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 (A)

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : PROBABILITY AND STATISTICS – 17FE08

L-T-P STRUCTURE : 3-2-0

COURSE CREDITS : 4

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.

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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-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 to Subject, course outcomes	1	11-06-18		TLM1	---	---	
2.	Introduction to probability	1	12-06-18		TLM1	CO1	T1	
3.	Basic definitions, simple problems	1	14-06-18		TLM1	CO1	T1	
4.	Problem on addition theorem	1	16-06-18		TLM1	CO1	T1, ,T2	
5.	Conditional probability	1	18-06-18		TLM1	CO1	T1	
6.	Multiplication theorem, examples	1	19-06-18		TLM1	CO1	T1	
7.	Independent events, theorems	1	21-06-18		TLM1	CO1	T1	
8.	Problems on multiplication theorem	1	22-06-18		TLM1	CO1	T1, ,T2	
9.	problems	1	23-06-18		TLM1	CO1	T1	
10.	Baye's theorem	1	25-06-18		TLM1	CO1	T1, ,T2	
11.	Problems on baye's theorem	1	26-06-18		TLM1	CO1	T1	
12.	Random variables, Mathematical Expections	1	28-06-18		TLM1	CO1	T1,T2	
13.	Problems on PMF	1	29-06-18		TLM1	CO1	T1,T2	

14.	Problems on PMF	1	30-06-18		TLM1	CO1	T1,T2	
15.	Problems on PDF	1	02-07-18		TLM1	CO1	T1,T2	
16.	Problems on PDF	1	03-07-18		TLM1	CO1	T1,T2	
17.	Tutorial -1	1	05-07-18		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		17			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
18.	Binomial Distribution : mean and variance	1	06-07-18		TLM1	CO2	T1	
19.	Problems on Binomial distribution	1	07-07-18		TLM1	CO2	T1,T2	
20.	Problems on Binomial distribution	1	09-07-18		TLM1	CO2	T1,T2	
21.	Fitting of binomial distribution	1	10-07-18		TLM1	CO2	T1,T2	
22.	Poisson distribution, mean and variance	1	12-07-18		TLM1	CO2	T1	
23.	Problems on Poisson distribution	1	13-07-18		TLM1	CO2	T1,T2	
24.	Fitting of poisson distributions	1	14-07-18		TLM1	CO2	T1,T2	
25.	Normal distribution: mean, variance	1	16-07-18		TLM1	CO2	T1	
26.	Problems on Normal Distribution	1	17-07-18		TLM1	CO2	T1,T2	
27.	Problems on Normal Distribution	1	19-07-18		TLM1	CO2	T1,T2	
28.	problems	1	20-07-18		TLM1	CO2	T1,T2	
29.	Exponential distribution: mean and variance	1	21-07-18		TLM1	CO2	T2	
30.	Simple applications	1	23-07-18		TLM1	CO2	T2	
31.	Moment Generating Functions	1	24-07-18		TLM1	CO2	T2	
32.	Moment Generating Functions	1	26-07-18		TLM1	CO2	T2	

33.	Applications	1	27-07-18		TLM1	CO2	T1,T2	
34.	Tutorial-2	1	28-07-18		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-II		17			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 COs	Text Book followed	HOD Sign Weekly
35.	Sampling distribution ,definitions	1	06-08-18		TLM1	CO3	T1	
36.	Sampling distribution of mean, variance	1	07-08-18		TLM1	CO3	T1	
37.	Sampling distribution of mean, variance	1	09-08-18		TLM1	CO3	T1,T2	
38.	problems	1	10-08-18		TLM1	CO3	T1,T2	
39.	Problems on central limit theorem	1	11-08-18		TLM1	CO3	T2	
40.	Problems on central limit theorem	1	13-08-18		TLM1	CO3	T2	
41.	Sums and differences	1	14-08-18		TLM1	CO3	T1,T2	
42.	Estimation	1	16-08-18		TLM1	CO3	T1,T2	
43.	Point and interval estimation	1	17-08-18		TLM1	CO3	T1,T2	
44.	Interval estimation of mean in large samples	1	18-08-18		TLM1	CO3	T1,T2	
45.	Interval estimation of proportion in large samples	1	20-08-18		TLM1	CO3	T1,T2	
46.	Interval estimation of mean in small samples	1	21-08-18		TLM1	CO3	T1,T2	
47.	problems	1	23-08-18		TLM1	CO3	T1,T2	
48.	Tutorial-3	1	24-08-18		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		14			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
49.	Testing of Hypothesis , definitions	1	25-08-18		TLM1	CO4	T1,T2	

50.	Z-test for single mean	1	27-08-18		TLM1	CO4	T1,T2	
51.	Z-test for difference of means	1	28-08-18		TLM1	CO4	T1,T2	
52.	problems	1	30-08-18		TLM1	CO4	T1,T2	
53.	Z-test for single proportion	1	31-08-18		TLM1	CO4	T1,T2	
54.	Z-test for difference of proportions	1	01-09-18		TLM1	CO4	T1,T2	
55.	problems	1	03-09-18		TLM1	CO4	T1,T2	
56.	t-test for single mean	1	04-09-18		TLM1	CO4	T1,T2	
57.	t-test for difference of means	1	06-09-18		TLM1	CO4	T1,T2	
58.	Paired t-test	1	07-09-18		TLM1	CO4	T2	
59.	problems	1	08-09-18		TLM1	CO4	T1,T2	
60.	F-test for population variances	1	10-09-18		TLM1	CO4	T1,T2	
61.	χ^2 test for goodness of fit	1	11-09-18		TLM1	CO4	T2	
62.	χ^2 test for independence of attributes	1	14-09-18		TLM1	CO4	T2	
63.	problems	1	15-09-18		TLM1	CO4	T2	
64.	Tutorial-4	1	17-09-18		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		16			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
65.	Simple Bi-variate Correlation	1	18-09-18		TLM1	CO5	T1	
66.	Problems on Pearson's Correlation	1	20-09-18		TLM1	CO5	T1,T2	
67.	Problems	1	21-09-18		TLM1	CO5	T1,T2	
68.	Regression lines	1	22-09-18		TLM1	CO5	T2	
69.	Problems on Regression lines	1	24-09-18		TLM1	CO5	T1,T2	
70.	Properties of Regression coefficients	1	25-09-18		TLM1	CO5	T1,T2	
71.	Problems on Regression coefficients	1	27-09-18		TLM1	CO5	T1,T2	
72.	problems	1	28-09-18		TLM1	CO5	T1,T2	

73.	Problems on rank Correlation	1	29-09-18		TLM1	CO5	T2	
74.	Problems on repeated ranks	1	01-10-18		TLM1	CO5	T2	
75.	problems	1	04-10-18		TLM1	CO5	T1,T2	
76.	problems	1	05-10-18		TLM1	CO5	T1,T2	
77.	Tutorial-5	1	06-10-18		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		13			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
78.	Axioms of probability, results	1	14-06-18		TLM1	CO1	T2	
79.	Bivariate correlation	1	21-09-18		TLM1	CO1	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	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
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=20
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=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**

Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 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.

Course Instructor	Course Coordinator	Module Coordinator	HOD

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

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : PROBABILITY AND STATISTICS – 17FE08

L-T-P STRUCTURE : 3-2-0

COURSE CREDITS : 4

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.

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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-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 to Subject, course outcomes	1	11-06-18		TLM1	---	---	
2.	Introduction to probability	1	12-06-18		TLM1	CO1	T1	
3.	Basic definitions, simple problems	1	13-06-18		TLM1	CO1	T1	
4.	Problem on addition theorem	1	16-06-18		TLM1	CO1	T1, ,T2	
5.	Conditional probability	1	16-06-18		TLM1	CO1	T1	
6.	Multiplication theorem, examples	1	18-06-18		TLM1	CO1	T1,T2	
7.	Independent events, theorems	1	19-06-18		TLM1	CO1	T1	
8.	problems	1	20-06-18		TLM1	CO1	T1,T2	
9.	Problems on multiplication theorem	1	23-06-18		TLM1	CO1	T1, ,T2	
10.	problems	1	23-06-18		TLM1	CO1	T1	
11.	Baye's theorem	1	25-06-18		TLM1	CO1	T1, ,T2	
12.	Problems on baye's theorem	1	26-06-18		TLM1	CO1	T1	
13.	Random variables, Mathematical Expections	1	27-06-18		TLM1	CO1	T1,T2	

14.	Problems on PMF	1	30-06-18		TLM1	CO1	T1,T2	
15.	Problems on PMF	1	30-06-18		TLM1	CO1	T1,T2	
16.	Problems on PDF	1	02-07-18		TLM1	CO1	T1,T2	
17.	Problems on PDF	1	03-07-18		TLM1	CO1	T1,T2	
18.	Tutorial -1	1	04-07-18		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-I		18			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
19.	Binomial Distribution : mean and variance	1	07-07-18		TLM1	CO2	T1	
20.	Problems on Binomial distribution	1	07-07-18		TLM1	CO2	T1,T2	
21.	Problems on Binomial distribution	1	09-07-18		TLM1	CO2	T1,T2	
22.	Fitting of binomial distribution	1	10-07-18		TLM1	CO2	T1,T2	
23.	Poisson distribution, mean and variance	1	11-07-18		TLM1	CO2	T1	
24.	Problems on Poisson distribution	1	14-07-18		TLM1	CO2	T1,T2	
25.	Fitting of poisson distributions	1	14-07-18		TLM1	CO2	T1,T2	
26.	Normal distribution: mean, variance	1	16-07-18		TLM1	CO2	T1	
27.	Problems on Normal Distribution	1	17-07-18		TLM1	CO2	T1,T2	
28.	Problems on Normal Distribution	1	18-07-18		TLM1	CO2	T1,T2	
29.	problems	1	21-07-18		TLM1	CO2	T1,T2	
30.	Exponential distribution: mean and variance	1	21-07-18		TLM1	CO2	T2	
31.	Simple applications	1	23-07-18		TLM1	CO2	T2	
32.	Moment Generating Functions	1	24-07-18		TLM1	CO2	T2	

33.	Moment Generating Functions	1	25-07-18		TLM1	CO2	T2	
34.	Applications	1	28-07-18		TLM1	CO2	T1,T2	
35.	Tutorial-2	1	28-07-18		TLM3	CO1	T1,T2	
No. of classes required to complete UNIT-II		17			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 COs	Text Book followed	HOD Sign Weekly
36.	Sampling distribution ,definitions	1	06-08-18		TLM1	CO3	T1	
37.	Sampling distribution of mean, variance	1	07-08-18		TLM1	CO3	T1	
38.	Sampling distribution of mean, variance	1	08-08-18		TLM1	CO3	T1,T2	
39.	problems	1	11-08-18		TLM1	CO3	T1,T2	
40.	Problems on central limit theorem	1	11-08-18		TLM1	CO3	T2	
41.	Problems on central limit theorem	1	13-08-18		TLM1	CO3	T2	
42.	Sums and differences	1	14-08-18		TLM1	CO3	T1,T2	
43.	Estimation	1	18-08-18		TLM1	CO3	T1,T2	
44.	Point and interval estimation	1	18-08-18		TLM1	CO3	T1,T2	
45.	Interval estimation of mean in large samples	1	20-08-18		TLM1	CO3	T1,T2	
46.	Interval estimation of proportion in large samples	1	21-08-18		TLM1	CO3	T1,T2	
47.	Interval estimation of mean in small samples	1	22-08-18		TLM1	CO3	T1,T2	
48.	problems	1	25-08-18		TLM1	CO3	T1,T2	
49.	Tutorial-3	1	25-08-18		TLM3	CO3	T1,T2	
No. of classes required to complete UNIT-III		14			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

50.	Testing of Hypothesis , definitions	1	27-08-18		TLM1	CO4	T1,T2	
51.	Z-test for single mean	1	28-08-18		TLM1	CO4	T1,T2	
52.	Z-test for difference of means	1	29-08-18		TLM1	CO4	T1,T2	
53.	problems	1	01-09-18		TLM1	CO4	T1,T2	
54.	Z-test for single proportion	1	01-09-18		TLM1	CO4	T1,T2	
55.	Z-test for difference of proportions	1	03-09-18		TLM1	CO4	T1,T2	
56.	problems	1	04-09-18		TLM1	CO4	T1,T2	
57.	t-test for single mean	1	05-09-18		TLM1	CO4	T1,T2	
58.	t-test for difference of means	1	08-09-18		TLM1	CO4	T1,T2	
59.	Paired t-test	1	08-09-18		TLM1	CO4	T2	
60.	problems	1	10-09-18		TLM1	CO4	T1,T2	
61.	F-test for population variances	1	11-09-18		TLM1	CO4	T1,T2	
62.	χ^2 test for goodness of fit	1	12-09-18		TLM1	CO4	T2	
63.	χ^2 test for independence of attributes	1	15-09-18		TLM1	CO4	T2	
64.	problems	1	15-09-18		TLM1	CO4	T2	
65.	Tutorial-4	1	17-09-18		TLM3	CO4	T1,T2	
No. of classes required to complete UNIT-IV		16			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
66.	Simple Bi-variate Correlation	1	18-09-18		TLM1	CO5	T1	
67.	Problems on Pearson's Correlation	1	19-09-18		TLM1	CO5	T1,T2	
68.	Problems	1	22-09-18		TLM1	CO5	T1,T2	
69.	Regression lines	1	22-09-18		TLM1	CO5	T2	
70.	Problems on Regression lines	1	24-09-18		TLM1	CO5	T1,T2	
71.	Properties of Regression coefficients	1	25-09-18		TLM1	CO5	T1,T2	
72.	Problems on Regression coefficients	1	26-09-18		TLM1	CO5	T1,T2	

73.	problems	1	29-09-18		TLM1	CO5	T1,T2	
74.	Problems on rank Correlation	1	29-09-18		TLM1	CO5	T2	
75.	Problems on repeated ranks	1	01-10-18		TLM1	CO5	T2	
76.	problems	1	03-10-18		TLM1	CO5	T1,T2	
77.	problems	1	06-10-18		TLM1	CO5	T1,T2	
78.	Tutorial-5	1	06-10-18		TLM3	CO5	T1,T2	
No. of classes required to complete UNIT-V		13			No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
79.	Axioms of probability, results	1	16-06-18		TLM1	CO1	T2	
80.	Bivariate correlation	1	22-09-18		TLM1	CO1	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	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
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=20
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=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**

Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 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.

Course Instructor	Course Coordinator	Module Coordinator	HOD

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Environmental Studies- 17FE03

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

COURSE CREDITS : **3**

COURSE INSTRUCTOR : **V. Bhagya Lakshmi**

COURSE COORDINATOR : **Dr. Shaheda Niloufer**

PRE-REQUISITE:

COURSE OBJECTIVE: 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 OUT COMES (CO): After the completion of the course, students should be able to:

CO1: Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.
CO2: Evaluate local, regional and global environmental issues related to resources and their sustainable management.
CO3: Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
CO4: 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):

Course Code	COs	Programme Outcomes												PSOs	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
17FE03	3	3				2						1	3		
	3					2						1	3		
	3	3	2			2						1	3		

	3	3				2						1	3		
	3		2				3					1	3		
1 = Slightly (low)			**2 = Moderate (medium)**									**3-Substantially(High)**			

BOS APPROVED 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.

BOS APPROVED 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.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, components of Environment	1	11-06-2018		1,2	CO1	T1	
2.	Scope and importance of environmental studies	1	13-06-2018		1,2	CO1	T1	
3.	Population explosion and variations among Nations.	1	18-06-2018		1,2	CO1	T1	
4.	Resettlement and Rehabilitation - Issues and possible solutions	1	20-06-2018		1,2	CO1	T1	
5.	Environment and human health	1	23-06-2018		1,2	CO1	T1	
6.	HIV-AIDS	1	25-06-2018		1,2	CO1	T1	

7.	Environmental ethics	1	27-06-2018		1,2	CO1	T1	
8.	Role of Information Technology in environmental management and human health	1	30-06-2018		3	CO1	T1	
9.	**Assignment in UNIT I**	1	02-07-2018		6	CO1	T1	
10.	**Tutorial -1**	1	04-07-2018		3			
11.	Introduction and classification of Natural resources		07-07-2018					
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II: NATURAL RESOURCES AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Forest Resources	1	09-07-2018		1,2	CO2	T1	
13.	**Assignment in UNIT II**	1	11-07-2018		1,2	CO2	T1	
14.	Water Resources	1	16-07-2018		6	CO2	T1	
15.	**Tutorial-2**	1	18-07-2018		1,2	CO2	T1	
16.	Mineral Resources	1	21-07-2018		1,2	CO2	T1	
17.	Food Resources	1	23-07-2018		3	CO2	T1	
18.	Food Resources	1	25-07-2018		1,2	CO2	T1	
19.	Energy Resources	1	28-07-2018					
20.	I MID EXAMINATION	1	30-07-2018		1,2	CO2	T1	
21.	I MID EXAMINATION	1	01-08-2018					
22.	I MID EXAMINATION	1	04-08-2018					
No. of classes required to complete UNIT-II		11			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
23.	Definition, structure and functions of an ecosystem Food chains and Food webs	1	06-08-2018		1,2	CO3	T1,T2	
24.	Ecological succession, Ecological pyramids	1	08-08-2018		1,2	CO3	T1, T2	
25.	Biogeochemical cycles, Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological	1	11-08-2018		1,2	CO3	T1, T2	

	Niche and Keystone Species							
26.	**Tutorial-3**	1	13-08-2018		3	CO3	T1, T2	
27.	Bio geographical classification of India. India as a mega diversity nation	1	18-08-2018		1,2	CO3	T1, T2	
28.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Man and wild life conflicts. Endangered and endemic species of India	1	20-08-2018		1,2	CO3	T1, T2	
29.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	25-08-2018		1,2	CO3	T1, T2	
30.	**Assignment Unit III**	1	27-08-2018		1,2	CO3	T1, T2	
31.	Introduction to Environmental Pollution Causes, effects and control measures of: Air Pollution	1	29-08-2018		6	CO3	T1, T2	
No. of classes required to complete UNIT-III		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
32.	Causes, effects and control measures of: Water Pollution	1	01-09-2018		1,2	CO4	T1, T2	
33.	Causes, effects and control measures of: Soil Pollution	1	05-09-2018		1,2	CO4	T1, T2	
34.	**Tutorial-4**	1	10-09-2018		1,2	CO4	T1, T2	
35.	Causes, effects and control measures of: Noise Pollution	1	12-09-2018		3	CO4	T1, T2	
36.	Causes, effects and control measures of: Nuclear Pollution	1	15-09-2018		1,2	CO4	T1, T2	
37.	Solid Waste Management	1	17-09-2018		1,2	CO4	T1, T2	
38.	Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion	1	19-09-2018		1,2	CO4	T1, T2	
39.	Disaster Management- Floods, Cyclones, Earthquakes, Landslides and Tsunamis. **Assignment in Unit IV**	1	22-09-2018		3	CO4	T1,T2	
40.	Sustainable development and unsustainability	1	24-09-2018		1,2,6	CO4	T1,T2	
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
41.	Stockholm and Rio Summit	1	26-09-2018		1,2		T2	
42.	**Tutorial-5**	1	29-09-2018		1,2		T2	
43.	Environmental Impact Assessment (EIA), Green building	1	01-10-2018		3		T2	
44.	**Assignment in UNIT- V**	1	03-10-2018		1,2		T2	
45.	Consumerism and Waste products. Carbon credits and carbon trading.	1	06-10-2018		6		T2	
46.	Environmental Law- Air, Water, Wild life, Forest, and Environmental protection act	1	08-10-2018		1,2		T2	
47.	**II MID EXAMINATION**	1	10-10-2018					
48	**II MID EXAMINATION**	1	13-10-2018					
No. of classes required to complete UNIT-V		08			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
49	Case studies of Environmental Pollution	1			1,2			
50	Limitations for Environmental Legislation in India	1			1,2			

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	11-16-2018	28-07-2018	7
I Mid Examinations	30-07-2018	04-08-2018	1
II Phase of Instructions	06-08-2018	06-10-2018	9
II Mid Examinations	08-10-2018	13-10-2018	1
Preparation and Practicals	15-10-2018	27-10-2018	2
Semester End Examinations	29-10-2018	10-11-2018	2

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
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=20
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=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

V. Bhagya Lakshmi — **Course Instructor**

Dr. Shaheda Niloufer — **Course Coordinator**

Module Coordinator

HOD

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

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

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Environmental Studies- 17FE03

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

COURSE CREDITS : **3**

COURSE INSTRUCTOR : **V. Bhagya Lakshmi**

COURSE COORDINATOR : **Dr. Shaheda Niloufer**

PRE-REQUISITE:

COURSE OBJECTIVE: 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 OUT COMES (CO): After the completion of the course, students should be able to:

CO1: Identify environmental problems arising due to engineering and technological activities that help to be the part of sustainable solutions.
CO2: Evaluate local, regional and global environmental issues related to resources and their sustainable management.
CO3: Realize the importance of ecosystem and biodiversity for maintaining ecological balance.
CO4: 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):

Course Code	COs	Programme Outcomes												PSOs	
		1	2	3	4	5	6	7	8	9	10	11	12	1	2
17FE03	3	3				2						1	3		
	3					2						1	3		
	3	3	2			2						1	3		

	3	3				2						1	3		
	3		2				3					1	3		
1 = Slightly (low)			**2 = Moderate (medium)**									**3-Substantially(High)**			

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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.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction, components of Environment	1	11-06-2018		1,2	CO1	T1	
2.	Scope and importance of environmental studies	1	14-06-2018		1,2	CO1	T1	
3.	Population explosion and variations among Nations.	1	15-06-2018		1,2	CO1	T1	
4.	Resettlement and Rehabilitation - Issues and possible solutions	1	18-06-2018		1,2	CO1	T1	
5.	Environment and human health	1	21-06-2018		1,2	CO1	T1	

6.	HIV-AIDS	1	22-06-2018		1,2	CO1	T1	
7.	Environmental ethics	1	25-06-2018		1,2	CO1	T1	
8.	Role of Information Technology in environmental management and human health	1	28-06-2018		3	CO1	T1	
9.	**Assignment in UNIT I**	1	29-06-2018		6	CO1	T1	
10.	**Tutorial -1**	1	02-07-2018		3			
11.	Introduction and classification of Natural resources	1	05-07-2018					
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II: NATURAL RESOURCES AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Forest Resources	1	06-07-2018		1,2	CO2	T1	
13.	**Assignment in UNIT II**	1	09-07-2018		1,2	CO2	T1	
14.	Water Resources	1	12-07-2018		6	CO2	T1	
15.	**Tutorial-2**	1	13-07-2018		1,2	CO2	T1	
16.	Mineral Resources	1	16-07-2018		1,2	CO2	T1	
17.	Food Resources	1	19-07-2018		3	CO2	T1	
18.	Food Resources	1	20-07-2018		1,2	CO2	T1	
19.	Energy Resources	1	23-07-2018					
20.	Energy Resources	1	26-07-2018		1,2	CO2	T1	
21.	Revision	1	27-07-2018		1,2	CO2	T1	
22.	I MID EXAMINATION	1	30-07-2018					
23.	I MID EXAMINATION	1	02-08-2018					
24.	I MID EXAMINATION	1	03-08-2018					
No. of classes required to complete UNIT-II		13			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
25.	Definition, structure and functions of an ecosystem Food chains and Food webs	1	06-08-2018		1,2	CO3	T1,T2	

26.	Ecological succession, Ecological pyramids	1	09-08-2018		1,2	CO3	T1, T2	
27.	Biogeochemical cycles, Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem, Ecological Niche and Keystone Species	1	10-08-2018		1,2	CO3	T1, T2	
28.	**Tutorial-3**	1	13-08-2018		3	CO3	T1, T2	
29.	Bio geographical classification of India. India as a mega diversity nation	1	16-08-2018		1,2	CO3	T1, T2	
30.	Values of biodiversity- Direct and Indirect values. Threats to biodiversity; Man and wild life conflicts. Endangered and endemic species of India	1	17-08-2018		1,2	CO3	T1, T2	
31.	Conservation of biodiversity: In-situ and Ex-situ conservation methods	1	20-08-2018		1,2	CO3	T1, T2	
32.	**Assignment Unit III**	1	23-08-2018		1,2	CO3	T1, T2	
33.	Introduction to Environmental Pollution Causes, effects and control measures of: Air Pollution	1	24-08-2018		6	CO3	T1, T2	
No. of classes required to complete UNIT-III		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
34.	Causes, effects and control measures of: Water Pollution	1	27-08-2018		1,2	CO4	T1, T2	
35.	Causes, effects and control measures of: Soil Pollution	1	30-08-2018		1,2	CO4	T1, T2	
36.	**Tutorial-4**	1	31-08-2018		1,2	CO4	T1, T2	
37.	Causes, effects and control measures of: Noise Pollution	1	06-09-2018		3	CO4	T1, T2	
38.	Causes, effects and control measures of: Nuclear Pollution	1	07-09-2018		1,2	CO4	T1, T2	
39.	Solid Waste Management	1	10-09-2018		1,2	CO4	T1, T2	
40.	Environmental Issues relating to Climate change, global warming, acid rain, ozone layer depletion	1	14-09-2018		1,2	CO4	T1, T2	
41.	Disaster Management-Floods, Cyclones,	1	17-09-2018		3	CO4	T1,T2	

	Earthquakes, Landslides and Tsunamis. **Assignment in Unit IV**							
42.	Sustainable development and unsustainability	1	20-09-2018		1,2,6	CO4	T1,T2	
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
43.	Stockholm and Rio Summit	1	24-09-2018		1,2		T2	
44.	**Tutorial-5**	1	27-09-2018		1,2		T2	
45.	Environmental Impact Assessment (EIA), Green building	1	28-09-2018		3		T2	
46.	**Assignment in UNIT- V**	1	01-10-2018		1,2		T2	
47.	Consumerism and Waste products. Carbon credits and carbon trading.	1	04-10-2018		6		T2	
48.	Environmental Law- Air, Water, Wild life, Forest, and Environmental protection act	1	05-10-2018		1,2		T2	
48.	**II MID EXAMINATION**	1	08-10-2018					
49	**II MID EXAMINATION**	1	11-10-2018					
50	**II MID EXAMINATION**	1	12-10-2018					
No. of classes required to complete UNIT-V		09			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
51	Case studies of Environmental Pollution	1			1,2			
52	Limitations for Environmental Legislation in India	1			1,2			

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	11-16-2018	28-07-2018	7
I Mid Examinations	30-07-2018	04-08-2018	1
II Phase of Instructions	06-08-2018	06-10-2018	9
II Mid Examinations	08-10-2018	13-10-2018	1
Preparation and Practicals	15-10-2018	27-10-2018	2
Semester End Examinations	29-10-2018	10-11-2018	2

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
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=20
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=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

V.Bhagya Lakshmi Dr. Shaheda Niloufer

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION 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

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

ACADEMIC YEAR : 2017-18

COURSE NAME & CODE : DISCRETE MATHEMATICAL STRUCTURES &17CI03

L-T-P STRUCTURE : 3-1-2

COURSE CREDITS : 3

COURSE INSTRUCTOR : **G BALU NARASIMHARAO**

COURSE COORDINATOR :

1. **Pre-requisites:** Basic mathematical knowledge

2. **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.

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

CO1: Outline basic proofs for theorems using the techniques of - direct proofs, example, and Proof by contradiction, mathematical induction.

CO2: Illustrate by examples the basic terminology of functions, relations, and sets and Demonstrate knowledge of their associated operations.

CO3: Designing Network application, data structures using Graph terminology.

CO4: Apply the graph algorithms for routing and scheduling in different operating systems.

CO5: Construct compilers, error detection code, solve practical applications with the use of basic Counting principles of permutations, combinations, inclusion/exclusion principle and the Pigeonhole methodology.

4. **Course Articulation Matrix:**

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
S197	CO1	3	3													
	CO2	3	3	1	2											

	CO3	3	3	1	2											
	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).

BOS APPROVED TEXT BOOKS:

T1: Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH Publications

BOS APPROVED 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): Section-A

UNIT –I: Mathematical Logic & Predicate calculus

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
81.	Introduction, Propositional Calculus	2	11-06-18 & 14-06-18		**TLM1**	CO1	T1	
82.	Connectives, Truth Tables	1	15-06-18		**TLM1**	CO1	T1	
83.	Tautologies, Equivalence of Formulas Duality law	1	16-06-18		**TLM1**	CO1	T1	
84.	Tautological Implications	1	18-06-18		**TLM1**	CO1	T1	
85.	Normal Forms	2	21-06-18 & 22-06-18		**TLM1**	CO1	T1,R1	
86.	Theory of Inference for Statement Calculus	2	23-06-18, 25-06-18 &		**TLM1**	CO1	T1,R1	
87.	Consistency of Premises Indirect Method of Proof	1	28-06-18		**TLM1**	CO1	T1,R1	
88.	Predicative Logic	1	29-06-18		**TLM1**	CO1	T1,R1	
89.	Tutorial – I	1	30-06-18		**TLM3**	CO1	T1	
90.	Statement Functions, Variables and Quantifiers Free & Bound Variables	1	02-07-18		**TLM1**	CO1	T1	

91.	Inference theory for predicate calculus	1	05-07-18		**TLM1**	CO1	T1	
No. of classes required to complete UNIT-I		**14**			No. of classes taken:			

UNIT –II: Set Theory & 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
92.	Set Theory: Introduction, Operations on Binary Sets	1	06-07-18		**TLM1**	CO2	T1	T1
93.	Principle of Inclusion and Exclusion	1	07-07-18		**TLM1**	CO2	T1	
94.	Relations: Properties of Binary Relations	1	09-07-18		**TLM1**	CO2	T1	
95.	Relation Matrix and Digraph Operations on Relations	1	12-07-18		**TLM1**	CO2	T1	
96.	Partition and Covering, Transitive Closure	1	13-07-18				T1	
97.	Equivalence Relation	1	14-07-18		**TLM1**	CO2	T1,R1	
98.	Compatibility Relation	1	16-07-18		**TLM1**	CO2	T1	
99.	Partial Ordering Relation & Hasse Diagrams	1	19-07-18		**TLM1**	CO2	T1,R1	
100.	Functions: Bijective Functions	1	20-07-18		**TLM1**	CO2	T1	
101.	Composition of Functions, Inverse Functions	1	21-07-18		**TLM1**	CO2	T1,R1	
102.	Permutation Functions, Recursive Functions	1	23-07-18		**TLM1**	CO2	T1,R1	
103.	Tutorial – II	1	26-07-18		**TLM3**	CO2	T1	
No. of classes required to complete **UNIT-2**		**12**			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 Outcome COs	Text Book followed	HOD Sign Weekly
104.	Basic Concepts of Graphs, Sub graphs	1	27-07-18		**TLM1**	CO3	T1	
105.	Matrix Representation of Graphs	1	28-07-18		**TLM1**	CO3	T1	
106.	Adjacency Matrices, Incidence Matrices	1	06-08-18		**TLM1**	CO3	T1	
107.	Isomorphic Graphs, Paths and Circuits	2	09-08-18 &10-8-18		**TLM1**	CO3	T1,R1	
108.	Eulerian Graphs, Hamiltonian Graphs	1	11-08-18		**TLM1**	CO3	T1,R1	
109.	Multigraphs, Planar Graphs, Euler's Formula	1	13-8-18		**TLM1**		T1,R1	
110.	Tutorial – III	1	16-08-18		**TLM3**	CO3	T1	
111.	Graph Colouring and Covering, Chromatic Number	1	17-08-18		**TLM1**	CO3	T1	
112.	Trees, Directed trees	1	18-08-18		**TLM1**	CO3	T1	
113.	Binary Trees, Decision Trees	1	20-08-18		**TLM1**	CO3	T1	
114.	Spanning Trees: Properties	1	23-08-18		**TLM1**	CO3	T1,R1	
115.	Algorithms for Spanning trees and Minimum Spanning Trees	2	24-08-18		**TLM1**	CO3	T1,R1	
No. of classes required to complete **UNIT-3**		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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
116.	Algebraic Systems with one Binary Operation	1	25-08-18		**TLM1**	CO4	T1	
117.	Properties of Binary operations, Semi groups and Monoids	1	27-08-18		**TLM1**	CO4	T1	
118.	Homomorphism of Semi	1	30-8-18		**TLM1**	CO4	T1	

	groups and Monoids, Groups							
119.	Abelian Group, Cosets, Subgroups	1	31-08-18		**TLM1**	CO4	T1,R1	
120.	Lattice: Properties, Algebraic Systems with two Binary Operations: Rings	2	01-09-18 &3-09-18		**TLM1**	CO4	T1,R1	
121.	Tutorial – IV	1	06-09-18		**TLM3**	CO4	T1	
122.	Basic of Counting, Permutations, Derangements	1	07-09-18		**TLM1**		T1	
123.	Permutations with Repetition of Objects	1	08-9-18		**TLM1**	CO4	T1,R1	
124.	Circular Permutations, Restricted Permutations	1	10-09-18		**TLM1**	CO4	T1	
125.	Combinations, Restricted Combinations	1	13-09-18		**TLM1**	CO4	T1	
126.	Pigeonhole Principle and its Application	1	14-09-18		**TLM1**	CO4	T1	
No. of classes required to complete **UNIT-4**		12			No. of classes taken:			

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 Outcome COs	Text Book followed	HOD Sign Weekly
127.	Binomial Theorem**,** Binomial and Multinomial Coefficients	1	15-09-18		**TLM1**	CO5	T1	T1
128.	Generating Functions of Permutations and Combinations	2	17-09-18 &20-9-18		**TLM1**	CO5	T1	
129.	The Principles of Inclusion – Exclusion	1	21-09-18		**TLM1**	CO5	T1,R1,R2	
130.	Generating Function of Sequences, Partial Fractions	1	22-09-18		**TLM1**	CO5	T1,R1,R2	
131.	Calculating Coefficient of Generating Functions	1	24-09-18		**TLM1**	CO5	T1	

132.	Tutorial – V	1	27-09-18		**TLM3**	CO5	T1	
133.	Recurrence Relations, Formulation as Recurrence Relations	1	28-09-18		**TLM1**	CO5	T1,R1,R2	
134.	Solving linear homogeneous recurrence Relations by substitution	2	29-09-18 & 1-10-18		**TLM1**	CO5	T1,R1,R2	
135.	Generating functions and The Method of Characteristic Roots	1	04-10-18		**TLM1**	CO5	T1,R1,R2	
136.	Solving Inhomogeneous Recurrence Relations	1	6-10-18		**TLM1**	CO5	T1,R1,R2	
No. of classes required to complete **UNIT-5**		12			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
137.	Rules of Inference and Automatic Theorem Proving	1			**TLM1**	CO1		
138.	Polish theorem	1			**TLM1**	CO4		
139.	DFS & BFS algorithm	1			**TLM1**	CO5	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

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:

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.

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**

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2017-18

COURSE NAME & CODE : DISCRETE MATHEMATICAL STRUCTURES &17CI03

L-T-P STRUCTURE : 3-1-2

COURSE CREDITS : 3

COURSE INSTRUCTOR : **G BALU NARASIMHARAO**

COURSE COORDINATOR :

4. Pre-requisites: Basic mathematical knowledge

5. 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.

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

CO1: Outline basic proofs for theorems using the techniques of - direct proofs, example, and Proof by contradiction, mathematical induction.

CO2: Illustrate by examples the basic terminology of functions, relations, and sets and Demonstrate knowledge of their associated operations.

CO3: Designing Network application, data structures using Graph terminology.

CO4: Apply the graph algorithms for routing and scheduling in different operating systems.

CO5: Construct compilers, error detection code, solve practical applications with the use of basic Counting principles of permutations, combinations, inclusion/exclusion principle and the Pigeonhole methodology.

4. Course Articulation Matrix:

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
S197	CO1	3	3													
	CO2	3	3	1	2											

	CO3	3	3	1	2											
	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).

BOS APPROVED TEXT BOOKS:

T1: Tremblay, Manohar, Discrete Mathematical Structures with Applications to Computer Science, TMH Publications

BOS APPROVED 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): Section-A

UNIT –I: Mathematical Logic & Predicate calculus

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
140.	Introduction, Propositional Calculus	2	12-06-18 & 13-06-18		**TLM1**	CO1	T1	
141.	Connectives, Truth Tables	1	14-06-18		**TLM1**	CO1	T1	
142.	Tautologies, Equivalence of Formulas Duality law	1	16-06-18		**TLM1**	CO1	T1	
143.	Tautological Implications	1	19-06-18		**TLM1**	CO1	T1	
144.	Normal Forms	2	20-06-18 & 21-06-18		**TLM1**	CO1	T1,R1	
145.	Theory of Inference for Statement Calculus	2	23-06-18, 26-06-18 &		**TLM1**	CO1	T1,R1	
146.	Consistency of Premises Indirect Method of Proof	1	27-06-18		**TLM1**	CO1	T1,R1	
147.	Predicative Logic	1	28-06-18		**TLM1**	CO1	T1,R1	
148.	Tutorial – I	1	30-06-18		**TLM3**	CO1	T1	
149.	Statement Functions, Variables and Quantifiers Free & Bound Variables	1	03-07-18		**TLM1**	CO1	T1	

150.	Inference theory for predicate calculus	1	04-07-18		**TLM1**	CO1	T1	
No. of classes required to complete UNIT-I		**14**			No. of classes taken:			

UNIT –II: Set Theory & 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
151.	Set Theory: Introduction, Operations on Binary Sets	1	05-07-18		**TLM1**	CO2	T1	T1
152.	Principle of Inclusion and Exclusion	1	07-07-18		**TLM1**	CO2	T1	
153.	Relations: Properties of Binary Relations	1	10-07-18		**TLM1**	CO2	T1	
154.	Relation Matrix and Digraph Operations on Relations	1	11-07-18		**TLM1**	CO2	T1	
155.	Partition and Covering, Transitive Closure	1	12-07-18				T1	
156.	Equivalence Relation	1	14-07-18		**TLM1**	CO2	T1,R1	
157.	Compatibility Relation	1	17-07-18		**TLM1**	CO2	T1	
158.	Partial Ordering Relation & Hasse Diagrams	1	18-07-18		**TLM1**	CO2	T1,R1	
159.	Functions: Bijective Functions	1	19-07-18		**TLM1**	CO2	T1	
160.	Composition of Functions, Inverse Functions	1	21-07-18		**TLM1**	CO2	T1,R1	
161.	Permutation Functions, Recursive Functions	1	24-07-18		**TLM1**	CO2	T1,R1	
162.	Tutorial – II	1	25-07-18		**TLM3**	CO2	T1	
No. of classes required to complete **UNIT-2**		**12**			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 Outcome COs	Text Book followed	HOD Sign Weekly
163.	Basic Concepts of Graphs, Sub graphs	1	26-07-18		**TLM1**	CO3	T1	
164.	Matrix Representation of Graphs	1	28-07-18		**TLM1**	CO3	T1	
165.	Adjacency Matrices, Incidence Matrices	1	07-08-18		**TLM1**	CO3	T1	
166.	Isomorphic Graphs, Paths and Circuits	2	08-08-18 &9-08-18		**TLM1**	CO3	T1,R1	
167.	Eulerian Graphs, Hamiltonian Graphs	1	11-08-18		**TLM1**	CO3	T1,R1	
168.	Multigraphs, Planar Graphs, Euler's Formula	1	14-8-18		**TLM1**		T1,R1	
169.	Tutorial – III	1	15-08-18		**TLM3**	CO3	T1	
170.	Graph Colouring and Covering, Chromatic Number	1	16-08-18		**TLM1**	CO3	T1	
171.	Trees, Directed trees	1	18-08-18		**TLM1**	CO3	T1	
172.	Binary Trees, Decision Trees	1	21-08-18		**TLM1**	CO3	T1	
173.	Spanning Trees: Properties	1	22-08-18		**TLM1**	CO3	T1,R1	
174.	Algorithms for Spanning trees and Minimum Spanning Trees	2	23-08-18		**TLM1**	CO3	T1,R1	
No. of classes required to complete **UNIT-3**		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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
175.	Algebraic Systems with one Binary Operation	1	25-08-18		**TLM1**	CO4	T1	
176.	Properties of Binary operations, Semi groups and Monoids	1	28-08-18		**TLM1**	CO4	T1	
177.	Homomorphism of Semi	1	29-8-18		**TLM1**	CO4	T1	

	groups and Monoids, Groups							
178.	Abelian Group, Cosets, Subgroups	1	30-08-18		**TLM1**	CO4	T1,R1	
179.	Lattice: Properties, Algebraic Systems with two Binary Operations: Rings	2	01-09-18 &4-09-18		**TLM1**	CO4	T1,R1	
180.	Tutorial – IV	1	05-09-18		**TLM3**	CO4	T1	
181.	Basic of Counting, Permutations, Derangements	1	06-09-18		**TLM1**		T1	
182.	Permutations with Repetition of Objects	1	08-9-18		**TLM1**	CO4	T1,R1	
183.	Circular Permutations, Restricted Permutations	1	11-09-18		**TLM1**	CO4	T1	
184.	Combinations, Restricted Combinations	1	12-09-18		**TLM1**	CO4	T1	
185.	Pigeonhole Principle and its Application	1	13-09-18		**TLM1**	CO4	T1	
No. of classes required to complete **UNIT-4**		12			No. of classes taken:			

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 Outcome COs	Text Book followed	HOD Sign Weekly
186.	Binomial Theorem**,** Binomial and Multinomial Coefficients	1	15-09-18		**TLM1**	CO5	T1	T1
187.	Generating Functions of Permutations and Combinations	2	18-09-18 &19-9-18		**TLM1**	CO5	T1	
188.	The Principles of Inclusion – Exclusion	1	20-09-18		**TLM1**	CO5	T1,R1,R2	
189.	Generating Function of Sequences, Partial Fractions	1	22-09-18		**TLM1**	CO5	T1,R1,R2	
190.	Calculating Coefficient of Generating Functions	1	25-09-18		**TLM1**	CO5	T1	

191.	Tutorial – V	1	26-09-18		**TLM3**	CO5	T1	
192.	Recurrence Relations, Formulation as Recurrence Relations	1	27-09-18		**TLM1**	CO5	T1,R1,R2	
193.	Solving linear homogeneous recurrence Relations by substitution	2	29-09-18 & 2-10-18		**TLM1**	CO5	T1,R1,R2	
194.	Generating functions and The Method of Characteristic Roots	1	04-10-18		**TLM1**	CO5	T1,R1,R2	
195.	Solving Inhomogeneous Recurrence Relations	2	6-10-18		**TLM1**	CO5	T1,R1,R2	
No. of classes required to complete **UNIT-5**		12			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
196.	Rules of Inference and Automatic Theorem Proving	1			**TLM1**	CO1		
197.	Polish theorem	1			**TLM1**	CO4		
198.	DFS & BFS algorithm	1			**TLM1**	CO5	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

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:

13. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
14. **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.
15. **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.
16. **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.
17. **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.
18. **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.
19. **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.
20. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
21. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

22. **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.

23. **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.

24. 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** **HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & 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

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

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : PYTHON PROGRAMMING – 17CI04

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.K.SUNDEEP SARADHI**

COURSE COORDINATOR : **Mrs.G.V.RAJYA LAKSHMI**

PRE-REQUISITE: **C Programming**

COURSE OBJECTIVE:. 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 (CO)

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 (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	-	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).

BOS APPROVED TEXT BOOKS:

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

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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

COURSE DELIVERY PLAN (LESSON PLAN): Section-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
49.	Introduction to Programming	1	13.06.2018		**TLM1**	CO1	T1	
50.	History of Python	1	14.06.2018		**TLM1**	CO1	T1	
51.	Usage of Python Interpreter	1	15.06.2018		**TLM8**	CO1	T1	
52.	Structure of Python Program, Python Shell	1	20.06.2018		**TLM1/ TLM8**	CO1	T1	
53.	Indentation, Python Built-in types , Variables	1	21.06.2018		**TLM1**	CO1	T1	
54.	Assignment, Input-Output Statements	1	22.06.2018		**TLM1**	CO1	T1	
55.	Identifiers, keywords	1	23.06.2018		**TLM1**	CO1	R1	
56.	Literals , simple programs	1	27.06.2018		**TLM3**	CO1	T1	
57.	Arithematic , Relational, Logical Operators, Assignment Operators	1	28.06.2018		**TLM4 / TLM5**	CO1	T1	
58.	Tutorial - 1	1	29.06.2018		**TLM1**	CO1	T1	
59.	Bitwise Operators, Increment/decrement operators	1	30.06.2018		**TLM1**	CO1	T1	
60.	Python Membership Operator, Python Identity Operator , Operator Precedence	1	04.07.2018		**TLM1**	CO1	T1	

61.	Assignment / Quiz - 1	1	05.07.2018		**TLM6**	CO1	T1	
No. of classes required to complete UNIT-I		13			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
62.	Conditonal Statements – if, if-else	1	06.07.2018		**TLM1**	CO2	T1	
63.	Nested If-else	1	07.07.2018		**TLM1**	CO2	T1	
64.	Jumping Statements – continue, break, pass	1	11.07.2018		**TLM1**	CO2	T1	
65.	Python Loops – While loop, for loop	1	12.07.2018		**TLM1**	CO2	T1	
66.	Nested Loops with Programs	1	13.07.2018		**TLM4 / TLM5**	CO2	T1	
67.	Mathematical functions & constants, Random Number functions	1	18.07.2018		**TLM1**	CO2	T1	
68.	Python List - concept , Creating and Accessing Elements	1	19.07.2018		**TLM3**	CO2	T1	
69.	Tutorial - 2	1	20.07.2018		**TLM1**	CO2	T1	
70.	Updating Lists & Deleting Lists	1	21.07.2018		**TLM1**	CO2	T1	
71.	Basic List operations , Reverse, Indexing	1	25.07.2018		**TLM1**	CO2	T1	
72.	Slicing & Matrices	1	26.07.2018		**TLM1**	CO2	T1	
73.	Built-in List Functions	1	27.07.2018		**TLM1**	CO2	T1	
74.	Assignment / Quiz - 2	1	28.07.2018		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		13			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
75.	Python Strings - concept , Slicing, Escape Characters	1	08.08.2018		**TLM1**	CO3	T1	
76.	String Special Operations, String	1	09.08.2018		**TLM1**	CO3	T1	

	formatting operator							
77.	Triple quotes , raw string, Unicode strings	1	10.08.2018		**TLM1**	CO3	T1	
78.	Built-in string methods	1	16.08.2018		**TLM1**	CO3	T1	
79.	Tutorial - 3	1	17.08.2018		**TLM3**	CO3	T1	
80.	Defining and calling a function, Types of functions,	1	18.08.2018		**TLM1**	CO3	T1	
81.	Function arguments, Anonymous functions	1	23.08.2018		**TLM1**	CO3	T1	
82.	Global and Local variables, Recursion with programs	1	24.08.2018		**TLM4 / TLM5**	CO3	T1	
83.	Assignment / Quiz-3	1	25.08.2018		**TLM6**	CO3	T1	
No. of classes required to complete UNIT-III		09			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
84.	Python Tuples – Introduction	1	29.08.2018		**TLM1**	CO4	T1	
85.	Creating and Deleting Tuples Accessing Values in a Tuple	1	30.08.2018		**TLM1**	CO4	T1	
86.	Updating tuples , Delete tuple elements, Basic tuple operations	1	31.08.2018		**TLM1**	CO4	T1	
87.	Indexing , Slicing and Matrices	1	05.09.2018		**TLM1**	CO4	T1	
88.	Built-in tuple functions	1	06.09.2018		**TLM3**	CO4	T1	
89.	Tutorial - 4	1	07.09.2018		**TLM1**	CO4	T1	
90.	Sets-concepts, operations	1	12.09.2018		**TLM1**	CO4	T1	
91.	Files – Creating files, Operation on files	1	14.09.2018		**TLM1**	CO4	T1	
92.	Assignment / Quiz - 4	1	15.09.2018		**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
93.	Searching Techniques – Linear Search, Binary Search	1	19.09.2018		**TLM1**	CO5	T1	
94.	Sorting Techniques – Bubble sort Selection Sort	1	20.09.2018		**TLM1**	CO5	T1	
95.	Insertion Sort, Merge Sort	1	22.09.2018		**TLM1**	CO5	T1	
96.	Heap Sort	1	26.09.2018		**TLM1**	CO5	T1	
97.	Exception Handling – Exceptions, Except clause , try	1	28.09.2018		**TLM3**	CO5	T1	
98.	Tutorial - 5	1	29.09.2018		**TLM1**	CO5	T1	
99.	Finally clause, user defined exceptions	1	03.09.2018		**TLM1**	CO5	T1	
100.	Database – introduction, connections, Executing queries,	1	04.10.2018		**TLM1**	CO5	T1	
101.	Transactions , Handling errors , Simple Programs	1	05.10.2018		**TLM4 / TLM5**	CO5	T1	
102.	Assignment / Quiz - 5	1	06.10.2018		**TLM6**	CO5	T1	
No. of classes required to complete 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 Weekly
103.	Convertion of strings to numbers	1	01.09.18		**TLM1**	CO2		
104.	Introduction to Classes and OOP	1	27.09.18		**TLM1**	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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	11-06-2018	28-07-2018	7W
I Mid Examinations	30-07-2018	04-08-2018	1W
II Phase of Instructions	06-08-2018	06-10-2018	9W
II Mid Examinations	08-10-2018	13-10-2018	1W
Preparation and Practicals	15-10-2018	27-10-2018	2W
Semester End Examinations	29-10-2018	10-11-2018	2W

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:

25. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
26. **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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28. **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.
29. **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.
30. **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.
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32. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
33. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

34. **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.

35. **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.

36. 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

Course Instructor	Course Coordinator	Module Coordinator	HOD
K.Sundeep Saradhi	G.V.Rajya Lakshmi	Dr. D.Veeraiah	Dr.Ch.Venkata Narayana

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2017-18

COURSE NAME & CODE : PYTHON PROGRAMMING – 17CI04

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mrs.G.V.RAJYA LAKSHMI**

COURSE COORDINATOR : **Mrs.G.V.RAJYA LAKSHMI**

PRE-REQUISITE: **C Programming**

COURSE OBJECTIVE:. 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 (CO)

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

COURSE DELIVERY PLAN (LESSON PLAN): Section-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
105.	Introduction to Programming	1	11.06.2018		**TLM1**	CO1	T1	
106.	History of Python	1	12.06.2018		**TLM1**	CO1	T1	
107.	Usage of Python Interpreter	1	13.06.2018		**TLM8**	CO1	T1	
108.	Structure of Python Program, Python Shell	1	18.06.2018		**TLM1/ TLM8**	CO1	T1	
109.	Indentation, Python Built-in types , Variables	1	19.06.2018		**TLM1**	CO1	T1	
110.	Assignment, Input-Output Statements	1	20.06.2018		**TLM1**	CO1	T1	
111.	Identifiers, keywords	1	23.06.2018		**TLM1**	CO1	R1	
112.	Literals , simple programs	1	25.06.2018		**TLM3**	CO1	T1	
113.	Tutorial – 1	1	26.06.2018		**TLM4 / TLM5**	CO1	T1	
114.	Arithematic , Relational, Logical Operators, Assignment Operators	1	27.06.2018		**TLM1**	CO1	T1	
115.	Bitwise Operators, Increment/decrement operators	1	30.06.2018		**TLM1**	CO1	T1	
116.	Python Membership	1	02.07.2018		**TLM1**	CO1	T1	

	Operator, Python Identity Operator , Operator Precedence							
117.	Assignment / Quiz – 1	1	03.07.2018		**TLM6**	CO1	T1	
No. of classes required to complete UNIT-I		13			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
118.	Conditonal Statements – if, if-else	1	04.07.2018		**TLM1**	CO2	T1	
119.	Nested If-else	1	07.07.2018		**TLM1**	CO2	T1	
120.	Jumping Statements – continue, break, pass	1	09.07.2018		**TLM1**	CO2	T1	
121.	Python Loops – While loop, for loop	1	10.07.2018		**TLM1**	CO2	T1	
122.	Nested Loops with Programs	1	11.07.2018		**TLM4 / TLM5**	CO2	T1	
123.	Mathematical functions & constants, Random Number functions	1	16.07.2018		**TLM1**	CO2	T1	
124.	Tutorial – 2	1	17.07.2018		**TLM3**	CO2	T1	
125.	Python List - concept , Creating and Accessing Elements	1	18.07.2018		**TLM1**	CO2	T1	
126.	Updating Lists & Deleting Lists	1	21.07.2018		**TLM1**	CO2	T1	
127.	Basic List operations , Reverse, Indexing	1	23.07.2018		**TLM1**	CO2	T1	
128.	Slicing & Matrices	1	24.07.2018		**TLM1**	CO2	T1	
129.	Built-in List Functions	1	25.07.2018		**TLM1**	CO2	T1	
130.	Assignment / Quiz – 2	1	28.07.2018		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		13			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
131.	Python Strings - concept , Slicing, Escape Characters	1	06.08.2018		**TLM1**	CO3	T1	
132.	String Special Operations, String formatting operator	1	07.08.2018		**TLM1**	CO3	T1	
133.	Triple quotes , raw string, Unicode strings	1	08.08.2018		**TLM1**	CO3	T1	
134.	Built-in string methods	1	11.08.2018		**TLM1**	CO3	T1	
135.	Defining and calling a function, Types of functions,	1	13.08.2018		**TLM3**	CO3	T1	
136.	Tutorial – 3	1	14.08.2018		**TLM1**	CO3	T1	
137.	Function arguments, Anonymous functions	1	18.08.2018		**TLM1**	CO3	T1	
138.	Global and Local variables, Recursion with programs	1	20.08.2018		**TLM4 / TLM5**	CO3	T1	
139.	Assignment / Quiz-3	1	21.08.2018		**TLM6**	CO3	T1	
No. of classes required to complete UNIT-III		09			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
140.	Python Tuples – Introduction	1	25.08.2018		**TLM1**	CO4	T1	
141.	Creating and Deleting Tuples Accessing Values in a Tuple	1	27.08.2018		**TLM1**	CO4	T1	
142.	Updating tuples , Delete tuple elements, Basic tuple operations	1	28.08.2018		**TLM1**	CO4	T1	
143.	Indexing , Slicing and Matrices	1	29.08.2018		**TLM1**	CO4	T1	
144.	Built-in tuple functions,	1	01.09.2018		**TLM3**	CO4	T1	
145.	Tutorial – 4	1	04.09.2018		**TLM1**	CO4	T1	
146.	Sets-concepts, operations	1	05.09.2018		**TLM1**	CO4	T1	
147.	Files – Creating files, Operation	1	10.09.2018		**TLM1**	CO4	T1	

	on files							
148.	Assignment / Quiz – 4	1	11.09.2018		**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
149.	Searching Techniques – Linear Search, Binary Search	1	12.09.2018		**TLM1**	CO5	T1	
150.	Sorting Techniques – Bubble sort Selection Sort	1	17.09.2018		**TLM1**	CO5	T1	
151.	Insertion Sort, Merge Sort	1	18.09.2018		**TLM1**	CO5	T1	
152.	Heap Sort	1	19.09.2018		**TLM1**	CO5	T1	
153.	Example programs on all sorting methods	1	24.09.2018		**TLM3**	CO5	T1	
154.	Tutorial – 5	1	25.09.2018		**TLM1**	CO5	T1	
155.	Exception Handling – Exceptions, Except clause , try Finally clause	1	26.09.2018		**TLM1**	CO5	T1	
156.	Database – introduction, connections, Executing queries,	1	29.09.2018		**TLM1**	CO5	T1	
157.	Transactions , Handling errors ,	1	01.10.2018		**TLM1**	CO5	T1	
158.	Simple Programs on database	1	03.10.2018		**TLM4 / TLM5**	CO5	T1	
159.	Assignment / Quiz - 5	1	06.10.2018		**TLM6**	CO5	T1	
No. of classes required to complete 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 Weekly
160.	Convertion of strings to numbers	1	11.09.18		**TLM1**	CO2		
161.	Introduction to Classes and OOP	1	25.09.18		**TLM1**	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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	11-06-2018	28-07-2018	7W
I Mid Examinations	30-07-2018	04-08-2018	1W
II Phase of Instructions	06-08-2018	06-10-2018	9W
II Mid Examinations	08-10-2018	13-10-2018	1W
Preparation and Practicals	15-10-2018	27-10-2018	2W
Semester End Examinations	29-10-2018	10-11-2018	2W

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:

37. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
38. **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.
39. **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.
40. **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.
41. **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.
42. **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.
43. **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.

44. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
45. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
46. **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.
47. **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.
48. **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

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

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2018-19

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

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **A.S.R.C.Murthy**

COURSE COORDINATOR : **A.S.R.C.Murthy**

PRE-REQUISITE: C

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), explore the sections of ADT. Analyze example programs with data structures using analyzing tools.

CO2: Develop & analyze the algorithms for stack and apply the same for problem solving.

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).

BOS APPROVED TEXT BOOKS:

T1 Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2ndedition

T2 ReemaThareja, Data Structures using c, Oxford Publications.

BOS APPROVED 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.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A &B

UNIT-I : Java Language & Introducing classes

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
162.	Introduction to Subject	1	11-06-18		TLM1	CO1	T1	
163.	UNIT - I Mathematical Background	1	13-06-18		TLM1	CO1	T1	
164.	Model, Analysis and Run Time Calculations	1	14-06-18		TLM1	CO1	T1	
165.	Model, Analysis and Run Time Calculations	1	15-06-18		TLM1	CO1	T1	
166.	Introduction to Data, The Abstract Data Type	1	18-06-18		TLM1	CO1	T1	
167.	Introduction to Lists, List ADT using arrays	1	20-06-18		TLM1	CO1	T1	
168.	Single linked list operations	1	21-06-18		TLM1	CO1	T1	

169.	Single linked list operations	1	22-06-18		TLM5	CO1	T1	
170.	Single linked list operations	1	25-06-18		TLM5	CO1	T1	
171.	Single linked list operations	1	27-06-18		TLM5	CO1	T1	
172.	Double linked list operations	1	28-06-18		TLM1	CO1	T1	
173.	Double linked list operations	1	29-06-18		TLM5	CO1	T1	
174.	Double linked list operations	1	04-07-18		TLM5	CO1	T1	
175.	Double linked list operations	1	05-07-18		TLM5	CO1	T1	
176.	Circular linked list operations	1	06-07-18		TLM1	CO1	T1	
177.	Circular linked list operations	1	09-07-18		TLM5	CO1	T1	
178.	Polynomial ADT operations	1	11-07-18		TLM5	CO1	T1	
179.	Tutorial-1	1	12-07-18		TLM3	CO1		
180.	Assignment/Quiz-1	1	13-07-18		TLM6	CO1		
No. of classes required to complete UNIT-I		19			No. of classes taken:			

UNIT-II: Stacks, Applications & Queues.

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
181.	Stacks: The Stack: Definition, operations, implementation using arrays	1	16-07-18		TLM1	CO2	T1	
182.	Using Linked List	1	18-07-18		TLM5	CO2	T1	
183.	Infix to postfix expression conversion	1	19-07-18		TLM1	CO2	T1	
184.	Infix to postfix expression conversion	1	20-07-18		TLM1	CO2	T1	

185.	Evaluation of Postfix expressions	1	23-07-18		TLM1	CO2	T1	
186.	Balancing the symbols. Queue: definition, operations	1	25-07-18		TLM1	CO2	T1	
187.	implementation using arrays, implementation using linked lists	1	26-07-18		TLM5	CO2	T1	
188.	Circular queue: definition its operations, implementation	1	27-07-18		TLM5	CO2	T1	
189.	**DE queue:** **Definition& its types, implementation**	1	06-08-18		TLM1	CO2	T1	
190.	**Tutorial-2**	1	08-08-18		TLM3	CO2	T1	
191.	Assignment/Quiz-2	1	09-08-18		TLM6	CO2		
No. of classes required to complete UNIT-II		11			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
192.	Searching: Linear Searching	1	10-08-18		TLM1	CO3	T1	
193.	Binary Search	1	10-08-18		TLM1	CO3	T2	
194.	Fibonacci Search	1	13-08-18		TLM5	CO3	T2	
195.	Sorting: Bubble sort	1	16-08-18		TLM1	CO3	T2	
196.	Insertion Sort	1	17-08-18		TLM1	CO3	T2	
197.	Merge Sort	1	20-08-18		TLM1	CO3	T2	
198.	Merge Sort	1	23-08-18		TLM5	CO3	T2	
199.	Quick Sort	1	24-08-18		TLM1	CO3	T2	
200.	Quick Sort	1	27-08-18		TLM5	CO3	T2	
201.	Heap Sort	1	29-08-18		TLM1	CO3	T1	
202.	Heap Sort	1	30-08-18		TLM1	CO3	T1	
203.	Heap Sort	1	31-08-18		TLM5	CO3	T1	

204.	**Tutorial – 3**	1	05-09-18		TLM3	CO3		
205.	Assignment/Quiz-3	1	06-09-18		TLM6	CO3		
No. of classes required to complete UNIT-III		14			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
206.	Trees: Terminology, Binary Trees: definition,	1	07-09-18		TLM1	CO4	T1	
207.	types of binary trees, Representation	1	10-09-18		TLM1	CO4	T1	
208.	Implementation (linked list)	1	12-09-18		TLM5	CO4	T1	
209.	Tree traversals: Recursive techniques, Tree traversals: Recursive techniques	1	14-09-18		TLM5	CO4	T1	
210.	Search Tree: Binary Search Tree-search	1	17-09-18		TLM1	CO4	T1	
211.	insertion, Deletion (all the three cases	1	18-09-18		TLM1	CO4	T1	
212.	insertion, Deletion (all the three cases	1	19-09-18		TLM5	CO4	T1	
213.	Balanced Tree –Introduction to AVL tree and Rotations	1	20-09-18		TLM1	CO4	T1	
214.	AVL tree and Rotations	1	24-09-18		TLM1	CO4	T1	
215.	TUTORIAL-4	1	26-09-18		TLM3	CO4		
216.	Assignment/Quiz-4	1	27-09-18		TLM6	CO4		
No. of classes required to complete UNIT-IV		11			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
217.	Graphs: Fundamentals, Representation of graphs	1	28-03-18		TLM1	CO5	T1	

218.	Graph Traversals: BFS, DFS	1	01-10-18		TLM1	CO5	T1	
219.	Minimum Cost spanning tree: Definition, Prim's Algorithm, Kruskal's algorithm	1	03-10-18		TLM1	CO5	T1	
220.	Hashing: Hash Table, Hash Function, Collision resolution Techniques	1	03-10-18		TLM1	CO5	T1	
221.	SeparateChaining, Open addressing, rehashing.	1	04-10-18		TLM1	CO5	T1	
222.	Tutorial-5	1	05-10-18		TLM3	CO5	T1	
223.	Assignment/Quiz-5	1	06-10-18		TLM6	CO5		
No. of classes required to complete UNIT-V		7			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
224.	Introduction to B Trees.	1			TLM1	CO4	T1	
225.	Introduction to Splay Trees	1			TLM1	CO3	T1	

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:

49. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
50. **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.
51. **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.
52. **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.
53. **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.

54. **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.
55. **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.
56. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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58. **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.
59. **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.
60. **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

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

**(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
NAAC Accredited with 'A' grade, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.**

COURSE HANDOUT

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

ACADEMIC YEAR : **2018-19**

COURSE NAME & CODE : **COMPUTER ARCHIETECTURE– 17CI06**

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

COURSE CREDITS : **3**

COURSE INSTRUCTOR : **Dr.O.RAMA DEVI**

COURSE COORDINATOR : **Dr.O.RAMA DEVI**

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).

BOS APPROVED 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.

BOS APPROVED 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-A

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
199.	Block Diagram of a Computer, Basic Functional Units of a Computer	1	11.06.2018		**TLM1**	CO1	T1	
200.	Computer Architecture Models	1	13.06.2018		**TLM1**	CO1	T2	
201.	Internal Organization of a Central Processing Unit	1	14.06.2018		**TLM8**	CO1	T1	

202.	Register Structure	1	16.06.2018		**TLM1/ TLM8**	CO1	T1	
203.	Introduction to Sequence of Micro operations	1	18.06.2018		**TLM1**	CO1	T1	
204.	Introduction to Control steps	1	20.06.2018		**TLM1**	CO1	T2	
205.	Register Transfer language	1	21.06.2018		**TLM1**	CO1	R1	
206.	Tutorial - 1	1	23.06.2018		**TLM3**	CO1	T1	
207.	Classification of Micro operations- Arithmetic Micro Operations	1	25.06.2018		**TLM1**	CO1	T1	
208.	Logic Micro Operations and Shift Micro Operations	1	27.06.2018		**TLM1**	CO1	T1	
209.	Instruction cycle Instruction Set	1	28.06.2018		**TLM1**	CO1	T1	
210.	Basic Computer Instructions	1	30.06.2018		**TLM1**	CO1	T1	
211.	Assignment / Quiz - 1	1	02.07.2018		**TLM6**	CO1	T1	
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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
212.	Instruction formats	1	04.07.2018		**TLM1**	CO2	T1	
213.	Addressing modes	1	05.07.2018		**TLM1**	CO2	T1	
214.	Example for Addressing modes	1	07.07.2018		**TLM1**	CO2	T1	
215.	Data Transfer and Manipulation Instructions,	1	9.07.2018		**TLM1**	CO2	T1	
216.	Logical Instructions, Program control Instructions,	1	11.07.2018		**TLM1**	CO2	T1	
217.	Data Representation	1	12.07.2018		**TLM1**	CO2	T1	

218.	Tutorial - 2	1	14.07.2018		**TLM3**	CO2	T1	
219.	Addition and Subtraction	1	16.07.2018		**TLM4**	CO2	T1	
220.	Multiplication Algorithms	1	18.07.2018		**TLM4**	CO2	T1	
221.	Booth Multiplication Algorithm	1	19.07.2018		**TLM4**	CO2	T1	
222.	Division Algorithms	1	21.07.2018		**TLM4**	CO2	T1	
223.	Floating Point Arithmetic operations	1	23.07.2018		**TLM1**	CO2	T1	
224.	Assignment / Quiz - 2	1	28.07.2018		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		13			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
225.	Control Memory	1	6.08.2018		**TLM1**	CO3	T1	
226.	Hard wired control	1	8.08.2018		**TLM1**	CO3	T1	
227.	Micro programmed control	1	9.08.2018		**TLM1**	CO3	T1	
228.	Micro Instruction Format	1	11.08.2018		**TLM1**	CO3	T1	
229.	Tutorial – 3	1	13.08.2018		**TLM3**	CO3	T1	
230.	Address Sequencing	1	15.08.2018		**TLM1**	CO3	T1	
231.	Design of Control Unit.	1	16.08.2018		**TLM1**	CO3	T1	
232.	Assignment / Quiz-3	1	18.08.2018		**TLM6**	CO3	T1	
No. of classes required to complete UNIT-III		08			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly

233.	Memory Hierarchy	1	23.08.2018		**TLM1**	CO4	T1	
234.	Primary Memory	1	25.08.2018		**TLM1**	CO4	T1	
235.	Introduction to Secondary Memory	1	29.08.2018		**TLM1**	CO4	T1	
236.	Associative Memory	1	1.09.2018		**TLM1**	CO4	T1	
237.	Tutorial - 4	1	3.09.2018		**TLM3**	CO4	T1	
238.	Cache Memory	1	5.09.2018		**TLM1**	CO4	T1	
239.	Hit Ratio and Mapping Techniques	1	8.09.2018		**TLM1**	CO4	T1	
240.	Example Problems	1	10.09.2018		**TLM4**	CO4	T1	
241.	Assignment / Quiz - 4	1	13.09.2018		**TLM6**	CO4	T1	
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
242.	Peripheral Devices	1	17.09.2018		**TLM1**	CO5	T1	
243.	Modes of Transfer	1	20.09.2018		**TLM1**	CO5	T1	
244.	Priority Interrupt	1	22.09.2018		**TLM1**	CO5	T1	
245.	Direct Memory Access	1	24.09.2018		**TLM1**	CO5	T1	
246.	Input Output Processor.	1	26.09.2018		**TLM1**	CO5	T1	
247.	Tutorial - 5	1	27.09.2018		**TLM3**	CO5	T1	
248.	Input Output Interface	1	29.09.2018		**TLM1**	CO5	T1	
249.	Synchronous data transfer and Asynchronous Data Transfer	1	1.10.2018		**TLM1**	CO5	T1	
250.	Timing diagrams for	1	03.10.2018		**TLM1**	CO5	T1	

	Synchronous and Asynchronous data transfers							
251.	Serial communication	1	04.10.2018		**TLM4 / TLM5**	CO5	T1	
252.	Assignment / Quiz - 5	1	06.10.2018		**TLM6**	CO5	T1	
No. of classes required to complete 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 Weekly
253.	Introduction to Small Computer System Interface (SCSI)	1	24.09.2018		**TLM1**	CO2	T2	
254.	Universal Serial Bus(USB)	1	06.10.2018		**TLM1**	CO4	T2	

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	11-06-2018	28-07-2018	7W
I Mid Examinations	30-07-2018	04-08-2018	1W
II Phase of Instructions	06-08-2018	06-10-2018	9W
II Mid Examinations	08-10-2018	13-10-2018	1W
Preparation and Practicals	15-10-2018	27-10-2018	2W
Semester End Examinations	29-10-2018	10-11-2018	2W

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:

61. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
62. **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.

63. **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.
64. **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.
65. **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.
66. **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.
67. **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.
68. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
69. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
70. **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.
71. **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.

72. 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

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.O.Rama Devi	Dr.O.Rama Devi	Dr. R.Chandrasekharam	Dr.Ch.Venkata Narayana

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : COMPUTER ARCHITECTURE– 17CI06

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.V.SIVA KRISHNA**

COURSE COORDINATOR : **Dr.O.RAMA DEVI**

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).

BOS APPROVED 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.

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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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
226.	Block Diagram of a Computer, Basic Functional Units of a Computer	1	11.06.2018		**TLM1**	CO1	T1	
227.	Computer Architecture Models	1	12.06.2018		**TLM1**	CO1	T2	
228.	Internal Organization of a Central Processing Unit	1	13.06.2018		**TLM1**	CO1	T1	
229.	Register Structure	1	18.06.2018		**TLM1**	CO1	T1	
230.	Introduction to Sequence of Micro operations	1	19.06.2018		**TLM1**	CO1	T1	
231.	Introduction to Control steps	1	20.06.2018		**TLM1**	CO1	T2	
232.	Register Transfer language	1	23.06.2018		**TLM1**	CO1	R1	
233.	Tutorial - 1	1	25.06.2018		**TLM3**	CO1	T1	
234.	Classification of Micro operations- Arithmetic Micro	1	26.06.2018		**TLM1**	CO1	T1	

	Operations							
235.	Logic Micro Operations and Shift Micro Operations	1	27.06.2018		**TLM1**	CO1	T1	
236.	Instruction cycle Instruction Set	1	30.06.2018		**TLM1**	CO1	T1	
237.	Basic Computer Instructions	1	02.07.2018		**TLM1**	CO1	T1	
238.	Assignment / Quiz - 1	1	03.07.2018		**TLM6**	CO1	T1	
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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
239.	Instruction formats	1	04.07.2018		**TLM1**	CO2	T1	
240.	Addressing modes	1	07.07.2018		**TLM1**	CO2	T1	
241.	Example for Addressing modes	1	09.07.2018		**TLM1**	CO2	T1	
242.	Data Transfer and Manipulation Instructions,	1	10.07.2018		**TLM1**	CO2	T1	
243.	Logical Instructions, Program control Instructions,	1	11.07.2018		**TLM1**	CO2	T1	
244.	Data Representation	1	16.07.2018		**TLM1**	CO2	T1	
245.	Tutorial - 2	1	17.07.2018		**TLM3**	CO2	T1	
246.	Addition and Subtraction	1	18.07.2018		**TLM4**	CO2	T1	
247.	Multiplication Algorithms	1	21.07.2018		**TLM4**	CO2	T1	
248.	Booth Multiplication Algorithm	1	23.07.2018		**TLM4**	CO2	T1	
249.	Division Algorithms	1	24.07.2018		**TLM4**	CO2	T1	
250.	Floating Point Arithmetic operations	1	25.07.2018		**TLM1**	CO2	T1	
251.	Assignment / Quiz - 2	1	28.07.2018		**TLM6**	CO2	T1	
No. of classes required to complete UNIT-II		13			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
252.	Control Memory	1	06.08.2018		**TLM1**	CO3	T1	
253.	Hard wired control	1	07.08.2018		**TLM1**	CO3	T1	
254.	Micro programmed control	1	08.08.2018		**TLM1**	CO3	T1	
255.	Micro Instruction Format	1	11.08.2018		**TLM1**	CO3	T1	
256.	Tutorial – 3	1	13.08.2018		**TLM3**	CO3	T1	
257.	Address Sequencing	1	14.08.2018		**TLM1**	CO3	T1	
258.	Design of Control Unit.	1	18.08.2018		**TLM1**	CO3	T1	
259.	Assignment / Quiz-3	1	20.08.2018		**TLM6**	CO3	T1	
No. of classes required to complete UNIT-III		08			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
260.	Memory Hierarchy	1	25.08.2018		**TLM1**	CO4	T1	
261.	Primary Memory	1	27.08.2018		**TLM1**	CO4	T1	
262.	Introduction to Secondary Memory	1	28.08.2018		**TLM1**	CO4	T1	
263.	Associative Memory	1	29.08.2018		**TLM1**	CO4	T1	
264.	Tutorial - 4	1	01.09.2018		**TLM3**	CO4	T1	
265.	Cache Memory	1	04.09.2018		**TLM1**	CO4	T1	
266.	Hit Ratio and Mapping Techniques	1	05.09.2018		**TLM1**	CO4	T1	
267.	Example Problems	1	10.09.2018		**TLM4**	CO4	T1	
268.	Assignment / Quiz - 4	1	11.09.2018		**TLM6**	CO4	T1	
No. of classes required to complete UNIT-IV		09			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
269.	Peripheral Devices	1	12.09.2018		**TLM1**	CO5	T1	
270.	Modes of Transfer	1	17.09.2018		**TLM1**	CO5	T1	
271.	Priority Interrupt	1	18.09.2018		**TLM1**	CO5	T1	
272.	Direct Memory Access	1	19.09.2018		**TLM1**	CO5	T1	
273.	Input Output Processor.	1	24.09.2018		**TLM1**	CO5	T1	
274.	Tutorial - 5	1	25.09.2018		**TLM3**	CO5	T1	
275.	Input Output Interface	1	26.09.2018		**TLM1**	CO5	T1	
276.	Synchronous data transfer and Asynchronous Data Transfer	1	29.09.2018		**TLM1**	CO5	T1	
277.	Timing diagrams for Synchronous and Asynchronous data transfers	1	01.10.2018		**TLM1**	CO5	T1	
278.	Serial communication	1	03.10.2018		**TLM1**	CO5	T1	
279.	Assignment / Quiz - 5	1	06.10.2018		**TLM6**	CO5	T1	
No. of classes required to complete 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 Weekly
280.	Introduction to Small Computer System Interface (SCSI)	1	25.09.2018		**TLM1**	CO2	T2	
281.	Universal Serial Bus(USB)	1	06.10.2018		**TLM1**	CO4	T2	

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	11-06-2018	28-07-2018	7W
I Mid Examinations	30-07-2018	04-08-2018	1W
II Phase of Instructions	06-08-2018	06-10-2018	9W
II Mid Examinations	08-10-2018	13-10-2018	1W
Preparation and Practicals	15-10-2018	27-10-2018	2W
Semester End Examinations	29-10-2018	10-11-2018	2W

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:

73. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
74. **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.
75. **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.
76. **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.
77. **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.
78. **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.
79. **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.
80. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
81. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

82. **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.

83. **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.

84. 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

Course Instructor	Course Coordinator	Module Coordinator	HOD
V.Siva Krishna	Dr.O.Rama Devi	Dr. R.Chandrasekharam	Dr.Ch.Venkata Narayana