematical Logic

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Mathematical Logic: Propositional Calculus	1	17.08.2020		TLM2	
2.	Statement and Notations, Connectives,	1	19.08.2020		TLM2	
3.	Truth Tables, Tautologies	1	21.08.2020		TLM2	
4.	Equivalence of Formulas, Duality law	1	22.08.2020			
5.	Tautological Implications	1	24.08.2020		TLM2	
6.	Normal Forms	2	26.08.2020 28.08.2020		TLM2	
7.	Theory of Inference for Statement Calculus	1	29.08.2020		TLM2	
8.	Consistency of Premises , Indirect Method of Proof	1	31.08.2020		TLM2	
9.	Introduction to Predicate Calculus	1	02-09-2020		TLM2	
10.	Variables and Quantifiers, Free and Bound Variables	2	04-09-2020 05.09.2020		TLM2	

11.	Inference Theory for Predicate Calculus	1	07.09.2020		TLM2	
12.	Tutorial – I	1	09.09.2020		TLM3	
No. of Classes Required to complete UNIT I: 14				No. of classes taken:		

UNIT-II: SETS,RELATIONS AND FUNCTIONS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Set Theory: Introduction, Operations on Binary Sets	1	11.09.2020		TLM2	
14.	Relations: Properties of Binary Relations	1	12.09.2020		TLM2	
15.	Relation Matrix and Digraph Operations on Relations	1	14.09.2020		TLM2	
16.	Partition and Covering, Transitive Closure	1	16.09.2020		TLM2	
17.	Equivalence Relation, Compatibility Relation	1	18.09.2020		TLM2	
18.	Partial Ordering Relation & Hasse Diagrams	1	19.09.2020		TLM2	
19.	Functions: Bijective Functions	1	21.09.2020		TLM2	
20.	Composition of Functions, Inverse Functions	1	23.09.2020		TLM2	
21.	Permutation Functions, Recursive Functions	1	25.09.2020		TLM2	
22.	Tutorial – II	1	26.09.2020		TLM3	
No. of Classes Required to complete UNIT II : 11				No. of classes taken:		

UNIT-III: Graph Theory

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs	1	05.10.2020		TLM2	
24.	Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits	1	07.10.2020		TLM2	
25.	Eulerian Graphs, Hamiltonian Graphs	1	09.10.2020		TLM2	
26.	Multigraphs, Planar Graphs, Euler's Formula	1	10.10.2020		TLM2	
27.	Graph Colouring and Covering, Chromatic Number	1	12.10.2020		TLM2	
28.	Trees, Directed trees, Binary Trees, Decision Trees	1	14.10.2020		TLM2	
29.	Spanning Trees: Properties	1	16.10.2020		TLM2	
30.	Algorithms for Spanning trees and Minimum Spanning Trees	1	17.10.2020		TLM2	
31.	Tutorial – III	1	19.10.2020		TLM3	
No. of Classes Required to complete UNIT III: 14				No. of classes taken:		

UNIT-IV: Algebraic Structures & Combinatorics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Algebraic Systems with one Binary Operation	1	21.10.2020		TLM2	
33.	Properties of Binary operations, Semi groups and Monoids	1	23-10-2020		TLM2	
34.	Homomorphism of Semi groups and Monoids, Groups, Abelian	1	24-11-2020		TLM2	

	Group, Cosets, Subgroups					
35.	Lattice: Properties, Algebraic Systems with two Binary Operations: Rings	1	26-11-2020		TLM2	
36.	Basic of Counting, Permutations, Derangements	1	28-11-2020		TLM2	
37.	Permutations with Repetition of Objects	1	30-11-2020		TLM2	
38.	Circular Permutations, Restricted Permutations	1	31-11-2020		TLM2	
39.	Combinations, Restricted Combinations	1	02-11-2020		TLM2	
40.	Pigeonhole Principle and its Application, Algebraic Systems with one Binary Operation	1	04-11-2020		TLM2	
41.	Properties of Binary operations, Semi groups and Monoids	1	06-11-2020		TLM2	
42.	Tutorial – IV	1	06-11-2020		TLM-3	
No. of Classes Required to complete UNIT IV : 06				No. of classes taken:		

UNIT-V: Recurrence Relations

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Generating Function of Sequences,	1	07-11-2020		TLM2	
44.	Calculating Coefficient of Generating Functions	1	09-11-2020		TLM2	
45.	Recurrence Relations, Formulation as Recurrence Relations	1	10-11-2020		TLM2	
46.	Solving linear homogeneous recurrence Relations by	1	11-11-2020		TLM2	

	substitution					
47.	Generating functions and The Method of Characteristic Roots	1	13-11-2020		TLM2	
48.	Solving Inhomogeneous Recurrence Relations	1	14.11.2020		TLM2	
49.	Tutorial – V	1	14-11-2020		TLM3	
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/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment –1	A1=5
Assignment –2	A2=5
Quiz-1	B1=10
I-Mid Examination	C1=20
Assignment –3	A3=5
Assignment –4	A4=5
Assignment --5	A5=5
Quiz-2	B2=10
II-Mid Examination	C2=20
Evaluation of Assignment Marks: A=(A1+A2+A3+A4+A5)/5	A=5
Evaluation of Quiz Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	B=10
Evaluation of Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	C=20
Attendance	D=5
Cumulative Internal Examination : A+B+C+D	**A+B+C+D=4**
Semester End Examinations	**E=60**
Total Marks: A+B+C+D+E	**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	**Programming Paradigms:** To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes/ methodologies/ practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Mr. V. Siva Krishna)	(Mr. D. Srinivasa Rao)	(Dr.Ch.V.Narayana)	(Dr. D. Veeraiah)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., III-Sem., CSE-A
ACADEMIC YEAR : 2020-21
COURSE NAME & CODE : PYTHON PROGRAMMING-17CI04
L-T-P STRUCTURE : 2-2-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : **Mr. S. Govindu**
COURSE COORDINATOR : **Mr. K. Sundeep Saradhi**

Pre-requisites: C Programming

Course Educational Objectives (CEOs: Python is a Modern Language useful for writing compact codes specifically for Programming in the area of Server-side Web Development, Data Analytics, AI and Scientific Computing as well as Production Tools and Game Programming.

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

CO1: Identify the basic python constructs with a view of using them in problem solving.
CO2: Apply control structures and use python lists in examples of problem solving.
CO3: Explore the utility of strings and functions in modular programming using python.
CO4: Apply tuple, set and file operations to organize the data in real world problems.
CO5: Analyze various searching and sorting techniques using python and apply exception Handling, database operations in python.

Course Articulation Matrix:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PO11**	**PO12**	**PS01**	**PSO 2**	**PSO 3**
CO 1	3	2	1	-	3	-	-	-	-	-	-	2	3	-	1
CO 2	3	2	1	-	3	-	-	-	-	-	-	3	3	-	1
CO	3	2	1	-	3	-	-	-	-	-	-	3	3	-	1

3														
CO 4	3	2	1	-	3	-	-	-	-	-	-	3	3	-	1
CO 5	3	2	1	-	3	-	-	-	-	-	-	3	3	-	1

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

BOS APPROVED TEXT BOOKS:

T1 PovelSolin, Martin Novak, "Introduction to Python Programming", NC Lab Public Computing, 2013.

T2 Bill Lubanovic, "Introducing Python- Modern Computing in Simple Packages", O'Reilly Publication, 1st Edition, 2015.

BOS APPROVED REFERENCE BOOKS:

R1 Jacob Fredslund, "Introduction to Python Programming", 2007.

R2 Y. Danial Liang, "Introduction to programming using python", Pearson, 2013.

R3 R. Nageswara Rao, "Core python programming", Dreamtech, 2017.

R4 Mark Summerfield, "Programming in Python 3" Pearson Education, 2nd Edition, 2010.

R5 Magnus Lie Hetland, "Beginning Python – From Novice to Professional", APress Publication, 3rd Edition, 2017.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT –I: Introduction to Python and Operators

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Programming, History of Python	1	20-08-20		**TLM1/ TLM2**	**CO1**	**T1**	
2.	Usage of Python Interpreter, Structure of Python Program	1	20-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
3.	Python Shell , Indentation	1	21-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	

4.	Python Built-in types, Variables	1	27-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
5.	Assignment, Input-Output Statements	1	27-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
6.	Identifiers, Keywords, Literals , simple programs	1	28-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
7.	Literals , simple programs	1	29-08-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
8.	Arithmetic operators	1	03-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
9.	Relational Operators	1	03-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
10.	Logical , Assignment Operators	1	04-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
11.	Bitwise Operators, Increment/decrement operators	1	05-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
12.	Python Membership Operators	1	10-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	
13.	Python Identity Operator , Operator Precedence	1	10-09-20		**TLM1/ TLM2/ TLM5**	**CO1**	**T1**	

No. of classes required to complete **UNIT-1:** 13	No. of classes taken:

UNIT –II: Control Structures and Lists

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
14.	Conditional statements – if, if-else	1	11-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
15.	Nested If-else	1	12-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
16.	Jumping Statements – continue, break, pass	1	17-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
17.	Python Loops – While loop, for loop	1	17-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
18.	Nested Loops with Programs	1	18-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
19.	Mathematical functions & constants, Random Number functions	1	19-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
20.	Python List – concept, Creating and Accessing Elements	1	24-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
21.	Updating Lists & Deleting Lists, Basic List operations	1	24-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
22.	Reverse, Indexing, Slicing	1	25-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
23.	Matrices, Built-in List Functions	1	26-09-20		**TLM1/TLM2/ TLM5**	**CO2**	**T1**	
No. of classes required to complete **UNIT-2:** 10					No. of classes taken:			

UNIT –III: Strings & Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
24.	Python Strings - concept	1	08-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
25.	Slicing, Escape Characters	1	08-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
26.	String Special Operations, String formatting operator	1	09-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
27.	Triple quotes , raw string	1	10-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
28.	Unicode strings, Built-in string methods	1	15-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
29.	Defining and calling a function	1	15-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
30.	Types of functions, Function arguments	1	16-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
31.	Anonymous functions, Global and Local variables	1	17-10-20		**TLM1/TLM2/ TLM5**	**CO3**	**T1**	
32.	Recursion with programs	1	22-10-20		**TLM1/TLM2 TLM5**	**CO3**	**T1**	
No. of classes required to complete **UNIT-3:** 09					No. of classes taken:			

UNIT-IV: Tuples, Sets & Files

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

33.	Python Tuples – Introduction	1	22-10-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
34.	Creating and Deleting Tuples	1	23-10-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
35.	Accessing Values in a Tuple , Updating tuples, Delete tuple elements	1	29-10-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
36.	Basic tuple operations , Indexing	1	29-10-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
37.	Slicing and Matrices	1	31-10-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
38.	Built-in tuple functions	1	05-11-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
39.	Sets-concepts , operations	1	05-11-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
40.	Files – Creating files, Operations on files	1	06-11-20		**TLM1/TLM2/ TLM5**	**CO4**	**T1**	
No. of classes required to complete **UNIT-4:** 08					No. of classes taken:			

UNIT-V: Searching &Sorting, Exception Handling and Database

S.No.	**Topics to be covered**	**No. of Classes Required**	**Tentative Date of Completion**	**Actual Date of Completion**	**Teaching Learning Methods**	**Learning Outcome COs**	**Text Book followed**	**HOD Sign Weekly**
41.	Searching Techniques – Linear Search, Binary Search	1	07-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
42.	Sorting Techniques – Bubble sort	1	12-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
43.	Selection Sort,	1	12-11-20		**TLM1/TLM2/**	**CO5**	**T1**	

	Insertion Sort				**TLM5**			
44.	Merge Sort	1	13-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
45.	Heap Sort	1	19-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
46.	Exception Handling – Exceptions	1	19-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
47.	Except clause , try	1	20-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
48.	Finally clause, user defined exceptions	1	21-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
49.	Database – introduction, connections	1	26-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
50.	Executing queries, Transactions, Handling errors , Programs	1	26-11-20		**TLM1/TLM2/ TLM5**	**CO5**	**T1**	
No. of classes required to complete **UNIT-5:** 10					No. of classes taken:			

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

ACADEMIC CALENDAR:

Description	**From**	**To**	**Weeks**
I Phase of Instructions-1	17-08-2020	03-10-2020	7W
I Mid Examinations	28-09-2020	03-10-2020	
II Phase of Instructions	05-10-2020	28-11-2020	8W
II Mid Examinations	23-11-2020	28-11-2020	
Preparation and Practical	30-11-2020	05-12-2020	1W
Semester End Examinations	07-12-2020	21-12-2020	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5

Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=30
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=30
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=30
Evaluation of Attendance		C=5
Cumulative Internal Examination : A+B+C	**1,2,3,4,5**	**A+B+C=40**
Semester End Examinations	**1,2,3,4,5**	**D=60**
Total Marks: A+B+C+D	**1,2,3,4,5**	**100**

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

1. Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering: To inculcate an ability to Analyze, Design and implement data driven applications into the students.

3. Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
S.Govindu	K.Sundeep Saradhi	Dr. M. Srinivasa Rao	Dr.D.Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. III-Sem., CSE- A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : **Data Structures -17CI05**

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. A. Sree Rama Chandra Murthy**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITE: C programming language

COURSE OBJECTIVE: To make students familiar with:

Writing algorithms to implement operations involved in different data structures like stack and queue using arrays as well as linked list, to implement different types of trees, various searching and sorting techniques.

COURSE OUTCOMES (CO)

CO1: Compare normal data type with abstract data type (ADT). Analyze example programs
with data structures using analyzing tools.

CO2: Develop & analyze the algorithms for stacks and Queues

CO3: Analyze, implement and compare searching and sorting Techniques.

CO4: Design & analyze algorithms for operations on Binary Search Trees & AVL Trees data structures.

CO5: Evaluate Graph traversal and minimum cost spanning tree algorithms and compare hashing methods on hash table data structure.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1										3	3	2
CO2	3	3	2										3	3	1
CO3	3	3	1										3	3	2
CO4	3	3	2										3	3	1
CO5	3	3	2										3	3	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 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2ndedition

T2 Reema Thareja, Data Structures using c, Oxford Publications.

REFERENCE BOOKS:

R1 Langson, Augenstein &Tenenbaum, 'Data Structures using C and C++', 2nd Ed, PHI.

R2 RobertL.Kruse, Leung and Tando, 'Data Structures and Program Design in C', 2ndedition, PHI.

R3 Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, 2011.

R4 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, PHI, 2009.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	18-08-20		TLM2	CO1	T1,T2	
2.	Mathematical Background	1	19-08-20		TLM2	CO1	T1,R4	
3.	Model, Analysis and Run Time Calculations	1	20-08-20		TLM2	CO1	T1,R4	
4.	Introduction to Data Structure and Abstract Data Type(ADTs)	1	25-08-20		TLM2	CO1	T1,R3	
5.	List ADT: List implementation using arrays and its operations	1	26-08-20		TLM2	CO1	T1,R3	
6.	List ADT : List implementation using pointers(Linked list)	2	27-08-20 & 29-08-20		TLM2	CO1	T1,R1	
7.	List ADT : List implementation using pointers(Linked list)	2	01-09-20 & 02-09-20		TLM2	CO1	T1,R2	
8.	Double Linked List	2	03-09-20 & 05-09-20,		TLM2	CO1	T1,T2	

9.	Operations on Doubly linked	2	08-09-20 & 09-09-20		TLM2	CO1	T1	
10.	Operations on Circular linked	2	10-09-20 &12-09-20		TLM2	CO1	T1	
11.	Polynomial ADT	1	15-09-20		TLM2	CO1	T1	
No. of classes required to complete UNIT-I		17			No. of classes taken:			

UNIT-II: Stacks, Queues and its Applications.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Stack: Definition and its operations, implementation using arrays	1	16-09-20		TLM2	CO2	T1,R1	
13.	Stack implementation Using Linked List	1	17-09-20		TLM2	CO2	T1,R1	
14.	Infix to postfix expression conversion	1	19-09-20		TLM2	CO2	T1,R2	
15.	Evaluation of Postfix expressions	1	22-09-20		TLM2	CO2	T1,R3	
16.	Balancing the symbols	1	23-09-20		TLM2	CO2	T1,R2	
17.	Queue: definition and its operations & implementation using arrays	1	24-09-20		TLM2	CO2	T1,R2	
18.	implementation using linked lists	1	26-09-20		TLM2	CO2	T1,R3	
19.	Circular queue: definition its operations, implementation	1	29-09-20		TLM2	CO2	T1,R3	
20.	DEQUEUE : Definition & its implementation	1	01-10-20		TLM2	CO2	T1,R3	
No. of classes required		9			No. of classes taken:			

to complete UNIT-II				

UNIT-III: Searching & Sorting Techniques

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Searching: Linear Searching	1	03-10-20		TLM2	CO3	T1,R3	
22.	Binary Search	1	06-10-20		TLM2	CO3	T1	
23.	Fibonacci Search	1	07-10-20		TLM2	CO3	T1	
24.	Sorting: Bubble sort	1	08-10-20		TLM2	CO3	T1	
25.	Insertion Sort	1	10-10-20		TLM2	CO3	T1	
26.	Merge Sort	2	13-10-20 & 14-10-20		TLM2	CO3	T1,R2	
27.	Quick Sort	2	17-10-20 & 15-10-20		TLM2	CO3	T1	
28.	Heap Sort	2	20-10-20 &21-10-20		TLM2	CO3	T1	
No. of classes required to complete UNIT-III		11			No. of classes taken:			

UNIT-IV: Trees, Traversals, Search Trees

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
29.	Trees: Terminology, Binary Trees: definition types of binary trees, Representation	1	27-10-20		TLM2	CO4	T1,R1	
30.	Implementation using linked list	1	28-10-20		TLM2	CO4	T1	
31.	Tree traversals: Recursive techniques	1	29-10-20		TLM2	CO4	T1	
32.	Expression Tress, Search Tree: Binary Search Tree-search operation	1	31-10-20		TLM2	CO4	T1,R2	
33.	insertion, Deletion (all the	1	03-11-20		TLM2	CO4	T1,R2	

	three cases							
34.	Balanced Tree - Introduction to AVL Tress	1	04-11-20		TLM2	CO4	T1,R1	
35.	AVL tree and Rotations	1	05-11-20		TLM2	CO4	T1,R1	
No. of classes required to complete UNIT-IV		7			No. of classes taken:			

UNIT-V: Graphs, Hashing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
36.	Graphs: Fundamentals, Representation of graphs Graph Traversals: BFS, DFS	1	07-11-20		TLM2	CO5	T1,R3	
37.	Minimum Cost spanning tree: Definition, Prim's Algorithm	1	10-11-20		TLM2	CO5	T1,R3	
38.	Kruskal's algorithm, Hashing: Hash Table and Hash Functions	1	11-11-20		TLM2	CO5	T1,R4	
39.	Collision resolution Techniques, separate Chaining, Open addressing, rehashing	1	12-11-20		TLM2	CO5	T1,R3	
No. of classes required to complete UNIT-V		04			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
40.	Introduction to B Trees.	1	09-11-20		TLM1	CO4	T1,R2	
41.	Introduction to Splay Trees	1	13-11-20		TLM1	CO3	T2,R2	

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

EVALUATION PROCESS:

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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PROGRAM SPECIFIC OUTCOMES

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To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

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Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	A.S. R.C. Murthy	A.S. R.C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah
Signature				

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

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., III-SEM, CSE-A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : COMPUTER ARCHITECTURE– 17CI06

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.M. Srinivasa Rao**

COURSE COORDINATOR : **Dr.M. Srinivasa Rao**

PRE-REQUISITE: DIGITAL LOGIC DESIGN

COURSE OBJECTIVE:. Understand the basic functional modules of a computer system and their interconnection mechanism.Understand the data path and control path organization in a general purpose CPU. Get the design knowledge of main memory and cache memory systems.Explore the methods of communication between CPU and I/O devices. A case study on standard I/O interfaces.

COURSE OUTCOMES (CO)

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

CO1: Identify the sequence of micro operations in the execution of one macro instruction and thereby gain the concepts of control steps, Instruction cycle, Register structure of CPU, Types of micro operations and RTL.
CO2: Analyze the internal organization of CPU for performing Integer Arithmetic, Floating point Arithmetic and logical operations.
CO3: Understand the features of hardwired and micro programmed control units leading to the comparative study of control path organization in these types.
CO4: Analyze the memory hierarchy system and performance improvement by cache memory organization and its principles.
CO5: Analyze the communication methods of I/O devices and standard I/O interfaces.

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	1		2											1	
CO2			3											1	
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, 3rd edition, 1992.

T2 Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "**Computer Organization**", TMH publications, 5th edition, 2002.

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.

R4 John D Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 1st edition, 2001.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Basic Computer Organization and 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
1.	Block Diagram of a Computer, Basic Functional Units of a Computer	1	17.08.2020		TLM2	
2.	Computer Architecture Models, Internal Organization of a Central Processing Unit	1	18.08.2020		TLM2	
3.	Introduction to Sequence of Micro operations and control steps	1	24.08.2020		TLM2	
4.	Register Transfer Microoperations	1	25.08.2020		TLM2	
5.	Arithmetic Micro Operations	1	29.08.2020		TLM2	
6.	Logic Micro Operations and Shift Micro Operations	1	31.09.2020		TLM2/TLM3	
7.	Instruction cycle Instruction Set	1	01.09.2020		TLM2	
8.	Basic Computer Instructions	1	05.09.2020		TLM2	
No. of Classes Required to complete UNIT I: 8				No. of classes taken:		

UNIT-II: Central Processing Unit

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
9.	Instruction formats and examples	1	07.09.2020		TLM2	
10.	Addressing modes and examples	1	08.09.2020		TLM2/TLM3	
11.	Data Transfer and Manipulation Instructions	1	12.09.2020		TLM2	
12.	Logical Instructions, Program control Instructions	1	14.09.2020		TLM2	
13.	Data Representation, Addition and Subtraction	1	15.09.2020		TLM2/TLM3	
14.	Multiplication Algorithms	1	19.09.2020		TLM2/TLM5	
15.	Booth Multiplication Algorithm	1	21.09.2020		TLM1/TLM2	
16.	Division Algorithms	1	22.09.2020/		TLM1/TLM2	
17.	Floating Point representation	1	23.09.2020		TLM2	
18.	Floating Point Arithmetic operations	1	26.09.2020		TLM2/TLM5	
No. of Classes Required to complete UNIT II: 10				No. of classes taken:		

UNIT-III: Control Unit

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Control Memory	1	05.10.2020		TLM2	
20.	Hard wired control	1	06.10.2020		TLM2	
21.	Micro programmed control	2	07,10.10.2020		TLM2	
22.	Micro Instruction Format	2	12,13.10.2020		TLM2	
23.	Address Sequencing	1	14.10.2020		TLM2	
24.	Design of Control Unit.	1	17.10.2020		TLM2	
No. of Classes Required to complete UNIT III: 8				No. of classes taken:		

UNIT-IV: Memory Organization

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.	Memory Hierarchy, Primary Memory	1	19.10.2020		TLM2	
26.	Introduction to Secondary Memory	1	20-10-2020		TLM2	
27.	Associative Memory	1	21.10.2020		TLM2	
28.	Cache Memory	2	27,28.10.2020		TLM2/TLM5	
29.	Hit Ratio and Mapping Techniques	1	31.10.2020		TLM2	
30.	Example Problems	1	02.11.2020		TLM3	
No. of Classes Required to complete UNIT IV: 7				No. of classes taken:		

UNIT-V: Input-Output Organization and Standard Input Output Interfaces

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.	Peripheral Devices	1	03-11-2020		TLM2	
32.	Modes of Transfer	1	04-11-2020		TLM2	
33.	Priority Interrupt	2	07,09-11-2020		TLM2	
34.	Direct Memory Access	2	10,11-11-2020		TLM2/TLM3	
35.	Input Output Processor, Input Output Interface	1	14-11-2020		TLM2	
36.	Synchronous data transfer	1	16-11-2020		TLM2	
37.	Asynchronous Data Transfer	1	17-11-2020		TLM2	
38.	Timing diagrams	1	18-11-2020		TLM2	
39.	Serial communication	1	21-11-2020		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

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment –1	A1=5
Assignment –2	A2=5
Quiz-1	B1=10
I-Mid Examination	C1=20
Assignment –3	A3=5
Assignment –4	A4=5
Assignment --5	A5=5
Quiz-2	B2=10
II-Mid Examination	C2=20
Evaluation of Assignment Marks: A=(A1+A2+A3+A4+A5)/5	A=5
Evaluation of Quiz Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	B=10
Evaluation of Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	C=20
Attendance	D=5
Cumulative Internal Examination : A+B+C+D	**A+B+C+D=40**
Semester End Examinations	**E=60**
Total Marks: A+B+C+D+E	**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 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	**Programming Paradigms:** To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes/ methodologies/ practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr. M. Srinivasa Rao)	(Dr. M. Srinivasa Rao)	(Dr.Ch.V.Narayana)	(Dr. D. Veeraiah)

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech. III-Sem., CSE-A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Statistical Programming with R Lab (17FE66)

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : Mr. G Balu Narasimha Rao

COURSE COORDINATOR : Mr.G.V.Suresh

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides a solid undergraduate foundation in both probability theory and mathematical statistics and at the same time provides an indication of the relevance and importance of the theory in solving practical problems in the real world.

COURSE OUTCOMES (COs): At the end of the course, the student will be able to:
CO1: Apply the different distributions

CO2: Use statistical tests in testing hypotheses on data

CO3: Describe the properties of discrete and continuous distribution functions

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										2	3	
CO2	3	2	2	1									2	2	
CO3	3	3	3			1							2	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).

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	Learning Outcome COs	HOD Sign Weekly
1	Cycle1:Introduction to R Programming	2	21/8/20		TLM4/TLM5	CO1	
2	Cycle 2: Getting Used to R: Describing Data • Viewing and Manipulating Data • Plotting Data • Reading in Your Own Data	2	28/8/20		TLM4/TLM5	CO1	
3	Cycle 3: Visualizing Data Tables, charts and plots. Visualizing Measures of Central Tendency, Variation, and Shape. Box plots, Pareto diagrams. How to find the mean median standard deviation and quantiles of a set of observations	4	4/9/20 11/9/20		TLM4/TLM5	CO1	
4	Cycle 4: Probability Distributions. Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of CDF and PDF uniform and normal, binomial Poisson distributions.	2	18/9/20		TLM4/TLM5	CO1	
5	Cycle 5: Densities of Random Variables • Off the Shelf Distributions in R • Matching a Density to Data • More About Making Histograms	4	25/9/20 9/10/20		TLM4/TLM5	CO1	
6	Cycle 6: Binomial Distribution Study of binomial distribution. Plots of density and distribution functions. Normal approximation to the Binomial distribution	2	16/10/20		TLM4/TLM5	CO1	
7	Cycle7: Building Confidence in Confidence Intervals • Populations Versus	2	23/10/20		TLM4/TLM5	CO2	

	Samples • Large Sample Confidence Intervals • Simulating Data Sets • Evaluating the Coverage of Confidence Intervals						
8	Cycle8: Perform Tests of Hypotheses How to perform tests of hypotheses about the mean when the variance is known. How to compute the p-value. Explore the connection between the critical region, the test statistic, and the p-value	2	30/10/20		TLM4/TLM5	CO2	
9	Cycle9:Correlation How to calculate the correlation between two variables. How to make scatter plots. Use the scatterplot to investigate the relationship between two variables	2	6/11/20		TLM4/TLM5	CO2	
10	Cycle 10 : Estimating a Linear Relationship • A Statistical Model for a Linear Relationship • Least Squares Estimates • The R Function lm • Scrutinizing the Residuals	2	13/11/20		TLM4/TLM5	CO3	
	LAB INTERNAL		20/11/20				

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2: Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.

PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power.

PSO2: Design and analyze electrical machines, modern drive and lighting systems

PSO3: Specify, design, implement and test analog and embedded signal processing electronic systems.

PSO4: Design controllers for electrical and electronic systems to improve their performance

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. G Balu NarasimhaRao	Mr.G.V.Suresh	Dr. Ch. Venkata Narayana	Dr. D VEERAIAH
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM	**:** B.Tech., III-Sem., CSE-A
ACADEMIC YEAR	**:** 2020-21
COURSE NAME & CODE	**:** Python Programming LAB (17CI62)
L-T-P STRUCTURE	**:** 0-0-2
COURSE CREDITS	**:** 1
COURSE INSTRUCTOR	**: Mr. S.Govindu**
COURSE COORDINATOR	**: Mr. K. Sundeep Saradhi**

PRE-REQUISITES: Programming languages like CGI, C Language

COURSE EDUCATIONAL OBJECTIVES (CEOs): This Python course leads the students from the basics of writing and running Python scripts to more advanced features such as file operations, sets, working with binary data, and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting.

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

CO1: Identify various data structures available in Python and apply them in solving computational problems.
CO2: Design and implement programs to process data.

CO3: Explore the usage of exception handling and database interaction

CO4: Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

Part-B

I. Exercise programs on basic control structures & loops

a) Write a program for checking the given number is even or odd.

b) Using a for loop, write a program that prints the decimal equivalents of 1/2, 1/3, 1/4,...1/10

c) Write a program for displaying reversal of a number.

d) Write a program for finding biggest number among 3 numbers.

e) Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.

II.Exercise programs on operators & I/O operations.

a) Write a program that takes 2 numbers as command line arguments and prints its sum.

b) Implement python script to show the usage of various operators available in python language.

c) Implement python script to read person 's age from keyboard and display whether person is eligible for voting or not.

d) Implement python script to check the given year is leap year or not.

III. Exercise programs on Python Script

a) Implement Python Script to generate first N natural numbers.

b) Implement Python Script to check given number is palindrome or not.

c) Implement Python script to print factorial of a number.

d) Implement Python Script to print sum of N natural numbers.

e) Implement Python Script to check given number is Armstrong or not.

f) Implement Python Script to generate prime numbers series up to n.

IV.Exercise programs on Lists

a) Finding the sum and average of given numbers using lists.

b) To display elements of list in reverse order.

c) Finding the minimum and maximum elements in the lists.

V.Exercise programs on Strings

a) Implement Python Script to perform various operations on string using string libraries.

b) Implement Python Script to check given string is palindrome or not.

c) Implement python script to accept line of text and find the number of characters, number of vowels and number of blank spaces in it.

VI. Exercise programs on functions.

a) Define a function max_of_three () that takes three numbers as arguments and returns the largest of them.

b) Write a program which makes use of function to display all such numbers which are divisible by7 but are not a multiple of 5, between 1000 and 2000.

VII. Exercise programs on recursion & parameter passing techniques.

a) Define a function which generates Fibonacci series up to n numbers.

b) Define a function that checks whether the given number is Armstrong

c) Implement a python script for Call-by-value and Call-by-reference

d) Implement a python script for factorial of number by using recursion.

IX. Exercise programs on Tuples

a) Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number. Suppose the following input is supplied to the program:34,67,55,33,12,98. Then, the output should be: ['34', '67', '55', '33', '12', '98'] ('34',67', '55', '33', '12', '98').

b) With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and the last half values in one line.

X. Exercise programs on files

a) Write Python script to display file contents.

b) Write Python script to copy file contents from one file to another.

XI. Exercise programs on searching & sorting Techniques.

a) Implement a python script to check the element is in the list or not by using Linear search & Binary search.

b) Implement a python script to arrange the elements in sorted order using Bubble, Selection, Insertion and Merge sorting techniques.

XII. Exercise programs on Exception handling concepts

a) Write a python program by using exception handling mechanism.

b) Write a python program to perform various database operations (create, insert, delete, update).

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	Learning Outcome COs	HOD Sign Weekly
1	Introduction to Python Interpreter	2	18-08-2020		TLM2/TLM8	CO1	
2	Exercise programs on basic control structures and loops	2	25-08-2020		TLM2/TLM8	CO1, CO4	
3	Exercise programs on operators and I/O operations	2	01-09-2020		TLM2/TLM8	CO1, CO4	
4	Exercise programs on Python Scripts	2	08-09-2020		TLM2/TLM8	CO1, CO4	
5	Exercise programs on Lists	2	15-09-2020		TLM2/TLM8	CO1, CO4	
6	Exercise programs on Strings	2	22-09-2020		TLM2/TLM8	CO1, CO4	
7	Exercise programs on Functions	2	06-10-2020		TLM2/TLM8	CO1, CO4	
8	Exercise programs on Recursion	2	13-10-2020		TLM2/TLM8	CO2, CO4	
9	Exercise programs on Parameter Passing Techniques	2	20-10-2020		TLM2/TLM8	CO2, CO4	
10	Exercise programs on Tuples	2	27-10-2020		TLM2/TLM8	CO2, CO4	
11	Exercise programs on Files	2	03-11-2020		TLM2/TLM8	CO2, CO4	
12	Exercise programs on Searching and Sorting	2	10-11-2020		TLM2/TLM8	CO3, CO4	
13	Exercise programs on Exception handling	2	17-11-2020		TLM2/TLM8	CO3, CO4	

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess

societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

1. Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

S.Govindu	K.Sundeep Saradhi	Dr. M. Srinivasa Rao	Dr.D Veeraiah
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
Part-A

PROGRAM : B.Tech., III-Sem., CSE - A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Data Structures Lab- 17CI63

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr. A. Sree Rama Chandra Murthy**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITES: C language

COURSE EDUCATIONAL OBJECTIVES (CEOs): To make students familiar with writing algorithms to implement operations involved in different data structures like linked list & different types of trees and implement various searching and sorting techniques.

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

CO1: Implement & test the performance of data structures like linked list, stacks & queues .

CO2: Implement & test the performance of searching & sorting techniques.
CO3: Implement & test the performance of trees and graph traversal techniques.
CO4**:** Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

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	Learning Outcome COs	HOD Sign Weekly
1	Practice session on Arrays, structures and pointers Practice session on Dynamic Memory allocation.	2	17-08-20		TLM4/TLM5	CO1	
2	Write a C program to implement various operations on List using arrays. Write a C program to implement various operations on Single linked List using pointers.	2	24-08-20		TLM4/TLM5	CO1	
3	Write an interactive C program to create a linear linked list of customer names and their telephone numbers. The program should be menu-driven and include features for adding a new customer, deleting an existing customer and for displaying the list of all customers.	2	31-08-20		TLM4/TLM5	CO1	
4	Write a C program to create a circular linked list so that	2	07-09-20		TLM4/TLM5	CO1	

	the input order of data items is maintained. Add the following functions to carry out the following operations on circular single linked lists. a) Count the number of nodes. b) insert a node c) delete a node						
5	Write a C program that will remove a specified node from a given doubly linked list and insert it at the end of the list on an existing list. Also write a function to display the contents of the list. Write a C program to implement a stack using array &linked list in which Push, Pop and display can be performed.	2	14-09-20		TLM4/TLM5	CO1	
6	Write a program to convert infix expression to post fix expressions using array implementation of stack Write a program for evaluating post fix expressions using array 2implementation of stack	2	21-09-20		TLM4/TLM5	CO1	

7	Write a C program to implement a queue using arrays and linked list in which insertions, deletions and display can be performed.	2	05-10-20		TLM4/TLM5	CO1	
8	Write a C program to implement insertion sort, Selection sort, Merge Sort	2	12-10-20		TLM4/TLM5	CO2	
9	Sort a sequence of n integers using Quick sort technique and then search for a key in the sorted array using Binary search, linear search techniques. Write a C program to Heap sort.	2	19-10-20		TLM4/TLM5	CO2	
10	. Write a C program to construct a binary tree and do inorder, preorder and post order traversals, printing the sequence of nodes visited in each case. Write a C program to implement BST operations- insert, search and delete.	2	26-10-20		TLM4/TLM5	CO3	
11	Write a C program to implement the following graph Traversals a) DFS b) BFS	2	02-11-20		TLM4/TLM5	CO3	

12	**Lab Internal Examination**	2	09-11-20		TLM4/TLM5		

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex

engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate an ability to Analyze, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	A.S. R. C. Murthy	A.S. R. C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., IV-Sem., CSE (B)

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : PROBABILITY AND STATISTICS - 17FE08

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : M.RAMI REDDY

COURSE COORDINATOR : M.RAMI REDDY

PRE-REQUISITES: None

COURSE EDUCATIONAL OBJECTIVES (CEOs) : In this course the students are able to understand the applications of probability distributions. They also learn various sample tests in testing the hypothesis and correlation, regression of a bi-variate data.

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

CO1: Predict various probabilistic situations based on various laws of probability and random variables.
CO2: Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Exponential distributions.
CO3: Estimate the point and interval estimators of mean and proportion for the given Sample data.
CO4: Apply various sample tests like Z-test, t-test, F-test and x2 -test for decision making regarding the population based on sample data.
CO5: Estimate the level of correlation, the linear relationship using the regression lines for the given bivariate data.

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 TEXT BOOKS:

T1 Miller & Freund's "Probability and Statistics for Engineers",8th edition. PHI, New Delhi,2011.

T2 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics", 11thEdition, Sultan Chand and sons, New Delhi,2014.

BOS APPROVED REFERENCE BOOKS:

R1 Jay L.Devore "Probability and Statistics for engineering and the sciences." , 8th edition, Cengage Learning india, 2012.

R2 B.V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, syllabus course outcomes	1	17-08-20		TLM5	---	---	
2.	Introduction to probability	1	18-08-20		TLM5	CO1	T1	
3.	Basic definitions, simple problems	1	21-08-20		TLM5	CO1	T1	
4.	Axioms, simple examples	1	24-08-20		TLM5	CO1	T1, T2	
5.	Problem on addition Rule	1	25-08-20		TLM5	CO1	T1	
6.	Conditional probability	1	28-08-20		TLM5	CO1	T1	
7.	Multiplication rule, examples	1	29-08-20		TLM5	CO1	T1	
8.	Independent events, problems	1	31-08-20		TLM5	CO1	T1, T2	
9.	Baye's rule	1	01-09-20		TLM5	CO1	T1	
10.	Problems on baye's rule	1	04-09-20		TLM5	CO1	T1, T2	
11.	Random variables, Mathematical Expections	1	05-09-20		TLM5	CO1	T1	
12.	Problems on PMF	1	07-09-20		TLM5	CO1	T1,T2	
13.	Problems on PDF	1	08-09-20		TLM5	CO1	T1,T2	
14.	Unit summary, Tutorial	1	11-09-20		TLM3,5	CO1	T1	
No. of classes as per schedule for 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
15.	Binomial Distribution : mean and variance	1	12-09-20		TLM5	CO2	T1	
16.	Problems on Binomial distribution	1	14-09-20		TLM5	CO2	T1,T2	
17.	Fitting of binomial distribution	1	15-09-20		TLM5	CO2	T1,T2	
18.	Poisson distribution, mean and variance	1	18-09-20		TLM5	CO2	T1	
19.	Problems , Fitting of Poisson distribution	1	19-09-20		TLM5	CO2	T1,T2	
20.	Normal distribution, problems	1	21-09-20		TLM5	CO2	T1,T2	
21.	Problems on Normal Distribution	1	22-09-20		TLM5	CO2	T1	
22.	Exponential distribution	1	25-09-20		TLM5	CO2	T1,T2	
23.	Unit summary, Tutorial	1	26-09-20		TLM3, 5	CO2	T1,T2	
No. of classes as per schedule for UNIT-II		9			No. of classes taken:			

UNIT-III : Sampling Distribution & Estimation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome CO	Text Book followed	HOD Sign Weekly
24.	Sampling distribution ,definitions	1	05-10-20		TLM5	CO3	T1	
25.	Sampling distribution of mean	1	06-10-20		TLM5	CO3	T1	
26.	problems	1	09-10-20		TLM5	CO3	T1,T2	
27.	Problems on central limit theorem	1	10-10-20		TLM5	CO3	T1,T2	
28.	Problems on central limit theorem	1	12-10-20		TLM5	CO3	T1	
29.	Point and interval estimation	1	13-10-20		TLM5	CO3	T1	
30.	Interval estimation of mean	1	16-10-20		TLM5	CO3	T1,T2	
31.	Interval estimation of proportion	1	17-10-20		TLM5	CO3	T1,T2	
32.	interval estimation of small samples	1	19-10-20		TLM5	CO3	T1,T2	

33.	Unit summary, Tutorial	1	20-10-20		TLM3,5	CO3	T1,T2	
No. of classes as per schedule for UNIT-III		10			No. of classes taken:			

UNIT-IV : Tests of Hypothesis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	Testing of Hypothesis , definitions	1	23-10-20		TLM5	CO4	T1,T2	
35.	Z-test for single mean	1	24-10-20		TLM5	CO4	T1,T2	
36.	Z-test for difference of means	1	26-10-20		TLM5	CO4	T1,T2	
37.	Z-test for single proportion	1	27-10-20		TLM5	CO4	T1,T2	
38.	Z-test for difference of proportions	1	30-10-20		TLM5	CO4	T1,T2	
39.	t-test for single mean	1	31-10-20		TLM5	CO4	T1,T2	
40.	t-test for difference of means	1	02-11-20		TLM5	CO4	T1,T2	
41.	Paired t-test	1	03-11-20		TLM5	CO4	T1,T2	
42.	F-test for population variances	1	06-11-20		TLM5	CO4	T1,T2	
43.	χ^2 test for goodness of fit	1	07-11-20		TLM5	CO4	T1,T2	
44.	χ^2 test for independence of attributes	1	09-11-20		TLM5	CO4	T1,T2	
45.	Unit summary, Tutorial	1	10-11-20		TLM3,5		T1,T2	
No. of classes as per schedule for UNIT-IV		12			No. of classes taken:			

UNIT-V : Correlation & Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
46.	Simple Bi-variate Correlation	1	13-11-20		TLM5	CO5	T1	
47.	Problems on Pearson's Correlation	1	14-11-20		TLM5	CO5	T1,T2	
48.	Bivariate frequency correlation, Regression lines	1	16-11-20		TLM5	CO5	T1	

49.	Problems on Regression lines	1	17-11-20		TLM5	CO5	T1,T2	
50.	Properties of Regression coefficients	1	20-11-20		TLM5	CO5	T1,T2	
51.	Problems on Regression coefficients	1	21-11-20		TLM5	CO5	T1,T2	
52.	Rank correlation	1	23-11-20		TLM5	CO5	T1,T2	
53.	Problems on rank Correlation	1	24-11-20		TLM5	CO5	T1	
54.	Problems on repeated ranks	1	27-11-20		TLM5	CO5	T1	
55.	Unit summary, Tutorial	1	28-11-20		TLM3,5	CO5	T1,T2	
No. of classes as per schedule for UNIT-V		10			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
56.	Axioms of probability, results	1	24-08-20		TLM5	CO1	T1	
57.	Bivariate frequency correlation	1	16-11-20		TLM5	CO5	T1	

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

Part - C

EVALUATION PROCESS:

Evaluation Task	Units	Marks
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any Other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:-

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

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.

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.

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.

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.

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.

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.

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

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

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.

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.

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

PROGRAM SPECIFIC OUTCOMES(PSOs):-

1.Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

M.RAMI REDDY	M.RAMI REDDY	Dr. A.RAMI REDDY	Dr. A.RAMI REDDY
Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : V. Bhagya Lakshmi
Course Name & Code : Environmental Science & 17FE03
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., III-Sem., Section- B A.Y : 2020-21

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 Mahua Basu, 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	18-08-2020		2	
2.	Scope and importance of environmental studies	1	20-08-2020		2	
3.	Population explosion and variations among Nations.	1	25-08-2020		2	
4.	Resettlement and Rehabilitation - Issues and possible solutions	1	27-08-2020		2	
5.	Environment and human health	1	01-09-2020		2	
6.	HIV-AIDS, Environmental ethics **Assignment in UNIT I**	1	03-09-2020		2,3	
7.	Role of Information Technology in environmental management and human health **Tutorial -1**	1	08-09-2020		2,3	
No. of classes required to complete UNIT-I: 9				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, Assignment in Unit II	1	10-09-2020		2	
2.	Water Resources	1	15-09-2020		2	
3.	Mineral Resources	1	17-09-2020		2	
4.	Food Resources	1	22-09-2020		2	
5.	Energy Resources **Tutorial-2**	1	24-09-2020		2,3	
6.	I MID EXAMINATION	1	29-09-2020			
7.	I MID EXAMINATION		1-10-2020			
No. of classes required to complete UNIT-II: 10				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 Food chains and Food webs, Ecological succession, Ecological pyramids	1	6-10-2020		2	
2.	Biogeochemical cycles, Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation	1	8-10-2020		2	
3.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Man and wild life conflicts. Endangered and endemic species of India	1	13-10-2020		2	
4.	Conservation of biodiversity: In-situ and Ex-situ conservation methods **Tutorial-3**	1	15-10-2020		2,3	
No. of classes required to complete UNIT-III: 9				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.	Causes, effects and control measures of: Water Pollution	1	20-10-2020		2	
2.	Causes, effects and control measures of: Soil Pollution, Causes, effects and control measures of: Noise Pollution	1	22-10-2020		2	
3.	Causes, effects and control measures of: Nuclear Pollution **Tutorial-4**	1	27-10-2020		2,3	
4.	Solid Waste Management, Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	29-10-2020		2	
5.	Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion. Sustainable development and un-sustainability. **Assignment in Unit IV**	1	03-11-2020		2,3	
No. of classes required to complete UNIT-IV: 9				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.	Stockholm and Rio Summit	1	05-11-2020		2	
2.	Green building **Tutorial-5**	1	10-11-2020		2,3	
3.	Environmental Impact Assessment (EIA),	1	12-11-2020		2	
4.	Consumerism and Waste products. Carbon credits and carbon trading. **Assignment in UNIT- V**	1	17-11-2020		2,3	
5.	Environmental Law	1	19-11-2020			
6.	**II Mid Examination**	1	24-11-2020			
7.	**II Mid Examination**		26-11-2020			
8.						
No. of classes required to complete UNIT-V: 8				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

V. Bhagya Lakshmi	**Dr. Shaheda Niloufer**	**Dr. Shaheda Niloufer**	**Dr. A. Rami Reddy**
Course Instructor (Name)	Course Coordinator (Name)	Module Coordinator (Name)	HOD (Name)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : S.NAGARJUNA REDDY

Course Name & Code : DISCRETE MATHAMETICAL STRUCTURES & 17CI03

L-T-P Structure : 3-1-2 Credits : 3

Program/Sem/Sec : B.Tech., CSE, III-Sem., Section – B A.Y : 2020 - 2021

PRE-REQUISITE: Basic mathematical knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Perform the operations associated with sets, functions, and relations. Relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and Terminology in context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior of software or to solve problems such as puzzles.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Outline basic proofs for theorems using the techniques of - direct proofs, example, and Proof by contradiction, mathematical induction.
CO2	Illustrate the basic terminology of functions, relations, and sets and demonstrate the knowledge of their associated operations by examples.
CO3	Understand the properties of graphs and able to relate these to practical problems
CO4	Apply basic principles/techniques to solve different algebraic structures and combinatorial problems.
CO5	Solve linear recurrence relations by recognizing homogeneity, linearity, constant coefficients and characteristic equation.

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	1	2											
CO3	3	3	1	2									1		
CO4	3	3	2	1									1		
CO5	3	3	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 Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH Publications

REFERENCE BOOKS:

R1 S.Santha, Discrete Mathematics, Cengage

R2 Thomas Koshy, Discrete Mathematics with Applications, Elsevier

R3 JK Sharma, Macmillan Discrete Mathematics, 2nd edition

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical Logic and Predicate Calculus

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
58.	Mathematical Logic: Propositional Calculus	1	17-08-2020		**TLM1**	CO1	T1	
59.	Statement and Notations, Connectives, Truth Tables	1	19-08-2020		**TLM1**	CO1	T1	
60.	Tautologies, Equivalence of Formulas, Duality law	1	21-08-2020		**TLM1**	CO1	T1	
61.	Tautological Implications	1	22-08-2020		**TLM1**	CO1	T1	
62.	Normal Forms	2	24-08-2020 & 26-08-2020		**TLM1**	CO1	T1,R1	
63.	Theory of inference for statement Calculus	2	28-08-2020 & 29-08-2020		**TLM1**	CO1	T1,R1	
64.	Consistency of Premises Indirect Method of Proof	1	31-08-2020		**TLM1**	CO1	T1,R1	
65.	Predicative Logic	1	02-09-2020		**TLM1**	CO1	T1,R1	
66.	Statement Functions, Variables and Quantifiers Free & Bound Variables	1	04-09-2020		**TLM1**	CO1	T1	
67.	Inference theory for predicate calculus	1	05-09-2020		**TLM1**	CO1	T1	
68.	Tutorial-1	1	07-09-2020		**TLM3**			
No. of classes required to complete UNIT-I		13				No. of classes taken:		

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UNIT-II: Set Theory and Functions

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Set Theory: Introduction, Operations on Binary Sets	1	09-09-2020		TLM1	CO2	T1	
2.	Relations: Properties of Binary Relations	1	11-09-2020		TLM1	CO2	T1	
3.	Relation Matrix and Digraph Operations on Relations	1	12-09-2020		TLM1	CO2	T1	
4.	Partition and Covering, Transitive Closure	1	14-09-2020		TLM1	CO2	T1	
5.	Equivalence Relation	1	16-09-2020		TLM1	CO2	T1	
6.	Compitable Relation	1	18-09-2020		TLM1	CO2	T1,R1	
7.	Partial Ordering Relation & Hasse Diagrams	1	19-09-2020		TLM1	CO2	T1	
8.	Functions: Bijective Functions	1	21-09-2020		TLM1	CO2	T1,R1	
9.	Composition of Functions, Inverse Functions	1	23-09-2020		TLM1	CO2	T1,R1	
10.	Permutation Functions, Recursive Functions	1	25-09-2020		TLM1	CO2	T1	
11.	Tutorial-2	1	26-09-2020		TLM3			
No. of classes required to complete UNIT-2		11				No. of classes taken:		

UNIT-III: GRAPH THEORY

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Basic Concepts of Graphs, Sub graphs	1	26-09-2020		TLM1	CO3	T1	
2.	Matrix Representation of Graphs	1	28-09-2020		TLM1	CO3	T1	
3.	Adjacency Matrices, Incidence Matrices	1	30-09-2020		TLM1	CO3	T1	
4.	Isomorphic Graphs, Paths and circuits	2	02-10-2020		TLM1	CO3	T1	
5.	Eulerian Graphs, Hamiltonian Graphs	1	03-10-2020		TLM1	CO3	T1	
6.	Multigraphs, Planar Graphs, Euler‟s Formula	1	05-10-2020		TLM1	CO3	T1,R1	

7.	Graph Colouring and Covering, Chromatic Number	1	07-10-2020		**TLM1**	CO3	T1	
8.	Trees, Directed trees	1	09-10-2020		**TLM1**	CO3	T1,R1	
9.	Binary Trees, Decision Trees	1	10-10-2020		**TLM1**	CO3	T1,R1	
10.	Spanning Trees: Properties	1	12-10-2020		**TLM1**	CO3	T1	
11.	Algorithms for Spanning trees and Minimum Spanning Trees	2	14-10-2020		**TLM1**	CO3	T1	
No. of classes required to complete UNIT-3		13				No. of classes taken:		

UNIT-IV: Algebraic Structures & Combinatorics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Algebraic Systems with one Binary Operation	1	16-10-2020		**TLM1**	CO4	T1	
2.	Properties of Binary operations, Semi groups and Monoids	1	17-10-2020		**TLM1**	CO4	T1	
3.	Homomorphism of Semi groups and Monoids, Groups	1	19-10-2020		**TLM1**	CO4	T1	
4.	Abelian Group, Cosets, Subgroups	1	21-10-2020		**TLM1**	CO4	T1	
5.	Lattice: Properties, Algebraic Systems with two Binary Operations: Rings	2	23-10-2020		**TLM1**	CO4	T1	
6.	Basic of Counting, Permutations, Derangements	1	24-10-2020		**TLM1**	CO4	T1,R1	
7.	Permutations with Repetition of Objects	1	26-10-2020		**TLM1**	CO4	T1	
8.	Circular Permutations, Restricted Permutations	1	28-10-2020		**TLM1**	CO4	T1,R1	
9.	Combinations, Restricted Combinations	1	30-10-2020		**TLM1**	CO4	T1,R1	
10.	Pigeonhole Principle and its Application	1	31-10-2020		**TLM1**	CO4	T1	
11.	Tutorial	1			**TLM3**	CO4	T1	
No. of classes required to complete UNIT-4		12				No. of classes taken:		

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UNIT-V: Recurrence Relation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Binomial Theorem, Binomial and Multinomial Coefficients	1	02-11-2020		**TLM1**	CO5	T1	
2.	Generating Functions of Permutations and Combinations	2	04-11-2020		**TLM1**	CO5	T1	
3.	The Principles of Inclusion – Exclusion	1	06-11-2020		**TLM1**	CO5	T1	
4.	Generating Function of Sequences, Partial Fractions	1	07-11-2020		**TLM1**	CO5	T1	
5.	Calculating Coefficient of Generating Functions	1	09-11-2020		**TLM1**	CO5	T1	
6.	Recurrence Relations, Formulation as Recurrence Relations	1	11-11-2020		**TLM1**	CO5	T1,R1	
7.	Solving linear homogeneous recurrence Relations by substitution	1	12-11-2020		**TLM1**	CO5	T1	
8.	Generating functions and The Method of Characteristic Roots	1	13-11-2020		**TLM1**	CO5	T1,R1	
9.	Solving Inhomogeneous Recurrence Relations	1	14-11-2020		**TLM1**	CO5	T1,R1	
10.	Tutorial	1			**TLM1**	CO5	T1	
No. of classes required to complete UNIT-5		11				No. of classes taken:		

Contents beyond the Syllabus

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Rules of Inference and Automatic Theorem Proving	1			**TLM1**	**CO1**	T1	
2.	Polish Theorem	1			**TLM1**	**CO4**	T1	
3.	DFS & BFS Algorithm	1			**TLM1**	**CO3**	**T1,R1**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD

TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17-08-2020	03-10-2020	6W
I Mid Examinations	28-09-2020	03-10-2020	1W
II Phase of Instructions	05-10-2020	21-11-2020	6W
II Mid Examinations	16-11-2020	21-11-2020	1W
Preparation and Practicals	23-11-2020	28-11-2020	1W
Semester End Examinations	30-11-2020	14-12-2020	2W

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Programming Paradigms:**

	To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Course Instructor	Course Coordinator	Module Coordinator	HOD
S.NAGARJUNA REDDY			DR. D.VEERAIAH

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : G.V.Rajya Lakshmi

Course Name & Code : Python Programming (17CI04)

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

Program/Sem/Sec : B.Tech., CSE., III-Sem., B A.Y : 2020-21

PRE-REQUISITE: C Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Python is a Modern Language useful for writing compact codes specifically for Programming in the area of Server-side Web Development, Data Analytics, AI and Scientific Computing as well as Production Tools and Game Programming

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

CO 1	Identify the basic python constructs with a view of using them in problem solving.
CO 2	Apply control structures and use python lists in examples of problem solving.
CO 3	Explore the utility of strings and functions in modular programming using python
CO 4	Apply tuple, set and file operations to organize the data in real world problems
CO 5	Analyze various searching and sorting techniques using python and apply exception Handling, database operations in python.

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	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO2	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO3	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO4	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO5	3	-	1	-	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 Povel Solin, Martin Novak, "Introduction to Python Programming", NC Lab Public Computing, 2013.

T2 Bill Lubanovic, "Introducing Python- Modern Computing in Simple Packages", O'Reilly Publication, 1st Edition, 2015.

REFERENCE BOOKS:

R1 Jacob Fredslund, "Introduction to Python Programming", 2007.

R2 Y.Daniel Liang, "Introduction to programming using python", Pearson, 2013.

R3 R. Nageswara Rao, "Core python programming", Dreamtech, 2017.

R4 Mark Summerfield, "Programming in Python 3" Pearson Education, 2nd Edition, 2010.

R5 Magnus Lie Hetland, "Beginning Python – From Novice to Professional", APress Publication, 3rd Edition, 2017

PART-B

COURSE DELIVERY PLAN (LESSON PLAN) : Sec B

UNIT-I : Introduction to Python & Operators

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
69.	Introduction to Programming, History of Python	1	18.08.2020		**TLM2**	CO1	T1	
70.	Usage of Python Interpreter, Structure of Python Program, Python Shell.	1	18.08.2020		**TLM2**	CO1	T1	
71.	Indentation, Python Built-in types , Variables	1	20.08.2020		**TLM2**	CO1	T1	
72.	Input-Output Statements	1	25.08.2020		**TLM2/ TLM4**	CO1	T1	
73.	Identifiers, keywords, Literals, Simple programs	1	25.08.2020		**TLM2**	CO1	T1	
74.	Arithematic , Relational, Logical Operators,	1	27.08.2020		**TLM2/TLM4**	CO1	T1	
75.	Bitwise Operators, Increment/decrement operators	1	29.08.2020		**TLM2/TLM4**	CO1	T1	
76.	Assignment Operators, Programming Examples	1	01.09.2020		**TLM2/TLM4**	CO1	T1	

77.	Python Membership Operator	1	01.09.2020		**TLM2 / TLM4**	CO1	T1	
78.	Python Identity Operator , Operator Precedence	1	03.09.2020		**TLM2/TLM4**	CO1	T1	
79.	Assignment / Quiz – 1	1	05.09.2020		**TLM6**	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II: Control Structures & Python Lists

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Conditonal Statements – if, if-else	1	08.09.2020		**TLM2**	CO2	T1	
2.	Nested If-else	1	08.09.2020		**TLM2**	CO2	T1	
3.	Jumping Statements – continue, break, pass	1	10.09.2020		**TLM2**	CO2	T1	
4.	Python Loops – While loop, for loop	1	12.09.2020		**TLM2**	CO2	T1	
5.	Nested Loops with Programs	1	15.09.2020		**TLM2 / TLM4**	CO2	T1	
6.	Mathematical functions & constants, Random Number functions	1	15.09.2020		**TLM2**	CO2	T1	
7.	Python List - concept , Creating and Accessing Elements	1	17.09.2020		**TLM4**	CO2	T1	
8.	Updating Lists & Deleting Lists	1	19.09.2020		**TLM4**	CO2	T1	
9.	Basic List operations , Reverse, Indexing	1	22.09.2020		**TLM4**	CO2	T1	
10.	Slicing & Matrices	1	22.09.2020		**TLM4**	CO2	T1	
11.	Built-in List Functions	1	24.09.2020		**TLM4**	CO2	T1	
12.	Assignment / Quiz – 2	1	26.09.2020		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		12			No. of classes taken:			

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UNIT-III: Python Strings & Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Python Strings - concept , Slicing, Escape Characters	1	06.10.2020		**TLM2**	CO3	T1	
2.	String Special Operations, String formatting operator	1	06.10.2020		**TLM2/TLM4**	CO3	T1	
3.	Triple quotes , raw string, Unicode strings	1	08.10.2020		**TLM2/TLM4**	CO3	T1	
4.	Built-in string methods	1	10.10.2020		**TLM2/TLM4**	CO3	T1	
5.	Defining and calling a function - Examples	1	13.10.2020		**TLM2/TLM4**	CO3	T1	
6.	Types of functions, Function arguments, Anonymous functions	1	13.10.2020		**TLM2**	CO3	T1	
7.	Global and Local variables, Recursion with programs	1	15.10.2020		**TLM2/TLM4**	CO3	T1	
8.	Assignment / Quiz-3	1	17.10.2020		**TLM4 / TLM2**	CO3	T1	
No. of classes required to complete UNIT-III		08			No. of classes taken:			

UNIT-IV: Python Tuples , Sets & Files

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Python Tuples – Introduction	1	20.10.2020		**TLM2**	CO4	T1	
2.	Creating and Deleting Tuples Accessing Values in a Tuple	1	20.10.2020		**TLM2**	CO4	T1	
3.	Updating tuples , Delete tuple elements, Basic tuple operations	1	22.10.2020		**TLM2/TLM4**	CO4	T1	

4.	Indexing , Slicing and Matrices	1	27.10.2020		**TLM2**	CO4	T1	
5.	Built-in tuple functions,	1	27.10.2020		**TLM3**	CO4	T1	
6.	Sets-concepts, operations	1	29.10.2020		**TLM2**	CO4	T1	
7.	Files – Creating files, Operation on files	1	31.10.2020		**TLM2**	CO4	T1	
8.	Programs on files	1	03.11.2020		**TLM2/TLM4**	CO4	T1	
9.	Assignment / Quiz – 4	1	03.11.2020		**TLM6**	CO4	T1	
No. of classes required to complete UNIT-IV		09			No. of classes taken:			

UNIT-V: Searching & Sorting , Exception Handling & Database

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1	Searching Techniques – Linear Search, Binary Search	1	05.11.2020		**TLM2**	CO5	T1	
2	Sorting Techniques – Bubble sort Selection Sort, Insertion Sort	1	07.11.2020		**TLM2**	CO5	T1	
3	Merge Sort, Heap Sort	1	10.11.2020		**TLM2**	CO5	T1	
4	Exception Handling – Exceptions, Except clause , try Finally clause	1	10.11.2020		**TLM2**	CO5	T1	
5	Database – introduction and connections	1	12.11.2020		**TLM2**	CO5	T1	
6	Executing queries and Transactions ,	1	17.11.2020		**TLM2/TLM4**	CO5	T1	
7	Simple Programs on database	1	17.11.2020		**TLM2/TLM4**	CO5	T1	
8	Handling errors in Database	1	19.11.2020		**TLM2**	CO5	T1	

9	Assignment / Quiz – 5	1	21.11.2020		**TLM6**	CO5	T1	
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 (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Programming Paradigms**: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
G.V.Rajya Lakshmi	G.V.Rajya Lakshmi	Dr.D.Veeraiah	Dr.D.Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. III-Sem., CSE- B

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : **Data Structures -17CI05**

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. T Udaya Kumar**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITE: C Programming Language

COURSE OBJECTIVE: To make students familiar with:

Writing algorithms to implement operations involved in different data structures like stack and queue using arrays as well as linked list, to implement different types of trees, various searching and sorting techniques.

COURSE OUTCOMES (CO)

CO1: Compare normal data type with abstract data type (ADT). Analyze example programs with data structures using analyzing tools.

CO2: Develop & analyze the algorithms for stacks and Queues

CO3: Analyze, implement and compare searching and sorting Techniques.

CO4: Design & analyze algorithms for operations on Binary Search Trees & AVL Trees data structures.

CO5: Evaluate Graph traversal and minimum cost spanning tree algorithms and compare hashing methods on hash table data structure.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1										3	3	2
CO2	3	3	2										3	3	1
CO3	3	3	1										3	3	2
CO4	3	3	2										3	3	1
CO5	3	3	2										3	3	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 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2ndedition

T2 Reema Thareja, Data Structures using c, Oxford Publications.

REFERENCE BOOKS:

R1 Langson, Augenstein &Tenenbaum, 'Data Structures using C and C++', 2nd Ed, PHI.

R2 RobertL.Kruse, Leung and Tando, 'Data Structures and Program Design in C', 2ndedition, PHI.

R3 Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, 2011.

R4 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, PHI, 2009.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
80.	Introduction	1	17-08-20		TLM2	CO1	T1,T2	
81.	Mathematical Background	1	18-08-20		TLM2	CO1	T1,R4	
82.	Model, Analysis and Run Time Calculations	1	20-08-20		TLM2	CO1	T1,R4	
83.	Introduction to Data Structure and Abstract Data Type(ADTs)	1	24-08-20		TLM2	CO1	T1,R3	
84.	List ADT: List implementation using arrays and its	1	25-08-20		TLM2	CO1	T1,R3	
85.	List ADT : List implementation using pointers(Linked list)	2	27-08-20 & 29-08-20		TLM2	CO1	T1,R1	

86.	List ADT : List implementation using pointers(Linked list)	2	31-08-20 & 01-09-20		TLM2	CO1	T1,R2	
87.	Double Linked List	2	03-09-20 & 05-09-20,		TLM2	CO1	T1,T2	
88.	Operations on Doubly linked	1	07-09-20		TLM2	CO1	T1	
89.	Operations on Circular linked	1	08-09-20		TLM2	CO1	T1	
90.	Polynomial ADT	1	10-09-20		TLM2	CO1	T1	
No. of classes required to complete UNIT-I		15			No. of classes taken:			

UNIT-II: Stacks, Queues and its Applications.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
91.	Stack: Definition and its operations, implementation using arrays	1	12-09-20		TLM2	CO2	T1,R1	
92.	Stack implementation Using Linked List	1	14-09-20		TLM2	CO2	T1,R1	
93.	Infix to postfix expression conversion	1	15-09-20		TLM2	CO2	T1,R2	
94.	Evaluation of Postfix expressions	1	17-09-20		TLM2	CO2	T1,R3	
95.	Balancing the symbols	1	19-09-20		TLM2	CO2	T1,R2	
96.	Queue: definition and	1	21-09-20		TLM2	CO2	T1,R2	

	its operations using arrays							
97.	implementation using linked lists	1	22-09-20		TLM2	CO2	T1,R3	
98.	Circular queue: definition its operations, implementation	1	24-09-20		TLM2	CO2	T1,R3	
99.	DEQUEUE : Definition & its implementation	1	26-09-20		TLM2	CO2	T1,R3	
No. of classes required to complete UNIT-II		9			No. of classes taken:			

UNIT-III: Searching & Sorting Techniques

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
100.	Searching: Linear Searching	1	05-10-20		TLM2	CO3	T1,R3	
101.	Binary Search	1	06-10-20		TLM2	CO3	T1	
102.	Fibonacci Search	1	08-10-20		TLM2	CO3	T1	
103.	Sorting: Bubble sort	1	10-10-20		TLM2	CO3	T1	
104.	Insertion Sort	1	12-10-20		TLM2	CO3	T1	
105.	Merge Sort	1	13-10-20		TLM2	CO3	T1,R2	
106.	Quick Sort	1	15-10-20		TLM2	CO3	T1	
107.	Heap Sort	2	17-10-20 &19-10-20		TLM2	CO3	T1	
No. of classes required to complete UNIT-III		9			No. of classes taken:			

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UNIT-IV: Trees, Traversals, Search Trees

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
108.	Trees: Terminology, Binary Trees: definition types of binary trees, Representation	1	21-10-20		TLM2	CO4	T1,R1	
109.	Implementation using linked list	1	22-10-20		TLM2	CO4	T1	
110.	Tree traversals: Recursive techniques	1	24-10-20		TLM2	CO4	T1	
111.	Expression Tress, Search Tree: Binary Search Tree-search operation	1	26-10-20		TLM2	CO4	T1,R2	
112.	insertion, Deletion (all the three cases	1	27-11-20		TLM2	CO4	T1,R2	
113.	Balanced Tree - Introduction to AVL Tress	1	29-11-20		TLM2	CO4	T1,R1	
114.	AVL tree and Rotations	1	31-11-20		TLM2	CO4	T1,R1	
No. of classes required to complete UNIT-IV		7			No. of classes taken:			

UNIT-V: Graphs, Hashing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
115.	Graphs: Fundamentals	1	02-11-20		TLM2	CO5	T1,R3	
116.	BFS	1	03-11-20		TLM2	CO5	T1,R3	
117.	DFS	1	05-11-20		TLM2	CO5	T1,R4	
118.	Minimum Cost spanning tree: Definition,	1	07-11-20		TLM2	CO5	T1,R3	

	Prim's Algorithm							
119.	Kruskal's algorithm	1	08-11-20		TLM2	CO5	T1,R3	
120.	Hashing: Hash Table and Hash Functions	1	10-11-20		TLM2	CO5	T1,R4	
121.	Collision resolution Techniques, separate Chaining, Open addressing, rehashing	1	12-11-20		TLM2	CO5	T1,R3	
No. of classes required to complete UNIT-V		07			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
122.	Introduction to B Trees.	1			TLM1	CO4	T1,R2	
123.	Introduction to Splay Trees	1			TLM1	CO3	T2,R2	

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

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment –1	1	A1=5
Assignment –2	2	A2=5

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

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

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.

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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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROGRAM SPECIFIC OUTCOMES

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate an ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Title	Course Instructor	Course Coordinator	Module Coordinator	HOD
Faculty	T Udaya Kumar	A.S. R.C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

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

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : COMPUTER ARCHITECTURE– 17CI06

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr.M. Srinivasa Rao**

COURSE COORDINATOR : **Dr.M. Srinivasa Rao**

PRE-REQUISITE: DIGITAL LOGIC DESIGN

COURSE OBJECTIVE:. Understand the basic functional modules of a computer system and their interconnection mechanism.Understand the data path and control path organization in a general purpose CPU. Get the design knowledge of main memory and cache memory systems.Explore the methods of communication between CPU and I/O devices. A case study on standard I/O interfaces.

COURSE OUTCOMES (CO)

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

CO1: Identify the sequence of micro operations in the execution of one macro instruction and thereby gain the concepts of control steps, Instruction cycle, Register structure of CPU, Types of micro operations and RTL.
CO2: Analyze the internal organization of CPU for performing Integer Arithmetic, Floating point Arithmetic and logical operations.
CO3: Understand the features of hardwired and micro programmed control units leading to the comparative study of control path organization in these types.
CO4: Analyze the memory hierarchy system and performance improvement by cache memory organization and its principles.
CO5: Analyze the communication methods of I/O devices and standard I/O interfaces.

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	1		2											1	
CO2			3											1	
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, 3rd edition, 1992.

T2 Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "**Computer Organization**", TMH publications, 5th edition, 2002.

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.

R4 John D Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 1st edition, 2001.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Basic Computer Organization and 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
1.	Block Diagram of a Computer, Basic Functional Units of a Computer	1	19.08.2020		TLM2	
2.	Computer Architecture Models, Internal Organization of a Central Processing Unit	1	20.08.2020		TLM2	
3.	Introduction to Sequence of Micro operations and control steps	1	21.08.2020		TLM2	
4.	Register Transfer Microoperations	1	26.08.2020		TLM2	
5.	Arithmetic Micro Operations	1	27.08.2020		TLM2	
6.	Logic Micro Operations and Shift Micro Operations	1	28.09.2020		TLM2/TLM3	
7.	Instruction cycle Instruction Set	1	02.09.2020		TLM2	
8.	Basic Computer Instructions	1	03.09.2020		TLM2	
9.	Turorial		04-09-2020		TLM3	
No. of Classes Required to complete UNIT I: 9				No. of classes taken:		

UNIT-II: Central Processing Unit

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.	Instruction formats and examples	1	09.09.2020		TLM2	
11.	Addressing modes and examples	1	10.09.2020		TLM2/TLM3	
12.	Data Transfer and Manipulation Instructions	1	11.09.2020		TLM2	
13.	Logical Instructions, Program control Instructions	1	16.09.2020		TLM2	
14.	Data Representation, Addition and Subtraction	1	17.09.2020		TLM2/TLM3	
15.	Multiplication Algorithms	1	18.09.2020		TLM2/TLM5	
16.	Booth Multiplication Algorithm	1	23.09.2020		TLM4	
17.	Division Algorithms	1	24.09.2020/		TLM4	
18.	Floating Point Arithmetic operations	1	25.09.2020		TLM2/TLM5	
No. of Classes Required to complete UNIT II : 9				No. of classes taken:		

UNIT-III: Control Unit

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Control Memory	1	07.10.2020		TLM2	
20.	Hard wired control	1	08.10.2020		TLM2	
21.	Micro programmed control	1	09.10.2020		TLM2	
22.	Micro Instruction Format	2	14.10.2020/		TLM2	
23.	Address Sequencing	1	15.10.2020		TLM2	
24.	Design of Control Unit.	1	16.10.2020		TLM2	
No. of Classes Required to complete UNIT III: 6				No. of classes taken:		

UNIT-IV: Memory Organization

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.	Memory Hierarchy, Primary Memory	1	21.10.2020		TLM2	
26.	Introduction to Secondary Memory	1	22-10-2020		TLM2	
27.	Associative Memory	1	23-10-2020		TLM2	
28.	Cache Memory	1	28-10-2020		TLM2/TLM5	
29.	Hit Ratio and Mapping Techniques	1	29-10-2020		TLM2	

30.	Example Problems	1	30-11-2020		TLM3	
No. of Classes Required to complete UNIT IV : 6				No. of classes taken:		

UNIT-V: Input-Output Organization and Standard Input Output Interfaces

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.	Peripheral Devices	1	04-11-2020		TLM2	
32.	Modes of Transfer	1	05-11-2020		TLM2	
33.	Priority Interrupt	1	06-11-2020		TLM2	
34.	Direct Memory Access	1	11-11-2020		TLM2/TLM3	
35.	Input Output Processor, Input Output Interface	1	12-11-2020		TLM2	
36.	Synchronous data transfer and Asynchronous Data Transfer	1	13-11-2020		TLM2	
37.	Timing diagrams for Synchronous and Asynchronous data transfers	1	18-11-2020		TLM2	
38.	Serial communication	1	19-11-2020		TLM2	
39.	Tutorial		20-11-2020		TLM3	
No. of Classes Required to complete UNIT I: 9				No. of classes taken:		

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

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment –1	A1=5
Assignment –2	A2=5
Quiz-1	B1=10
I-Mid Examination	C1=20
Assignment –3	A3=5
Assignment –4	A4=5
Assignment --5	A5=5
Quiz-2	B2=10

II-Mid Examination	C2=20
Evaluation of Assignment Marks: A=(A1+A2+A3+A4+A5)/5	A=5
Evaluation of Quiz Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	B=10
Evaluation of Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	C=20
Attendance	D=5
Cumulative Internal Examination : A+B+C+D	**A+B+C+D=40**
Semester End Examinations	**E=60**
Total Marks: A+B+C+D+E	**100**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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	**Programming Paradigms:** To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes/ methodologies/ practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr. M. Srinivasa Rao)	(Dr. M. Srinivasa Rao)	(Dr.Ch.V.Narayana)	(Dr. D. Veeraiah)

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech. III-Sem., CSE-A

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Statistical Programming with R Lab (17FE66)

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr.G.V.Suresh**

COURSE COORDINATOR : **Mr.G.V.Suresh**

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides a solid undergraduate foundation in both probability theory and mathematical statistics and at the same time provides an indication of the relevance and importance of the theory in solving practical problems in the real world.

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

CO1: Apply the different distributions

CO2: Use statistical tests in testing hypotheses on data

CO3: Describe the properties of discrete and continuous distribution functions

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										2	3	
CO2	3	2	2	1									2	2	
CO3	3	3	3			1							2	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).

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	Learning Outcome COs	HOD Sign Weekly
	Cycle1: Introduction to R Programming	2	17/08/2020		TLM4/TLM5	CO1	
	Cycle 2: Getting Used to R: Describing Data • Viewing and Manipulating Data • Plotting Data • Reading in Your Own Data	2	24/08/2020 31/08/2020		TLM4/TLM5	CO1	
4	Cycle 3: Visualizing Data Tables, charts and plots. Visualizing Measures of Central Tendency, Variation, and Shape. Box plots, Pareto diagrams. How to find the mean median standard deviation and quantiles of a set of observations	2	07/09/2020 14/09/2020		TLM4/TLM5	CO1	
5	Cycle 4: Probability Distributions. Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of CDF and PDF uniform and normal, binomial Poisson distributions.	2	21/09/2020 28/09/2020		TLM4/TLM5	CO1	
6	Cycle 5: Densities of Random Variables • Off the Shelf Distributions in R • Matching a Density to Data	2	05/10/2020 12/10/2020		TLM4/TLM5	CO1	

	• More About Making Histograms						
7	Cycle 6: Binomial Distribution Study of binomial distribution. Plots of density and distribution functions. Normal approximation to the Binomial distribution	2	19/10/2020		TLM4/TLM5	CO1	
9	Cycle7: Building Confidence in Confidence Intervals • Populations Versus Samples • Large Sample Confidence Intervals • Simulating Data Sets • Evaluating the Coverage of Confidence Intervals	2	26/10/2020		TLM4/TLM5	CO2	
10	Cycle8: Perform Tests of Hypotheses How to perform tests of hypotheses about the mean when the variance is known. How to compute the p-value. Explore the connection between the critical region, the test statistic, and the p-value	2	02/11/2020		TLM4/TLM5	CO2	
11	Cycle9:Correlation How to calculate the correlation between two variables. How to make scatter plots. Use the scatterplot to investigate the relationship between two variables	2	09/11/2020		TLM4/TLM5	CO2	
12	Cycle 10 : Estimating a Linear Relationship • A Statistical Model for a Linear Relationship • Least Squares Estimates • The R Function lm	2	04/10/2020		TLM4/TLM5	CO3	

	• Scrutinizing the Residuals						
15	**LAB INTERNAL**						

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2: Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.

PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

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

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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

PROGRAM SPECIFIC OUTCOMES

PSO-a: Specify, design and analyze systems that efficiently generate, transmit and distribute electrical power.

PSO b: Design and analyze electrical machines, modern drive and lighting systems

PSO c: Specify, design, implement and test analog and embedded signal processing electronic systems.

PSO d: Design controllers for electrical and electronic systems to improve their performance

Course Instructor	Course Coordinator	Module Coordinator	HOD
G V Suresh	G V Suresh		Dr. D Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : G.V.Rajya Lakshmi

Course Name & Code : Python Programming Lab (17CI62)

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

Program/Sem/Sec : B.Tech., CSE., III-Sem., B A.Y : 2020-21

PRE-REQUISITE : C Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Python course leads the students from the basics of writing and running Python scripts to more advanced features such as file operations, sets, working with binary data, and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting.

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

CO 1	Identify various data structures available in Python and apply them in solving computational problems.
CO 2	Design and implement programs to process data.
CO 3	Explore the usage of exception handling and database interaction.
CO 4	Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

PART-B

I. Exercise programs on basic control structures & loops

a) Write a program for checking the given number is even or odd.

b) Using a for loop, write a program that prints the decimal equivalents of 1/2, 1/3, 1/4,...1/10

c) Write a program for displaying reversal of a number.
d) Write a program for finding biggest number among 3 numbers.
e) Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.

II.Exercise programs on operators & I/O operations.

a) Write a program that takes 2 numbers as command line arguments and prints its sum.
b) Implement python script to show the usage of various operators available in python language.
c) Implement python script to read person‘s age from keyboard and display whether person is eligible for voting or not.
d) Implement python script to check the given year is leap year or not.

III. Exercise programs on Python Script

a) Implement Python Script to generate first N natural numbers.
b) Implement Python Script to check given number is palindrome or not.
c) Implement Python script to print factorial of a number.
d) Implement Python Script to print sum of N natural numbers.
e) Implement Python Script to check given number is Armstrong or not.
f) Implement Python Script to generate prime numbers series up to n.

IV.Exercise programs on Lists

a) Finding the sum and average of given numbers using lists.
b) To display elements of list in reverse order.
c) Finding the minimum and maximum elements in the lists.

V. Exercise programs on Strings

a) Implement Python Script to perform various operations on string using string libraries.
b) Implement Python Script to check given string is palindrome or not.
c) Implement python script to accept line of text and find the number of characters, number of
vowels and number of blank spaces in it.

VI. Exercise programs on functions.

a) Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.
b) Write a program which makes use of function to display all such numbers which are divisible
by7 but are not a multiple of 5, between 1000 and 2000.

VII. Exercise programs on recursion & parameter passing techniques.

a) Define a function which generates Fibonacci series up to n numbers.
b) Define a function that checks whether the given number is Armstrong
c) Implement a python script for Call-by-value and Call-by-reference
d) Implement a python script for factorial of number by using recursion.

IX. Exercise programs on Tuples

a) Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number. Suppose the following input is supplied
to the program:34,67,55,33,12,98. Then, the output should be: ['34', '67', '55', '33', '12', '98'] ('34',67', '55', '33', '12', '98').
b) With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one
line and the last half values in one line.

X. Exercise programs on files
a) Write Python script to display file contents.
b) Write Python script to copy file contents from one file to another.
XI. Exercise programs on searching & sorting Techniques.
a) Implement a python script to check the element is in the list or not by using Linear search &
Binary search.
b) Implement a python script to arrange the elements in sorted order using Bubble, Selection, Insertion and Merge sorting techniques.

XII. Exercise programs on Exception handling concepts
a) Write a python program by using exception handling mechanism.
b) Write a python program to perform various database operations (create, insert, delete, update).

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

S.No.	Programs to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Exercise programs on basic control structures and loops	2	19.08.2020		TLM4	CO1,CO4	
2.	Exercise programs on operators and I/O operations	2	26.08.2020		TLM4	CO1,CO4	
3.	Exercise programs on Python Scripts	2	02.09.2020		TLM4	CO1,CO4	
4.	Exercise programs on Lists	2	09.09.2020		TLM4	CO2,CO4	
5.	Exercise programs on Strings	2	16.09.2020		TLM4	CO2,CO4	
6.	Exercise programs on Functions	2	23.09.2020		TLM4	CO2,CO4	

7.	Exercise programs on Recursion	2	07.10.2020		TLM4	CO2,CO4	
8.	Exercise programs on Parameter Passing Techniques	2	14.10.2020		TLM4	CO2,CO4	
9.	Exercise programs on Tuples	2	21.10.2020		TLM4	CO2,CO4	
10.	Exercise programs on Files	2	28.10.2020		TLM4	CO2,CO4	
11.	Exercise programs on Searching and Sorting	2	04.11.2020		TLM4	CO2,CO4	
12.	Exercise programs on Exception handling and Database handling	2	11.11.2020		TLM4	CO3,CO4	

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

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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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	**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	**Programming Paradigms**: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	**Data Engineering:** To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	**Software Engineering:** Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
G.V.Rajya Lakshmi	G.V.Rajya Lakshmi	Dr.D.Veeraiah	Dr.D.Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., III-Sem., CSE - B

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Data Structures Lab- 17CI63

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr. T Udaya Kumar**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITES: C Language

COURSE EDUCATIONAL OBJECTIVES (CEOs): To make students familiar with writing algorithms to implement operations involved in different data structures like linked list & different types of trees and implement various searching and sorting techniques.

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

CO1: Implement & test the performance of data structures like linked list, stacks & queues.

CO2: Implement & test the performance of searching & sorting techniques.

CO3: Implement & test the performance of trees and graph traversal techniques.

CO4**:** Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

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	Learning Outcome COs	HOD Sign Weekly
1	Practice session on Arrays, structures and pointers Practice session on Dynamic Memory allocation.	2	21-08-20		TLM4/TLM5	CO1	
2	Write a C program to implement various operations on List using arrays. Write a C program to implement various operations on Single linked List using pointers.	2	28-08-20		TLM4/TLM5	CO1	
3	Write an interactive C program to create a linear linked list of	2	04-09-20		TLM4/TLM5	CO1	

	customer names and their telephone numbers. The program should be menu-driven and include features for adding a new customer, deleting an existing customer and for displaying the list of all customers.						
4	Write a C program to create a circular linked list so that the input order of data items is maintained. Add the following functions to carry out the following operations on circular single linked lists. a) Count the number of nodes. b) insert a node c) delete a node	2	11-09-20		TLM4/TLM5	CO1	
5	Write a C program that will remove a specified node from a given doubly linked list and insert it at the end of the list on an existing list. Also write a function to	2	18-09-20		TLM4/TLM5	CO1	

	display the contents of the list. Write a C program to implement a stack using array &linked list in which Push, Pop and display can be performed.						
6	Write a program to convert infix expression to post fix expressions using array implementation of stack Write a program for evaluating post fix expressions using array 2implementation of stack	2	25-09-20		TLM4/TLM5	CO1	
7	Write a C program to implement a queue using arrays and linked list in which insertions, deletions and display can be performed.	2	02-10-20		TLM4/TLM5	CO1	
8	Write a C program to implement insertion sort, Selection sort, Merge Sort	2	09-10-20		TLM4/TLM5	CO2	

9	Sort a sequence of n integers using Quick sort technique and then search for a key in the sorted array using Binary search, linear search techniques. Write a C program to Heap sort.	2	16-10-20		TLM4/TLM5	CO2	
10	. Write a C program to construct a binary tree and do inorder, preorder and post order traversals, printing the sequence of nodes visited in each case. Write a C program to implement BST operations- insert, search and delete.	2	23-10-20		TLM4/TLM5	CO3	
11	Write a C program to implement the following graph Traversals a) DFS b) BFS	2	30-10-20		TLM4/TLM5	CO3	
12	**Lab Internal Examination**	2	06-11-20		TLM4/TLM5		

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

13. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.

14. **Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

15. **Design/development of solutions**: Design solutions for complex engineering problems anddesign 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.

16. **Conduct investigations of complex problems**: Use research-based knowledge and

researchmethods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

17. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
18. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
19. **Environment and sustainability**: Understand the impact of the professional engineering solutionsin societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
20. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms ofthe engineering practice.
21. **Individual and team work**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
22. **Communication**: Communicate effectively on complex engineering activities with the engineeringcommunity 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.
23. **Project management and finance**: Demonstrate knowledge and understanding of theengineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.
24. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate an ability to Analyze, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD
T Udaya Kumar	A.S. R. C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., III-Sem., CSE (C)

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : PROBABILITY AND STATISTICS - 17FE08

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : M.RAMI REDDY

COURSE COORDINATOR : M.RAMI REDDY

PRE-REQUISITES: None

COURSE EDUCATIONAL OBJECTIVES (CEOs) : In this course the students are able to understand the applications of probability distributions. They also learn various sample tests in testing the hypothesis and correlation, regression of a bi-variate data.

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

CO1: Predict various probabilistic situations based on various laws of probability and random variables.
CO2: Distinguish among the criteria of selection and application of Binomial, Poisson, Normal and Exponential distributions.
CO3: Estimate the point and interval estimators of mean and proportion for the given Sample data.
CO4: Apply various sample tests like Z-test, t-test, F-test and $x2$ -test for decision making regarding the population based on sample data.
CO5: Estimate the level of correlation, the linear relationship using the regression lines for the given bivariate data.

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 TEXT BOOKS:

T1 Miller & Freund's "Probability and Statistics for Engineers",8th edition. PHI, New Delhi,2011.

T2 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics", 11thEdition, Sultan Chand and sons, New Delhi,2014.

BOS APPROVED REFERENCE BOOKS:

R1 Jay L.Devore "Probability and Statistics for engineering and the sciences." , 8th edition, Cengage Learning india, 2012.

R2 B.V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, syllabus course outcomes	1	02-11-20		TLM2	---	---	
2.	Introduction to probability	1	04-11-20		TLM2	CO1	T1	
3.	Basic definitions, simple problems	1	05-11-20		TLM2	CO1	T1	
4.	Axioms, simple examples	1	07-11-20		TLM2	CO1	T1, T2	
5.	Problem on addition Rule	1	09-11-20		TLM2	CO1	T1	
6.	Conditional probability	1	11-11-20		TLM2	CO1	T1	
7.	Multiplication rule, examples	1	12-11-20		TLM2	CO1	T1	
8.	Independent events, problems	1	16-11-20		TLM2	CO1	T1, T2	
9.	Baye's rule	1	18-11-20		TLM2	CO1	T1	
10.	Problems on baye's rule	1	19-11-20		TLM2	CO1	T1, T2	
11.	Applications	1	21-11-20		TLM2	CO1	T1, T2	
12.	Random variables, Expectations	1	23-11-20		TLM2	CO1	T1	
13.	Problems on PMF	1	25-11-20		TLM2	CO1	T1,T2	
14.	Problems on PDF	1	26-11-20		TLM2	CO1	T1,T2	
15.	Applications	1	28-11-20		TLM2	CO1	T1, T2	
16.	Unit summary, Tutorial	1	30-11-20		TLM3	CO1	T1	
No. of classes as per schedule for UNIT-I		16			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
17.	Binomial Distribution : mean and variance	1	02-12-20		TLM2	CO2	T1	
18.	Problems on Binomial distribution	1	03-12-20		TLM2	CO2	T1,T2	
19.	Fitting of binomial distribution	1	05-12-20		TLM2	CO2	T1,T2	
20.	Applications	1	07-12-20		TLM2	CO2	T1,T2	
21.	Poisson distribution, mean and variance	1	09-12-20		TLM2	CO2	T1	
22.	Problems , Fitting of Poisson distribution	1	10-12-20		TLM2	CO2	T1,T2	
23.	Applications	1	14-12-20		TLM2	CO2	T1,T2	
24.	Normal distribution, problems	1	16-12-20		TLM2	CO2	T1,T2	
25.	Problems on Normal Distribution	1	17-12-20		TLM2	CO2	T1	
26.	Applications	1	19-12-20		TLM2	CO2	T1,T2	
27.	Exponential distribution	1	21-12-20		TLM2	CO2	T1,T2	
28.	Unit summary, Tutorial	1	23-12-20		TLM2,3	CO2	T1,T2	
No. of classes as per schedule for UNIT-II		12			No. of classes taken:			

UNIT-III : Sampling Distribution & Estimation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome CO	Text Book followed	HOD Sign Weekly
29.	Sampling distribution ,definitions	1	24-12-20		TLM1,2	CO3	T1	
30.	Sampling distribution of mean	1	26-12-20		TLM1,2	CO3	T1	
31.	problems	1	28-12-20		TLM1,2	CO3	T1,T2	
32.	Problems on central limit theorem	1	30-12-20		TLM1,2	CO3	T1,T2	
33.	Problems on central limit theorem	1	31-12-20		TLM1,2	CO3	T1	
34.	Point and interval estimation	1	02-01-21		TLM1,2	CO3	T1	
35.	Interval estimation of mean	1	04-01-21		TLM1,2	CO3	T1,T2	
36.	Interval estimation of proportion	1	06-01-21		TLM1,2	CO3	T1,T2	
37.	interval estimation of small samples	1	07-01-21		TLM1,2	CO3	T1,T2	
38.	Unit summary, Tutorial	1	11-01-21		TLM1,3	CO3	T1,T2	
No. of classes as per schedule for UNIT-III		10			No. of classes taken:			

UNIT-IV : Tests of Hypothesis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
39.	Testing of Hypothesis , definitions	1	25-01-21		TLM1,2	CO4	T1,T2	
40.	Z-test for single mean	1	27-01-21		TLM1	CO4	T1,T2	
41.	Z-test for difference of means	1	28-01-21		TLM1	CO4	T1,T2	
42.	Z-test for single proportion	1	30-01-21		TLM1,2	CO4	T1,T2	
43.	Z-test for difference of proportions	1	01-02-21		TLM1	CO4	T1,T2	
44.	t-test for single mean	1	03-02-21		TLM1	CO4	T1,T2	
45.	t-test for difference of means	1	04-02-21		TLM1	CO4	T1,T2	
46.	Paired t-test	1	06-02-21		TLM1	CO4	T1,T2	
47.	F-test for population variances	1	08-02-21		TLM1,2	CO4	T1,T2	
48.	χ^2 test for goodness of fit	1	10-02-21		TLM1	CO4	T1,T2	
49.	χ^2 test for independence of attributes	1	11-02-21		TLM1	CO4	T1,T2	
50.	Applications	1	13-02-21		TLM1,2	CO4	T1,T2	
51.	Unit summary,Tutorial	1	15-02-21		TLM2,3	CO4	T1,T2	
No. of classes as per schedule for UNIT-IV		13			No. of classes taken:			

UNIT-V : Correlation & Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
52.	Simple Bi-variate Correlation	1	17-02-21		TLM1,2	CO5	T1	
53.	Problems on Pearson's Correlation	1	18-02-21		TLM1	CO5	T1,T2	
54.	Regression lines	1	20-02-21		TLM1	CO5	T1	
55.	Problems on Regression lines	1	22-02-21		TLM1	CO5	T1,T2	
56.	Properties of Regression coefficients	1	24-02-21		TLM1,2	CO5	T1,T2	
57.	Problems on Regression coefficients	1	25-02-21		TLM1	CO5	T1,T2	
58.	Rank correlation	1	27-02-21		TLM1	CO5	T1,T2	
59.	Problems on rank Correlation	1	01-03-21		TLM1	CO5	T1	
60.	Problems on repeated ranks	1	03-03-21		TLM1	CO5	T1	
61.	Applications	1	04-03-21		TLM1,2	CO5	T1,T2	
62.	Unit summary, Tutorial	1	06-03-21		TLM2,3	CO5	T1,T2	

No. of classes as per schedule for UNIT-V	11	No. of classes taken:

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
63.	Bivariate Random Variables	1	26-11-20		TLM2	CO1	T1,T2	
64.	Nonlinear Regression	1	22-01-21		TLM2	CO5	T1,T2	

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

Part - C

EVALUATION PROCESS:

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any Other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:-

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

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.

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.

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.

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.

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.

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.

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

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

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.

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.

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

PROGRAM SPECIFIC OUTCOMES(PSOs):-

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Shaheda Niloufer
Course Name & Code : Environmental Science & 17FE03
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., III-Sem., Section- C A.Y : 2020-21

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 Mahua Basu, 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	02-11-2020		2	
2.	Scope and importance of environmental studies	1	04-11-2020		2	
3.	Population explosion and variations among Nations.	1	09-11-2020		2	
4.	Resettlement and Rehabilitation - Issues and possible solutions	1	11-11-2020		2	
5.	Environment and human health	1	16-11-2020		2	
6.	HIV-AIDS, Environmental ethics **Assignment in UNIT I**	1	18-11-2020		2,3	
7.	Role of Information Technology in environmental management and human health **Tutorial -1**	1	23-11-2020		2,3	
No. of classes required to complete UNIT-I: 7				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, Assignment in Unit II	1	25-11-2020		2	
2.	Water Resources	1	30-11-2020		2	
3.	Mineral Resources	1	02-12-2020		2	
4.	Food Resources	1	07-12-2020		2	
5.	Energy Resources **Tutorial-2**	1	09-12-2020		2,3	
6.	I MID EXAMINATION	1	14-12-2020			
7.	I MID EXAMINATION	1	16-12-2020			
No. of classes required to complete UNIT-II: 07				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 Food chains and Food webs, Ecological succession, Ecological pyramids	1	21-12-2020		2	
2.	Biogeochemical cycles, Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species, Bio-geographical classification of India. India as a mega diversity nation	1	23-12-2020		2	
3.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Man and wild life conflicts. Endangered and endemic species of India	1	28-12-2020		2	
4.	Conservation of biodiversity: In-situ and Ex-situ conservation methods **Tutorial-3**	1	30-12-2020		2,3	
No. of classes required to complete UNIT-III: 4				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.	Causes, effects and control measures of: Water Pollution	1	04-01-2021		2	
2.	Causes, effects and control measures of: Soil Pollution, Causes, effects and control measures of: Noise Pollution	1	06-01-2021		2	
3.	Causes, effects and control measures of: Nuclear Pollution **Tutorial-4** Solid Waste Management, Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis.	1	11-01-2021		2,3	
4.	I Mid Examinations	1	18-01-2021			
5.	I Mid Examinations	1	20-01-2021			
6.	Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion. Sustainable development and un-sustainability. **Assignment in Unit IV**		25-01-2021		2,3	
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.	Stockholm and Rio Summit	1	25-01-2021		2	
2.	Green building **Tutorial-5**	1	27-01-2021		2,3	
3.	Environmental Impact Assessment (EIA), Environmental Law	1	01-02-2021		2	
4.	Consumerism and Waste products. **Assignment in UNIT- V**	1	03-02-2021		2,3	
5.	Environmental Law	1	08-02-2021		2	
6.	Environmental Law	1	10-02-2021		2	
7.	Environmental Law	1	15-02-2021		2	
8.	Carbon credits and carbon trading.	1	17-02-2021		2	
9.	**Revision**	1	22-02-2021		6	
10.	**Revision**	1	24-02-2021		6	
11.	**Revision**	1	01-03-2021		6	
12.	**Revision**	1	03-03-2021		6	
13.	**II Mid Examination**		08-03-2021			
14.	**II Mid Examination**		15-03-2021			
No. of classes required to complete UNIT-V: 14				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10

Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools

PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Dr. Shaheda Niloufer	**Dr. Shaheda Niloufer**	**Dr. Shaheda Niloufer**	**Dr. A. Rami Reddy**
Course Instructor (Name)	Course Coordinator (Name)	Module Coordinator (Name)	HOD (Name)

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: D.SRINIVASA RAO

Course Name & Code **:** DISCRETE MATHAMETICAL STRUCTURES & 17CI03

L-T-P Structure **:** 3-1-2 Credits : 3

Program/Sem/Sec **:** B.Tech., CSE, III-Sem., Section – B A.Y : 2020 - 2021

PRE-REQUISITE: Basic mathematical knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Perform the operations associated with sets, functions, and relations. Relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and Terminology in context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior of software or to solve problems such as puzzles.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Outline basic proofs for theorems using the techniques of - direct proofs, example, and Proof by contradiction, mathematical induction.
CO2	Illustrate the basic terminology of functions, relations, and sets and demonstrate the knowledge of their associated operations by examples.
CO3	Understand the properties of graphs and able to relate these to practical problems
CO4	Apply basic principles/techniques to solve different algebraic structures and combinatorial problems.
CO5	Solve linear recurrence relations by recognizing homogeneity, linearity, constant coefficients and characteristic equation.

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	1	2											
CO3	3	3	1	2									1		
CO4	3	3	2	1									1		
CO5	3	3	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 Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH Publications

REFERENCE BOOKS:

R1 S.Santha, Discrete Mathematics, Cengage

R2 Thomas Koshy, Discrete Mathematics with Applications, Elsevier

R3 JK Sharma, Macmillan Discrete Mathematics, 2nd edition

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical Logic and Predicate Calculus

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Mathematical Logic: Propositional Calculus	1	03-11-2020		**TLM2**	CO1	T1	
2.	Statement and Notations, Connectives, Truth Tables	1	05-11-2020		**TLM2**	CO1	T1	
3.	Tautologies	1	06-11-2020		**TLM2**	CO1		
4.	Equivalence of Formulas	1	07-11-2020		**TLM2**	CO1	T1	
5.	Duality Law		10-11-2020		**TLM2**	CO1		
6.	Tautological Implications	1	12-11-2020		**TLM2**	CO1	T1	
7.	Normal Forms,DNF	1	13-11-2020		**TLM6**	CO1	T1,R1	
8.	CNF	1	17-11-2020		**TLM2**	CO1		
9.	PCNF,PDNF	1	19-11-2020		**TLM2**	CO1		
10.	Theory of inference for statement Calculus	1	20-11-2020		**TLM2**	CO1	T1,R1	
11.	RULE CP	1	21-11-2020		**TLM2**	CO1		
12.	Consistency of Premises Indirect Method of Proof	1	24-11-2020		**TLM2**	CO1	T1,R1	
13.	Predicative Logic	1	26-11-2020		**TLM2**	CO1	T1,R1	
14.	Statement Functions, Variables Free & Bound Variables	1	27-11-2020		**TLM3**	CO1	T1	
15.	QUANTIFIERS	1	28-11-2020		**TLM2**	CO1		
16.	Inference theory for predicate calculus	1	01-12-2020		**TLM2**	CO1	T1	
No. of classes required to complete UNIT-I		16				No. of classes taken:		

UNIT-II: Set Theory and Functions

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly

1.	Set Theory: Introduction,	1	03-12-2020		**TLM2**	CO2	T1	
2.	Operations on Binary Sets	1	04-12-2020		**TLM2**	CO2		
3.	Operations on Binary Sets	1	05-12-2020		**TLM2**	CO2		
4.	Relations: Properties of Binary Relations	1	08-12-2020		**TLM2**	CO2	T1	
5.	Properties of relations	1	10-12-2020		**TLM3**	CO2		
6.	Relation Matrix and Digraph Operations on Relations	1	11-12-2020		**TLM2**	CO2	T1	
7.	Partition and Covering, Transitive Closure	1	12-12-2020		**TLM2**	CO2	T1	
8.	Equivalence Relation	1	15-12-2020		**TLM2**	CO2	T1	
9.	Compitable Relation	1	17-12-2020		**TLM2**	CO2	T1,R1	
10.	Partial Ordering Relation & Hasse Diagrams	1	18-12-2020		**TLM2**	CO2	T1	
11.	Functions: Bijective Functions	1	19-12-2020		**TLM2**	CO2	T1,R1	
12.	Composition of Functions, Inverse Functions	1	22-12-2020		**TLM2**	CO2	T1,R1	
13.	Permutation Functions, Recursive Functions	1	24-12-2020		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-2		13	13			No. of classes taken:		

UNIT-III: GRAPH THEORY

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Basic Concepts of Graphs, Sub graphs	1	26-12-2020		**TLM2**	CO3	T1	
2.	Matrix Representation of Graphs	1	29-12-2020		**TLM2**	CO3	T1	
3.	Adjacency Matrices, Incidence Matrices	1	31-12-2020		**TLM2**	CO3	T1	
4.	Isomorphic Graphs, Paths and circuits	2	02-01-2021		**TLM2**	CO3	T1	
5.	Eulerian Graphs, Hamiltonian Graphs	1	05-01-2021		**TLM2**	CO3	T1	
6.	Multigraphs, Planar Graphs, Euler‟s Formula	1	07-01-2021		**TLM2**	CO3	T1,R1	
7.	Graph Colouring and Covering, Chromatic Number	1	08-01-2021		**TLM2**	CO3	T1	
8.	Trees, Directed trees	1	09-01-2021		**TLM2**	CO3	T1,R1	
9.	Binary Trees, Decision Trees	1	12-01-2021		**TLM3**	CO3	T1,R1	
10.	Spanning Trees: Properties	1	29-01-2021		**TLM2**	CO3	T1	
11.	Algorithms for Spanning trees and Minimum Spanning Trees	1	30-01-2021		**TLM6**	CO3	T1	

No. of classes required to complete UNIT-3	13				No. of classes taken:

UNIT-IV: Algebraic Structures & Combinatorics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Algebraic Systems with one Binary Operation	1	02-02-2021		**TLM1**	CO4	T1	
2.	Properties of Binary operations, Semi groups and Monoids	1	04-02-2021		**TLM1**	CO4	T1	
3.	Homomorphism of Semi groups and Monoids, Groups	1	05-02-2021		**TLM6**	CO4	T1	
4.	Abelian Group, Cosets, Subgroups	1	06-02-2021		**TLM1**	CO4	T1	
5.	Lattice: Properties, Algebraic Systems with two Binary Operations: Rings	1	09-02-2021		**TLM1**	CO4	T1	
6.	Basic of Counting, Permutations, Derangements	1	11-02-2021		**TLM1**	CO4	T1,R1	
7.	Permutations with Repetition of Objects	1	12-02-2021		**TLM1**	CO4	T1	
8.	Circular Permutations, Restricted Permutations	1	13-02-2021		**TLM6**	CO4	T1,R1	
9.	Combinations, Restricted Combinations	1	16-02-2021		**TLM1**	CO4	T1,R1	
10.	Pigeonhole Principle and its Application	1	18-02-2021		**TLM1**	CO4	T1	
11.	Binomial Theorem, Binomial and Multinomial Coefficients	1	19-02-2021		**TLM1**	CO4	T1	
12.	Generating Functions of Permutations and Combinations	1	20-02-2021		**TLM3**	CO4	T1	
13.	The Principles of Inclusion – Exclusion	1	24-02-2021		**TLM1**	CO4	T1	
No. of classes required to complete UNIT-4		13				No. of classes taken:		

UNIT-V: Recurrence Relations

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	Text Books Followed	HOD Sign Weekly
1.	Generating Function of Sequences, Partial Fractions	1	26-02-2021		**TLM1**	CO5	T1	
2.	Calculating Coefficient of Generating Functions	1	27-02-2021		**TLM1**	CO5	T1	
3.	Recurrence Relations, Formulation as Recurrence Relations	2	02-03-2021		**TLM1 & 6**	CO5	T1,R1	
4.	Solving linear homogeneous recurrence Relations by substitution	2	04-03-2021		**TLM1**	CO5	T1	

5.	Generating functions and The Method of Characteristic Roots	1	06-03-2021		**TLM1**	CO5	T1,R1	
6.	Solving Inhomogeneous Recurrence Relations	1	06-03-2021		**TLM1**	CO5		
7.	Solving Inhomogeneous Recurrence Relations	1	06-03-2021		**TLM3**	CO5	T1,R1	
No. of classes required to complete UNIT-5		9				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Programming Paradigms:** The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement database applications.
PSO 3	**Software Engineering:** The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization..

Course Instructor	Course Coordinator	Module Coordinator	HOD
D.SRINIVASA RAO	D.SRINIVASA RAO		DR. D.VEERAIAH

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : K SUNDEEP SARADHI
Course Name & Code : Python Programming (17CI04)
L-T-P Structure : 3-1-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE., III-Sem., C A.Y : 2020-21

PRE-REQUISITE: C Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):

Python is a Modern Language useful for writing compact codes specifically for Programming in the area of Server-side Web Development, Data Analytics, AI and Scientific Computing as well as Production Tools and Game Programming

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

CO 1	Identify the basic python constructs with a view of using them in problem solving.
CO 2	Apply control structures and use python lists in examples of problem solving.
CO 3	Explore the utility of strings and functions in modular programming using python
CO 4	Apply tuple, set and file operations to organize the data in real world problems
CO 5	Analyze various searching and sorting techniques using python and apply exception Handling, database operations in python.

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

COs	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO2	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO3	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO4	3	-	1	-	3	-	-	-	-	-	-	3	3	-	-
CO5	3	-	1	-	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 Povel Solin, Martin Novak, "Introduction to Python Programming", NC Lab Public Computing, 2013.

T2 Bill Lubanovic, "Introducing Python- Modern Computing in Simple Packages", O'Reilly Publication, 1st Edition, 2015.

REFERENCE BOOKS:

R1 Jacob Fredslund, "Introduction to Python Programming", 2007.

R2 Y.Daniel Liang, "Introduction to programming using python", Pearson, 2013.

R3 R. Nageswara Rao, "Core python programming", Dreamtech, 2017.

R4 Mark Summerfield, "Programming in Python 3" Pearson Education, 2nd Edition, 2010.

R5 Magnus Lie Hetland, "Beginning Python – From Novice to Professional", APress Publication, 3rd Edition, 2017

PART-B

COURSE DELIVERY PLAN (LESSON PLAN) : Section C

UNIT-I : Introduction to Python & Operators

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1.	Introduction to Programming, History of Python	1	02.11.2020		TLM2	CO1	T1	
2.	Usage of Python Interpreter, Structure of Python Program, Python Shell.	1	04.11.2020		TLM2	CO1	T1	
3.	Indentation, Python Built-in types , Variables	1	04.11.2020		TLM2	CO1	T1	
4.	Input-Output Statements	1	07.11.2020		TLM2/ TLM4	CO1	T1	
5.	Identifiers, keywords, Literals, Simple programs	1	09.11.2020		TLM2	CO1	T1	
6.	Arithematic , Relational, Logical Operators,	1	11.11.2020		TLM2 /TLM4	CO1	T1	
7.	Bitwise Operators, Increment/decrement operators	1	11.11.2020		TLM2 /TLM4	CO1	T1	
8.	Assignment Operators, Programming Examples	1	16.11.2020		TLM2 /TLM4	CO1	T1	
9.	Python Membership Operator	1	18.11.2020		TLM2 / TLM4	CO1	T1	
10.	Python Identity Operator , Operator Precedence	1	18.11.2020		TLM2 /TLM4	CO1	T1	
11.	Assignment / Quiz – 1	1	21.11.2020		TLM6	CO1	T1	
No. of classes required to complete UNIT-I		**11**			**No. of classes taken:**			

UNIT-II: Control Structures & Python Lists

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12	Conditonal Statements – if, if-else	1	23.11.2020		TLM2	CO2	T1	
13	Nested If-else	1	25.11.2020		TLM2	CO2	T1	

14	Jumping Statements – continue, break, pass	1	25.11.2020		TLM2	CO2	T1	
15	Python Loops – While loop, for loop	1	28.11.2020		TLM2	CO2	T1	
16	Nested Loops with Programs	1	30.11.2020		TLM2 / TLM4	CO2	T1	
17	Mathematical functions & constants, Random Number functions	1	02.12.2020		TLM2	CO2	T1	
18	Python List - concept , Creating and Accessing Elements	1	02.12.2020		TLM4	CO2	T1	
19	Updating Lists & Deleting Lists	1	05.12.2020		TLM4	CO2	T1	
20	Basic List operations , Reverse, Indexing	1	07.12.2020		TLM4	CO2	T1	
21	Slicing & Matrices	1	09.12.2020		TLM4	CO2	T1	
22	Built-in List Functions	1	09.12.2020		TLM4	CO2	T1	
23	Assignment / Quiz – 2	1	12.12.2020		TLM6	CO2	T1	
No. of classes required to complete UNIT-II		**12**			**No. of classes taken:**			

UNIT-III: Python Strings & Functions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Python Strings - concept , Slicing, Escape Characters	1	14.12.2020		TLM2	CO3	T1	
2.	String Special Operations, String formatting operator	1	16.12.2020		TLM2 /TLM4	CO3	T1	
3.	Triple quotes , raw string, Unicode strings	1	16.12.2020		TLM2 /TLM4	CO3	T1	
4.	Built-in string methods	1	19.12.2020		TLM2 /TLM4	CO3	T1	
5.	Defining and calling a function - Examples	1	21.12.2020		TLM2 /TLM4	CO3	T1	
6.	Types of functions, Function arguments, Anonymous functions	1	23.12.2020		TLM2	CO3	T1	
7.	Global and Local variables, Recursion with programs	1	23.12.2020		TLM2 /TLM4	CO3	T1	
8.	Assignment / Quiz-3	1	26.12.2020		TLM4 / TLM2	CO3	T1	
No. of classes required to complete UNIT-III		**08**			**No. of classes taken:**			

UNIT-IV: Python Tuples , Sets & Files

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Python Tuples – Introduction	1	28.12.2020		TLM2	CO4	T1	
2.	Creating and Deleting Tuples Accessing Values in a Tuple	1	30.12.2020		TLM2	CO4	T1	
3.	Updating tuples , Delete tuple elements, Basic tuple operations	1	30.12.2020		TLM2 / TLM4	CO4	T1	
4.	Indexing , Slicing and Matrices	1	02.01.2021		TLM2	CO4	T1	
5.	Built-in tuple functions,	1	04.01.2021		TLM3	CO4	T1	
6.	Sets-concepts, operations	1	06.01.2021		TLM2	CO4	T1	
7.	Files – Creating files, Operation on files	1	06.01.2021		TLM2	CO4	T1	
8.	Programs on files	1	09.01.2021		TLM2 /TLM4	CO4	T1	
9.	Assignment / Quiz – 4	1	11.01.2021		TLM6	CO4	T1	
No. of classes required to complete UNIT-IV		**09**			**No. of classes taken:**			

UNIT-V: Searching & Sorting , Exception Handling & Database

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1	Searching Techniques – Linear Search, Binary Search	3	27.01.2021 27.01.2021 30.01.2021		TLM2	CO5	T1	
2	Sorting Techniques – Bubble sort, Selection Sort, Insertion Sort	3	01.02.202 03.02.2021 03.02.2021		TLM2	CO5	T1	
3	Merge Sort, Heap Sort	3	06.02.2021 08.02.2021 10.02.2021		TLM2	CO5	T1	
4	Exception Handling – Exceptions, Except clause , try Finally clause	1	10.02.2021		TLM2	CO5	T1	
5	Database – introduction and connections	1	15.02.2021		TLM2	CO5	T1	
6	Executing queries and Transactions ,	1	17.02.2021		TLM2 /TLM4	CO5	T1	
7	Simple Programs on database	1	17.02.2021		TLM2 /TLM4	CO5	T1	
8	Handling errors in Database	1	20.02.2021		TLM2	CO5	T1	
9	Assignment / Quiz – 5	1	22.02.2021		TLM6	CO5	T1	
No. of classes required to complete UNIT-V		**09**			**No. of classes taken:**			

Content Beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Dictionaries	1	24.02.2021		TLM1/ TLM5		T2/R3	
2.	OOPs Concepts	1	24.02.2021		TLM1/ TLM5		T2/R3	
3.	Classes, Objects	1	27.02.2021		TLM1/ TLM5		T2/R3	
4.	Introduction to Libraries	1	01.03.2021		TLM1/ TLM5		T2/R3	
5.	Revision	2	03.03.2021		TLM1/ TLM5		T2/R3	
6.	Revision	1	06.03.2021		TLM1/ TLM5		T2/R3	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**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	**Programming Paradigms:** The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement database applications.
PSO 3	**Software Engineering:** The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

Course Instructor	Course Coordinator	Module Coordinator	HOD
K Sundeep Saradhi	G.V.Rajya Lakshmi	Dr.M.Srinivasa Rao	Dr.D.Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. III-Sem., CSE- C

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : **Data Structures -17CI05**

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. A. Sudhakar**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITE: C programming language

COURSE OBJECTIVE: To make students familiar with:

Writing algorithms to implement operations involved in different data structures like stack and queue using arrays as well as linked list, to implement different types of trees, various searching and sorting techniques.

COURSE OUTCOMES (CO)

CO1: Compare normal data type with abstract data type (ADT). Analyze example programs with data structures using analyzing tools.
CO2: Develop & analyze the algorithms for stacks and Queues
CO3: Analyze, implement and compare searching and sorting Techniques.
CO4: Design & analyze algorithms for operations on Binary Search Trees & AVL Trees data structures.
CO5: Evaluate Graph traversal and minimum cost spanning tree algorithms and compare hashing methods on hash table data structure.

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

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	1										3	3	2
CO2	3	3	2										3	3	1
CO3	3	3	1										3	3	2
CO4	3	3	2										3	3	1
CO5	3	3	2										3	3	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 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2ndedition

T2 Reema Thareja, Data Structures using c, Oxford Publications.

REFERENCE BOOKS:

R1 Langson, Augenstein &Tenenbaum, 'Data Structures using C and C++', 2nd Ed, PHI.

R2 RobertL.Kruse, Leung and Tando, 'Data Structures and Program Design in C', 2ndedition, PHI.

R3 Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, 2011.

R4 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, PHI, 2009.

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I: List ADT, Polynomial ADT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	03-11-20		TLM2	CO1	T1,T2	
2.	Mathematical Background	1	04-11-20		TLM2	CO1	T1,R4	
3.	Model, Analysis and Run Time Calculations	1	06-11-20		TLM2	CO1	T1,R4	
4.	Introduction to Data Structure and Abstract Data Type(ADTs)	1	07-11-20		TLM2	CO1	T1,R3	
5.	List ADT: List implementation using arrays and its operations	1	10-11-20		TLM2	CO1	T1,R3	
6.	List ADT : List implementation using pointers(Linked list)	2	11-11-20 & 13-11-20		TLM2	CO1	T1,R1	
7.	List ADT : List implementation using pointers	2	14-11-20 & 17-11-20		TLM2	CO1	T1,R2	

8.	Double Linked List	2	18-11-20 &20-11-20		TLM2	CO1	T1,T2	
9.	Operations on Doubly linked	2	21-11-20 &24-11-20		TLM2	CO1	T1	
10.	Operations on CLL	2	25-11-20 &27-11-20		TLM2	CO1	T1	
11.	Polynomial ADT .	2	28-11-20 &01-12-20		TLM2	CO1	T1	
No. of classes required to complete UNIT-I		17			No. of classes taken:			

UNIT-II: Stacks, Queues and its Applications.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Stack: Definition and its operations, implementation using arrays	2	02-12-20 & 04-12-20		TLM2	CO2	T1,R1	
13.	Stack implementation Using Linked List	2	05-12-20 & 08-12-20		TLM2	CO2	T1,R1	
14.	Infix to postfix expression conversion	2	09-12-20& 11-12-20		TLM2	CO2	T1,R2	
15.	Evaluation of Postfix expressions	2	12-12-20& 15-12-20		TLM2	CO2	T1,R3	
16.	Balancing the symbols	1	16-12-20		TLM2	CO2	T1,R2	
17.	Queue: definition and its operations & implementation using arrays	2	18-12-20& 19-12-20		TLM2	CO2	T1,R2	
18.	Queue implementation using linked lists	1	22-12-20		TLM2	CO2	T1,R3	
19.	Circular queue: definition its operations,	2	23-12-20&		TLM2	CO2	T1,R3	

	implementation		26-12-20					
20.	DEQUEUE : Definition & its implementation	2	29-12-20& 30-12-20		TLM2	CO2	T1,R3	
No. of classes required to complete UNIT-II		16			No. of classes taken:			

UNIT-III: Searching & Sorting Techniques

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Searching: Linear Searching	1	02-01-21		TLM2	CO3	T1,R3	
22.	Binary Search	1	05-01-21		TLM2	CO3	T1	
23.	Fibonacci Search	1	06-01-21		TLM2	CO3	T1	
24.	Sorting: Bubble sort	1	08-01-21		TLM2	CO3	T1	
25.	Insertion Sort	2	09-01-21 & 12-01-21		TLM2	CO3	T1	
26.	Merge Sort	2	27-01-21 &29-01-21		TLM2	CO3	T1,R2	
27.	Quick Sort	2	30-01-21 &02-02-21		TLM2	CO3	T1	
28.	Heap Sort	2	03-02-21 &05-02-21		TLM2	CO3	T1	
No. of classes required to complete UNIT-III		12			No. of classes taken:			

UNIT-IV: Trees, Traversals, Search Trees

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
29.	Trees: Terminology, Binary Trees: definition types of binary trees, Representation	2	06-02-21& 10-02-21		TLM2	CO4	T1,R1	
30.	Implementation using linked list	1	12-02-21		TLM2	CO4	T1	
31.	Tree traversals: Recursive techniques	1	13-02-21		TLM2	CO4	T1	

32.	Expression Tress, Search Tree: Binary Search Tree-search operation	2	16-02-21& 17-02-21		TLM2	CO4	T1,R2	
33.	insertion, Deletion (all the three cases	1	19-02-21		TLM2	CO4	T1,R2	
34.	Balanced Tree - Introduction to AVL Tress	1	20-02-21		TLM2	CO4	T1,R1	
35.	AVL tree and Rotations	1	23-02-21		TLM2	CO4	T1,R1	
No. of classes required to complete UNIT-IV		9			No. of classes taken:			

UNIT-V: Graphs, Hashing

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
36.	Graphs: Fundamentals, Representation of graphs Graph Traversals: BFS, DFS	2	24-02-21& 26-02-21		TLM2	CO5	T1,R3	
37.	Minimum Cost spanning tree: Definition, Prim's Algorithm	2	27-02-21 & 02-03-21		TLM2	CO5	T1,R3	
38.	Kruskal's algorithm, Hashing: Hash Table and Hash Functions	1	03-03-21		TLM2	CO5	T1,R4	
39.	Collision resolution Techniques, separate Chaining, Open addressing, rehashing	2	05-03-21& 06-03-21		TLM2	CO5	T1,R3	
No. of classes required to complete UNIT-V		07			No. of classes taken:			

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

EVALUATION PROCESS:

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

multidisciplinary environments.

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

PROGRAM SPECIFIC OUTCOMES

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate an ability to Analyse, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	A. Sudhakar	A.S. R.C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech., III-SEM, CSE-C

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : COMPUTER ARCHITECTURE– 17CI06

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **A.RajaGopal**

COURSE COORDINATOR : **Dr.M. Srinivasa Rao**

PRE-REQUISITE: DIGITAL LOGIC DESIGN

COURSE OBJECTIVE:. Understand the basic functional modules of a computer system and their interconnection mechanism.Understand the data path and control path organization in a general purpose CPU. Get the design knowledge of main memory and cache memory systems.Explore the methods of communication between CPU and I/O devices. A case study on standard I/O interfaces.

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

CO1: Identify the sequence of micro operations in the execution of one macro instruction and thereby gain the concepts of control steps, Instruction cycle, Register structure of CPU, Types of micro operations and RTL.
CO2: Analyze the internal organization of CPU for performing Integer Arithmetic, Floating point Arithmetic and logical operations.
CO3: Understand the features of hardwired and micro programmed control units leading to the comparative study of control path organization in these types.
CO4: Analyze the memory hierarchy system and performance improvement by cache memory organization and its principles.
CO5: Analyze the communication methods of I/O devices and standard I/O interfaces.

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	1		2											1	
CO2			3											1	
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, 3rd edition, 1992.

T2 Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "**Computer Organization**", TMH publications, 5th edition, 2002.

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.

R4 John D Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 1st edition, 2001.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Basic Computer Organization and 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
1.	Block Diagram of a Computer, Basic Functional Units of a Computer	2	02,03-11-2020		TLM2	
2.	Computer Architecture Models, Internal Organization of a Central Processing Unit	2	5,6-11-2020		TLM2	
3.	Introduction to Sequence of Micro operations and control steps	1	09-11-2020		TLM2	
4.	Register Transfer Microoperations	2	10,12-11-2020		TLM2	
5.	Arithmetic Micro Operations	1	13-11-2020		TLM2	
6.	Logic Micro Operations and Shift Micro Operations	1	16-11-2020		TLM2/TLM3	
7.	Instruction cycle	2	17,19-11-2020		TLM2	
8.	Instruction Set	1	20-11-2020			
9.	Basic Computer Instructions	1	23-11-2020		TLM2	
No. of Classes Required to complete UNIT I: 13				No. of classes taken:		

UNIT-II: Central Processing Unit

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.	Instruction formats and examples	1	24-11-2020		TLM2	
11.	Addressing modes and examples	2	26,27-11-2020		TLM2/TLM3	
12.	Data Transfer and Manipulation Instructions	1	30-11-2020		TLM2	
13.	Logical Instructions, Program control Instructions	1	01-12-2020		TLM2	
14.	Data Representation, Addition and Subtraction	1	03-12-2020		TLM2/TLM3	
15.	Multiplication Algorithms	1	04-12-2020		TLM2/TLM5	
16.	Booth Multiplication Algorithm	2	07,08-12-2020		TLM4	
17.	Division Algorithms	1	10-12-2020		TLM4	
18.	Floating Point Arithmetic operations	2	11, 14-12-2020		TLM2/TLM5	
No. of Classes Required to complete UNIT II: 12				No. of classes taken:		

UNIT-III: Control Unit

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
19.	Control Memory	2	15,17-12-2020		TLM2	
20.	Hard wired control	2	18,21-12-2020		TLM2	
21.	Micro programmed control	2	22,24-12-2020		TLM2	
22.	Micro Instruction Format	2	28,29-12-2020		TLM2	
23.	Address Sequencing	2	31-12-2021, 04-01-2021		TLM2	
24.	Design of Control Unit.	2	05,07-01-2021		TLM2	
No. of Classes Required to complete UNIT III: 12				No. of classes taken:		

UNIT-IV: Memory Organization

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.	Memory Hierarchy, Primary Memory	1	08-01.2021		TLM2	
26.	Introduction to Secondary Memory	1	11-01-2021		TLM2	
27.	Associative Memory	2	18,28-01-2021		TLM2	
28.	Cache Memory	1	29-01-2021		TLM2/TLM5	
29.	Mapping Techniques	2	01,02-02-2021			
30.	Hit Ratio and Mapping Techniques	1	04-02-2021		TLM2	
31.	Example Problems	1	05-02-2021		TLM3	
No. of Classes Required to complete UNIT IV: 9				No. of classes taken:		

UNIT-V: Input-Output Organization and Standard Input Output Interfaces

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Peripheral Devices	1	08-02-2021		TLM2	
33.	Modes of Transfer	1	09-02-2021		TLM2	
34.	Priority Interrupt	1	11-02-2021		TLM2	
35.	Direct Memory Access	2	12,15-02-2021		TLM2/TLM3	
36.	Input Output Processor, Input Output Interface	1	16-02-2021		TLM2	
37.	Synchronous data transfer and Asynchronous Data Transfer	2	18,19-02-2021		TLM2	
38.	Timing diagrams for Synchronous and Asynchronous data transfers	2	22-02-2021, 23-02-2021,		TLM2	
39.	Serial communication	3	25-03-2021, 26-03-2021		TLM2	
40.	Review	2	01-03-2021, 02-03-2021		TLM2	
41.	Review	2	04-03-2021, 05-03-2021		TLM2	
No. of Classes Required to complete UNIT V: 17				No. of classes taken:		

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

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment –1	A1=5
Assignment –2	A2=5
Quiz-1	B1=10
I-Mid Examination	C1=20
Assignment –3	A3=5
Assignment –4	A4=5
Assignment --5	A5=5
Quiz-2	B2=10
II-Mid Examination	C2=20
Evaluation of Assignment Marks: A=(A1+A2+A3+A4+A5)/5	A=5
Evaluation of Quiz Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	B=10
Evaluation of Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	C=20
Attendance	D=5
Cumulative Internal Examination : A+B+C+D	**A+B+C+D=40**
Semester End Examinations	**E=60**
Total Marks: A+B+C+D+E	**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	**Programming Paradigms:** The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement database applications.
PSO 3	**Software Engineering:** The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

Course Instructor	Course Coordinator	Module Coordinator	HOD
(A.RajaGopal)	(Dr. M. Srinivasa Rao)	(Dr.Ch.V.Narayana)	(Dr. D. Veeraiah)

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Autonomous &Affiliated to JNTUK, Kakinada& Approved by AICTE, New Delhi, NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

Part-A

PROGRAM : B.Tech. III-Sem., CSE-C

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Statistical Programming with R Lab (17FE66)

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr.N V NAIK**

COURSE COORDINATOR : **Mr.G.V.Suresh**

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides a solid undergraduate foundation in both probability theory and mathematical statistics and at the same time provides an indication of the relevance and importance of the theory in solving practical problems in the real world.

COURSE OUTCOMES (COs): At the end of the course, the student will be able to:
CO1: Apply the different distributions

CO2: Use statistical tests in testing hypotheses on data

CO3: Describe the properties of discrete and continuous distribution functions

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										2	3	
CO2	3	2	2	1									2	2	
CO3	3	3	3			1							2	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).

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
	Cycle1:Introduction to R Programming	2	5/11/2020		TLM4/TLM5	CO1	
	Cycle 2: Getting Used to R: Describing Data • Viewing and Manipulating Data • Plotting Data • Reading in Your Own Data	2	12/11/2020		TLM4/TLM5	CO1	
4	Cycle 3: Visualizing Data Tables, charts and plots. Visualizing Measures of Central Tendency, Variation, and Shape. Box plots, Pareto diagrams. How to find the mean median standard deviation and quantiles of a set of observations	2	26/11/2020		TLM4/TLM5	CO1	
5	Cycle 4: Probability Distributions. Generate and Visualize Discrete and continuous distributions using the statistical environment. Demonstration of CDF and PDF uniform and normal, binomial Poisson distributions.	2	03/12/2020		TLM4/TLM5	CO1	
6	Cycle 5: Densities of Random Variables • Off the Shelf Distributions in R • Matching a Density to Data • More About Making Histograms	2	10/12/2020		TLM4/TLM5	CO1	
7	Cycle 6: Binomial Distribution Study of binomial distribution. Plots of density and distribution functions. Normal approximation to the Binomial distribution	2	17/12/2020 24/12/2020		TLM4/TLM5	CO1	
9	Cycle7: Building Confidence in Confidence Intervals • Populations Versus Samples • Large Sample	2	31/12/2020 07/01/2021		TLM4/TLM5	CO2	

	Confidence Intervals • Simulating Data Sets • Evaluating the Coverage of Confidence Intervals						
10	Cycle8: Perform Tests of Hypotheses How to perform tests of hypotheses about the mean when the variance is known. How to compute the p-value. Explore the connection between the critical region, the test statistic, and the p-value	2	28/1/2021 4/02/2021		TLM4/TLM5	CO2	
11	Cycle9:Correlation How to calculate the correlation between two variables. How to make scatter plots. Use the scatterplot to investigate the relationship between two variables	2	11/02/2021 18/02/2021		TLM4/TLM5	CO2	
12	Cycle 10 : Estimating a Linear Relationship • A Statistical Model for a Linear Relationship • Least Squares Estimates • The R Function lm • Scrutinizing the Residuals	2	25/02/2021		TLM4/TLM5	CO3	
15	**LAB INTERNAL**		04/02/2021				

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering disciplines.

PEO2: Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.

PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing and management principles and apply these to one's own work, as a member and** leader in a team, to manage projects and in multidisciplinary environments.

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

PROGRAM SPECIFIC OUTCOMES

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

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

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

Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : K SUNDEEP SARADHI
Course Name & Code : Python Programming Lab (17CI62)
L-T-P Structure : 0-0-2 Credits : 1
Program/Sem/Sec : B.Tech., CSE., III-Sem., C A.Y : 2020-21

PRE-REQUISITE : C Programming

COURSE EDUCATIONAL OBJECTIVES (CEOs):
Python course leads the students from the basics of writing and running Python scripts to more advanced features such as file operations, sets, working with binary data, and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting.

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

CO 1	Identify various data structures available in Python and apply them in solving computational problems.
CO 2	Design and implement programs to process data.
CO 3	Explore the usage of exception handling and database interaction.
CO 4	Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

PART-B

I. Exercise programs on basic control structures & loops
a) Write a program for checking the given number is even or odd.
b) Using a for loop, write a program that prints the decimal equivalents of 1/2, 1/3, 1/4,...1/10
c) Write a program for displaying reversal of a number.
d) Write a program for finding biggest number among 3 numbers.
e) Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.

II.Exercise programs on operators & I/O operations.
a) Write a program that takes 2 numbers as command line arguments and prints its sum.

b) Implement python script to show the usage of various operators available in python language.
c) Implement python script to read person‘s age from keyboard and display whether person is eligible for voting or not.
d) Implement python script to check the given year is leap year or not.

III. Exercise programs on Python Script
a) Implement Python Script to generate first N natural numbers.
b) Implement Python Script to check given number is palindrome or not.
c) Implement Python script to print factorial of a number.
d) Implement Python Script to print sum of N natural numbers.
e) Implement Python Script to check given number is Armstrong or not.
f) Implement Python Script to generate prime numbers series up to n.

IV.Exercise programs on Lists
a) Finding the sum and average of given numbers using lists.
b) To display elements of list in reverse order.
c) Finding the minimum and maximum elements in the lists.

V. Exercise programs on Strings
a) Implement Python Script to perform various operations on string using string libraries.
b) Implement Python Script to check given string is palindrome or not.
c) Implement python script to accept line of text and find the number of characters, number of vowels and number of blank spaces in it.

VI. Exercise programs on functions.
a) Define a function max_of_three() that takes three numbers as arguments and returns the largest of them.
b) Write a program which makes use of function to display all such numbers which are divisible
by7 but are not a multiple of 5, between 1000 and 2000.

VII. Exercise programs on recursion & parameter passing techniques.
a) Define a function which generates Fibonacci series up to n numbers.
b) Define a function that checks whether the given number is Armstrong
c) Implement a python script for Call-by-value and Call-by-reference
d) Implement a python script for factorial of number by using recursion.

IX. Exercise programs on Tuples
a) Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number. Suppose the following input is supplied
to the program:34,67,55,33,12,98. Then, the output should be: ['34', '67', '55', '33', '12', '98'] ('34',67', '55', '33', '12', '98').
b) With a given tuple (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and the last half values in one line.

X. Exercise programs on files
a) Write Python script to display file contents.
b) Write Python script to copy file contents from one file to another.
XI. Exercise programs on searching & sorting Techniques.
a) Implement a python script to check the element is in the list or not by using Linear search & Binary search.
b) Implement a python script to arrange the elements in sorted order using Bubble, Selection, Insertion and Merge sorting techniques.

XII. Exercise programs on Exception handling concepts

a) Write a python program by using exception handling mechanism.

b) Write a python program to perform various database operations (create, insert, delete, update).

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

S.No.	Programs to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Exercise programs on basic control structures and loops	2	06.11.2020		TLM4	CO1,CO4	
2.	Exercise programs on operators and I/O operations	2	13.11.2020		TLM4	CO1,CO4	
3.	Exercise programs on Python Scripts	2	20.11.2020		TLM4	CO1,CO4	
4.	Exercise programs on Lists	2	27.11.2020		TLM4	CO2,CO4	
5.	Exercise programs on Strings	2	04.12.2020		TLM4	CO2,CO4	
6.	Exercise programs on Functions	2	11.12.2020		TLM4	CO2,CO4	
7.	Exercise programs on Recursion	2	18.12.2020		TLM4	CO2,CO4	
8.	Exercise programs on Parameter Passing Techniques	2	08.01.2021		TLM4	CO2,CO4	
9.	Exercise programs on Tuples	2	29.01.2021		TLM4	CO2,CO4	
10.	Exercise programs on Files	2	05.02.2021		TLM4	CO2,CO4	
11.	Exercise programs on Searching and Sorting	2	12.02.2021		TLM4	CO2,CO4	
12.	Exercise programs on Exception handling and Database handling	2	19.02.2021		TLM4	CO3,CO4	
13.	Revision	2	26.02.2021		TLM6		
14.	Revision	2	05.03.2021		TLM6		

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

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**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	**Programming Paradigms:** The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 2	**Data Engineering:** To inculcate an ability to analyze, design and implement database applications.
PSO 3	**Software Engineering:** The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

Course Instructor	Course Coordinator	Module Coordinator	HOD
K.Sundeep Saradhi	G.V.Rajya Lakshmi	Dr.M.Srinivasa Rao	Dr.D.Veeraiah

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
Part-A

PROGRAM : B.Tech., III-Sem., CSE - C

ACADEMIC YEAR : 2020-21

COURSE NAME & CODE : Data Structures Lab- 17CI63

L-T-P STRUCTURE : 0-0-2

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr. A. Sudhakar**

COURSE COORDINATOR : **Mr. A. Sree Rama Chandra Murthy**

PRE-REQUISITES: C language

COURSE EDUCATIONAL OBJECTIVES (CEOs): To make students familiar with writing algorithms to implement operations involved in different data structures like linked list & different types of trees and implement various searching and sorting techniques.

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

CO1: Implement & test the performance of data structures like linked list, stacks & queues.

CO2: Implement & test the performance of searching & sorting techniques.
CO3: Implement & test the performance of trees and graph traversal techniques.
CO4**:** Improve individual / team work skills, communication & report writing skills with ethical values.

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Practice session on Arrays, structures and pointers Practice session on Dynamic Memory allocation.	2	03-11-20		TLM4/TLM5	CO1	
2	Write a C program to implement various operations on List using arrays. Write a C program to implement various operations on Single linked List using pointers.	4	10-11-20, 17-11-20		TLM4/TLM5	CO1	
3	Write an interactive C program to create a linear linked list of customer names and their telephone numbers. The program should be menu-driven and include features for adding a new customer, deleting an existing customer and for displaying the list of all customers.	2	24-11-20		TLM4/TLM5	CO1	
4	Write a C program to create a circular linked list so that	2	01-12-20		TLM4/TLM5	CO1	

	the input order of data items is maintained. Add the following functions to carry out the following operations on circular single linked lists. a) Count the number of nodes. b) insert a node c) delete a node						
5	Write a C program that will remove a specified node from a given doubly linked list and insert it at the end of the list on an existing list. Also write a function to display the contents of the list. Write a C program to implement a stack using array &linked list in which Push, Pop and display can be performed.	4	08-12-20 15-12-20		TLM4/TLM5	CO1	
6	Write a program to convert infix expression to post fix expressions using array implementation of stack Write a program for evaluating post fix expressions using array 2implementation of stack	4	22-12-20 29-12-20		TLM4/TLM5	CO1	

7	Write a C program to implement a queue using arrays and linked list in which insertions, deletions and display can be performed.	2	05-01-21		TLM4/TLM5	CO1	
8	Write a C program to implement insertion sort, Selection sort, Merge Sort	2	12-01-21		TLM4/TLM5	CO2	
9	Sort a sequence of n integers using Quick sort technique and then search for a key in the sorted array using Binary search, linear search techniques. Write a C program to Heap sort.	2	02-02-21		TLM4/TLM5	CO2	
10	. Write a C program to construct a binary tree and do inorder, preorder and post order traversals, printing the sequence of nodes visited in each case. Write a C program to implement BST operations- insert, search and delete.	2	16-02-21		TLM4/TLM5	CO3	
11	Write a C program to implement the following graph Traversals a)	2	23-02-21		TLM4/TLM5	CO3	

	DFS b) BFS						
12	**Lab Internal Examination**	2	02-03-21		TLM4/TLM5		

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO I: To inculcate the adaptability skills into the students for software design, software development or any other allied fields of computing.

PEO II: To equip the graduates with the ability to analyze, design and synthesize data to create novel products.

PEO III: Ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PEO IV: To empower the student with the qualities of effective communication, team work, continues learning attitude, leadership needed for a successful computer professional.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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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):

1. Programming Paradigms:

To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.

2. Data Engineering:

To inculcate an ability to Analyze, Design and implement data driven applications into the students.

3. Software Engineering:

Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products.

	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	A.Sudhakar	A.S. R. C. Murthy	Dr. M. Srinivas Rao	Dr. D Veeraiah
Signature				