



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)

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

Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi

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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### Part-A

**PROGRAM** : B.Tech., V-Sem., CSE- section A  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : **ENGINEERING ECONOMICS & ACCOUNTANCY – 17HS01**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **N. SAMBASIVA RAO**  
**COURSE COORDINATOR** : Dr. A ADISESHA REDDY

**PRE-REQUISITE:**

**COURSE OBJECTIVE:** Basic Sciences & Humanities

The objective of this course is to inculcate basic knowledge to students relating to concepts of Engineering Economics and Accountancy to make them effective business decision makers.

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

CO1	Capable of analyzing fundamentals of economics concepts which helps in effective business administration.
CO2	Discuss cost output relationship in business operations.
CO3	Analyze the features of market structures and present the pricing policies.
CO4	Identify the types of business organization of the company and the implementation requirements of each one.
CO5	Financial position of the company can be analyzing with the help of financial statements.

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

COs	a	b	c	d	e	f	g	h	i	j	k	l	PSOa	PSOb	PSOc	PSOd
CO1	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO2	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO3	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO4	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO5	-	-	-	2	3	2	-	-	2	-	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** Aryasri: Managerial Economics and Financial Analysis, MHE, 2014

**BOS APPROVED REFERENCE BOOKS:****R1** Varshney & Maheswari : Managerial Economics, Sultan Chand, 2003.**R2** Ambrish Gupta, Financial Accounting for Management, Pearson Education, New delhi.**R3** Lipey & Chrystal, Economics, Oxford University press.**Part-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-A****UNIT – I: introduction to Engineering Economics**

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	01	18.06.2019		<b>TLM1</b>	CO1	T1	
2.	Economics- definitions, nature & scope	01	20.06.2019		<b>TLM1</b>		T1	
3.	Branches of economics, engineering economics –	01	21.06.2019		<b>TLM1</b>	CO1	T1	
4.	features and scope.	01	25.06.2019		<b>TLM1</b>	CO1	T1	
5.	Demand- types, determinants, law of demand	01	27.06.2019		<b>TLM1</b>	CO1	T1	
6.	Elasticity of demand – significance-	01	28.06.2019		<b>TLM1</b>	CO3	T1	
7.	Types of elasticity of demand	01	02.07.2019		<b>TLM2</b>	CO1	T1	
8.	Demand forecasting types- factor governing-	01	04.07.2019		<b>TLM1</b>	CO1	T1	
9.	Methods of demand forecasting.	01	05.07.2019		<b>TLM2</b>	CO1	T1	
10.	TUTORIAL-1	01	09.07.2019		<b>TLM3</b>	CO1	T1	
11.	Assignment/Quiz – 1	01	11.07.2019		<b>TLM6</b>	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

**UNIT – II Theory of Production & Cost Analysis**

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 UNIT-II	01	12.07.2019		<b>TLM1</b>	CO1	T1	
2.	Production function- isoquant and isocost.	01	16.07.2019		<b>TLM1</b>	CO1	T1	
3.	MRTS, least cost combination of inputs ,	01	18.07.2019		<b>TLM2</b>	CO1	T1	

	law of returns							
4.	Internal and external economies of scale	01	19.07.2019		<b>TLM1</b>	CO1	T1	
5.	Cost analysis: cost concepts, cost & output relationship in short run & long run,	01	23.07.2019		<b>TLM2</b>	CO1	T1	
6.	Break even analysis, determination of BEP	01	25.07.2019		<b>TLM1</b>	CO1	T1	
7.	Significance & limitation of BEA.	01	26.07.2019		<b>TLM1</b>	CO1	T1	
8.	TUTORIAL-2	01	30.07.2019		<b>TLM3</b>	CO1	T1	
9.	Assignment/Quiz – 2	01	01.08.2019		<b>TLM6</b>	CO1	T1	
No. of classes required to complete UNIT-II		09			No. of classes taken:			

### UNIT-III: Market Pricing Policies- Market structures.

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 UNIT-III	01	02.08.2019		<b>TLM1</b>	CO3	T1	
2.	Types of markets, features & price output determinations under perfect competitions.	01	13.08.2019		<b>TLM1</b>	CO3	T1	
3.	Monopoly, monopolistic competitions, oligopoly markets.	01	16.08.2019		<b>TLM2</b>	CO3	T1	
4.	Pricing policies-	01	20.08.2019		<b>TLM1</b>	CO3	T1	
5.	Pricing objectives- methodes		22.08.2019			CO3	T1	
6.	Applications in business	01	23.08.2019		<b>TLM3, TLM9</b>	CO3	T1	
7.	Assignment/Quiz – 3	01	27.08.2019		<b>TLM6</b>	CO3	T1	
No. of classes required to complete UNIT-III		07			No. of classes taken:			

### UNIT IV – Capital & Capital Budgeting

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 UNIT-IV	01	29.08.2019		<b>TLM1</b>	CO2	T1	

2.	Capital & its significance- types of capital	01	30.08.2019		<b>TLM1</b>	CO2	T1	
3.	Estimation of fixed cost and working capital	01	03.09.2019		<b>TLM1</b>	CO2	T1	
4.	Components of working capital & factors determining the need of working capital	01	05.09.2019		<b>TLM1</b>	CO4	T1	
5.	Sources of raising working capital.	01	06.09.2019		<b>TLM9</b>	CO2	T1	
6.	Capital budgeting significance- process	01	12.09.2019		<b>TLM1</b>	CO4	T1	
7.	Techniques of capital budgeting	01	13.09.2019		<b>TLM2</b>	CO4	T1	
8.	Non discounted cash flow techniques		17.09.2019			CO4	T1	
9.	Discounted cash flow techniques.	01	19.09.2019		<b>TLM1</b>	CO2	T1	
10.	TUTORIAL-4	01	20.09.2019		<b>TLM3</b>	CO2	T1	
11.	Assignment/Quiz – 4	01	24.09.2019		<b>TLM6</b>	CO2	T1	
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

### UNIT-V Financial Accounting & Analysis

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 UNIT-V	01	26.09.2019		<b>TLM1</b>	CO5	T1	
2.	Accounting significance- book keeping- double entry system	01	27.09.2019		<b>TLM1</b>	CO5	T1	
3.	Journal- ledger- trail balance	01	01.10.2019		<b>TLM2</b>	CO5	T1	
4.	Final accounts with simple adjustments.	01	03.10.2019		<b>TLM1</b>	CO5	T1	
5.	Financial statement analysis through ratios.	01	04.10.2019		<b>TLM1</b>	CO5	T1	
6.	Financial statement analysis through ratios.	01	10.10.2019		<b>TLM1</b>	CO5	T1	
7.	TUTORIAL-5, Assignment/Quiz – 5	01	11.10.2019		<b>TLM3</b>	CO5	T1	
No. of classes required to complete UNIT-V		07			No. of classes taken:			

<b>Teaching Learning Methods</b>			
<b>TLM1</b>	Chalk and Talk	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)
<b>TLM2</b>	PPT	<b>TLM6</b>	Assignment or Quiz
<b>TLM3</b>	Tutorial	<b>TLM7</b>	Group Discussion/Project
<b>TLM4</b>	Demonstration (Lab/Field Visit)		

### **ACADEMIC CALENDAR:**

<b>Description</b>	<b>From</b>	<b>To</b>	<b>Weeks</b>
I Phase of Instructions	17.06.2019	03.08.2019	7W
I Mid Examinations	05.08.2019	10.08.2019	1W
II Phase of Instructions	12.08.2019	12.10.2019	9W
II Mid Examinations	14.10.2019	19.10.2019	1W
Preparation and Practicals	21.10.2019	31.10.2019	1 ½W
Semester End Examinations	01.11.2019	16.11.2019	2W

### **Part - C**

#### **EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
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: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	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 in independent and life-long learning in the broadest context of technological change.

## **PSOs**

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

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

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

N.SAMBASIVA RAO	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY
<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>HOD</b>



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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### Part-A

**PROGRAM** : B.Tech., V-Sem., CSE- section B  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : **ENGINEERING ECONOMICS & ACCOUNTANCY – 17HS01**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **N. SAMBASIVA RAO**  
**COURSE COORDINATOR** : Dr. A ADISESHA REDDY

**PRE-REQUISITE:**

**COURSE OBJECTIVE:** Basic Sciences & Humanities

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

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CO2	Discuss cost output relationship in business operations.
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CO4	Identify the types of business organization of the company and the implementation requirements of each one.
CO5	Financial position of the company can be analyzing with the help of financial statements.

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

COs	a	b	c	d	e	f	g	h	i	j	k	l	PSOa	PSOb	PSOc	PSOd
CO1	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO2	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO3	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO4	-	-	-	2	3	2	-	-	2	-	3	3	-	-	-	-
CO5	-	-	-	2	3	2	-	-	2	-	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** Aryasri: Managerial Economics and Financial Analysis, MHE, 2014**BOS APPROVED REFERENCE BOOKS:****R1** Varshney & Maheswari : Managerial Economics, Sultan Chand, 2003.**R2** Ambrish Guptha, Financial Accounting for Management, Pearson Education, New delhi.**R3** Lipey & Chrystal, Economics, Oxford University press.**Part-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-B****UNIT – I: Introduction to Engineering Economics**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
12.	Introduction to Subject, Course Outcomes	01	20.06.2019		<b>TLM1</b>	CO1	T1	
13.	Economics- definations, nature & scope	01	21.06.2019		<b>TLM1</b>		T1	
14.	Branches of economics, engineering economics –	01	22.06.2019		<b>TLM1</b>	CO1	T1	
15.	features and scope.	01	04.07.2019		<b>TLM1</b>	CO1	T1	
16.	Demand- types, determinants, law of demand	01	05.07.2019		<b>TLM1</b>	CO1	T1	
17.	Elasticity of demand – significance-	01	06.07.2019		<b>TLM1</b>	CO3	T1	
18.	Types of elasticity of demand	01	11.07.2019		<b>TLM2</b>	CO1	T1	
19.	Demand forecasting types-factor governing-	01	12.07.2019		<b>TLM1</b>	CO1	T1	
20.	Methods of demand forecasting.	01	13.07.2019		<b>TLM2</b>	CO1	T1	
21.	TUTORIAL-1	01	18.07.2019		<b>TLM3</b>	CO1	T1	
22.	Assignment/Quiz – 1	01	19.07.2019		<b>TLM6</b>	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

**UNIT – II Theory of Production & Cost Analysis**

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
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10.	Introduction to UNIT-II	01	20.07.2019		<b>TLM1</b>	CO1	T1	
11.	Production function-isoquant and isocost.	01	25.07.2019		<b>TLM1</b>	CO1	T1	
12.	MRTS, least cost combination of inputs , law of returns	01	26.07.2019		<b>TLM2</b>	CO1	T1	
13.	Internal and external economies of scale	01	27.07.2019		<b>TLM1</b>	CO1	T1	
14.	Cost analysis: cost concepts, cost & output relationship in short run & long run,	01	01.08.2019		<b>TLM2</b>	CO1	T1	
15.	Break even analysis, determination of BEP	01	02.08.2019		<b>TLM1</b>	CO1	T1	
16.	Significance & limitation of BEA.	01	03.08.2019		<b>TLM1</b>	CO1	T1	
17.	TUTORIAL-2	01	08.08.2019		<b>TLM3</b>	CO1	T1	
18.	Assignment/Quiz – 2	01	09.08.2019		<b>TLM6</b>	CO1	T1	
No. of classes required to complete UNIT-II		09			No. of classes taken:			

### UNIT-III: Market Pricing Policies- Market structures.

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
8.	Introduction to UNIT-III	01	10.08.2019		<b>TLM1</b>	CO3	T1	
9.	Types of markets, features & price output determinations under perfect competitions.	01	16.08.2019		<b>TLM1</b>	CO3	T1	
10.	Monopoly, monopolistic competitions, oligopoly markets.	01	17.08.2019		<b>TLM2</b>	CO3	T1	
11.	Pricing policies-	01	22.08.2019		<b>TLM1</b>	CO3	T1	
12.	Pricing objectives-methods		23.08.2019			CO3	T1	
13.	Applications in business	01	29.08.2019		<b>TLM3, TLM9</b>	CO3	T1	
14.	Assignment/Quiz – 3	01	30.08.2019		<b>TLM6</b>	CO3	T1	
No. of classes required to complete UNIT-III		07			No. of classes taken:			

### UNIT IV – Capital & Capital Budgeting

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
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12.	Introduction to UNIT-IV	01	31.08.2019		<b>TLM1</b>	CO2	T1	
13.	Capital & its significance- types of capital	01	05.09.2019		<b>TLM1</b>	CO2	T1	
14.	Estimation of fixed cost and working capital	01	06.09.2019		<b>TLM1</b>	CO2	T1	
15.	Components of working capital & factors determining the need of working capital	01	07.09.2019		<b>TLM1</b>	CO4	T1	
16.	Sources of raising working capital.	01	12.09.2019		<b>TLM9</b>	CO2	T1	
17.	Capital budgeting significance- process	01	13.09.2019		<b>TLM1</b>	CO4	T1	
18.	Techniques of capital budgeting	01	14.09.2019		<b>TLM2</b>	CO4	T1	
19.	Non discounted cash flow techniques		19.09.2019			CO4	T1	
20.	Discounted cash flow techniques.	01	20.09.2019		<b>TLM1</b>	CO2	T1	
21.	TUTORIAL-4	01	21.09.2019		<b>TLM3</b>	CO2	T1	
22.	Assignment/Quiz – 4	01	26.09.2019		<b>TLM6</b>	CO2	T1	
No. of classes required to complete UNIT-IV		11			No. of classes taken:			

### UNIT-V Financial Accounting & Analysis

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
8.	Introduction to UNIT-V	01	27.09.2019		<b>TLM1</b>	CO5	T1	
9.	Accounting significance- book keeping- double entry system	01	28.09.2019		<b>TLM1</b>	CO5	T1	
10.	Journal- ledger- trail balance	01	03.10.2019		<b>TLM2</b>	CO5	T1	
11.	Final accounts with simple adjustments.	01	04.10.2019		<b>TLM1</b>	CO5	T1	
12.	Financial statement analysis through ratios.	01	05.10.2019		<b>TLM1</b>	CO5	T1	
13.	Financial statement analysis through ratios.	01	10.10.2019		<b>TLM1</b>	CO5	T1	
14.	Financial statement analysis through ratios.	01	11.10.2019		<b>TLM1</b>	CO5	T1	

15.	TUTORIAL-5, Assignment/Quiz – 5	01	12.10.2019		<b>TLM3</b>	CO5	T1	
No. of classes required to complete UNIT-V		07			No. of classes taken:			

<b>Teaching Learning Methods</b>					
<b>TLM1</b>	Chalk and Talk	<b>TLM2</b>	PPT	<b>TLM3</b>	Tutorial
<b>TLM4</b>	Demonstration (Lab/Field Visit)	<b>TLM5</b>	ICT (NPTEL/Swayam Prabha/MOOCs)	<b>TLM6</b>	Assignment or Quiz
<b>TLM7</b>	Group Discussion/Project				

### **ACADEMIC CALENDAR:**

<b>Description</b>	<b>From</b>	<b>To</b>	<b>Weeks</b>
I Phase of Instructions	17.06.2019	03.08.2019	7W
I Mid Examinations	05.08.2019	10.08.2019	1W
II Phase of Instructions	12.08.2019	12.10.2019	9W
II Mid Examinations	14.10.2019	19.10.2019	1W
Preparation and Practicals	21.10.2019	31.10.2019	1 ½W
Semester End Examinations	01.11.2019	16.11.2019	2W

### **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: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	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 in independent and life-long learning in the broadest context of technological change.

## **PSOs**

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

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

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

N.SAMBASIVA RAO	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY	Dr. A ADISESHA REDDY
<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>HOD</b>

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

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**COURSE HANDOUT**

**PROGRAM** : B.Tech., V-Sem., C.S.E  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : Advanced Data Base Management Systems-17CI13  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : K N Prasanthi  
**COURSE COORDINATOR** : K N Prasanthi

**PRE-REQUISITE:** The student should have the knowledge of database management systems and algorithms.

**Course Educational objectives:** To introduce basic concepts of different types of databases like distributed databases, object oriented databases and parallel databases and to give basics of designing different types of databases.

**Course Outcomes(COs):** By the completion of the course, the students should be able to:

**CO1:** Outline the concepts of relational database system.

**CO2:** Understand the basic concepts in distributed databases.

**CO3:** Analyze the advanced concepts of distributed databases.

**CO4:** Understand the design issues in parallel databases.

**CO5:** Apply the concepts of object oriented databases to solve real world problems.

**Assessment of Course Outcomes(CO's)and Programme outcomes(PO's)**

**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
<b>CO1</b>	2	1	-	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO2</b>	3	2	1	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO3</b>	2	2	2	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO4</b>	2	1	1	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO5</b>	2	1	2	1	-	-	-	-	-	-	-	1	-	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:**

1. Thomas Connolly, Carolyn Begg —Database Systems, A Practical Approach to Design,

Implementation and Management, Third edition, Pearson Education (Units - 1,2,3)  
 2. Raghuramakrishnan and Johannes Gehrke: —Database Management Systems, 3rd Edition, TMH, 2006. (Units - 4,5)

**BOS APPROVED REFERENCE BOOKS:**

1. R.Elmasri, S.B.Navathe, —Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2006.
2. Abraham Silberschatz, Henry F. Korth, S.Sudharshan, —Database system concepts, Fifth Edition, TataMcGraw Hill, 2006.
3. C.J.Date, A.Kannan, S.Swamynathan, —An Introduction to Database Systems, eighth Edition, Pearson Education, 2006.
4. [https://onlinecourses.nptel.ac.in/noc18\\_cs15](https://onlinecourses.nptel.ac.in/noc18_cs15)
5. [www.nptelvideos.in/2012/11/database-management-system.html](http://www.nptelvideos.in/2012/11/database-management-system.html)
6. [nptel.ac.in/courses/106104135/](http://nptel.ac.in/courses/106104135/)
7. [freevideolectures.com](http://freevideolectures.com) > Computer Science > IISc Bangalore

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

**UNIT-I : RELATIONAL MODEL ISSUES:**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	17-6-19		<b>TLM1</b>	CO1 to CO5	-	
2.	ER model	1	19-6-19		<b>TLM1</b>	CO1	T1	
3.	Normalization	1	22-6-19		<b>TLM1</b>	CO1	T1	
4.	Query processing	1	24-6-19		<b>TLM1</b>	CO1	T1	
5.	Query processing	1	26-6-19		<b>TLM1</b>	CO1	T1	
6.	query optimization	1	29-6-19		<b>TLM1</b>	CO1	T1	
7.	query optimization	1	1-7-19		<b>TLM1</b>	CO1	T1	
8.	transaction processing	1	3-7-19		<b>TLM1</b>	CO1	T1	
9.	Database tuning	1	6-7-19		<b>TLM1</b>	CO1	T1	
10.	comparison of different databases	1	8-7-19		<b>TLM1</b>	CO1	T1	
11.	Review/Tutorial	1	10-7-19		<b>TLM1</b>	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

**UNIT-II: DISTRIBUTED DBMS Concepts 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
12.	Introduction	1	15-7-19		<b>TLM1</b>	CO2	T1	
13.	Overview of Networking	1	17-7-19		<b>TLM1</b>	CO2	T1	
14.	Functions and architectures of a DDBMS I	1	20-7-19		<b>TLM1</b>	CO2	T1	
15.	Functions and architectures of a DDBMS	1	22-7-19		<b>TLM1</b>	CO2	T1	
16.	Distributed Relational Database Design	1	24-7-19		<b>TLM1</b>	CO2	T1	
17.	Distributed Relational Database Design	1	27-7-19		<b>TLM1</b>	CO2	T1	
18.	Transparencies in a DDBMS	1	29-7-19		<b>TLM1</b>	CO2	T1	
19.	Transparencies in a DDBMS	1	31-7-19		<b>TLM1</b>	CO2	T1	
20.	Review/Tutorial-II	1	3-8-19					
No. of classes required to complete UNIT-II		9			No. of classes taken:			

### UNIT-III: DISTRIBUTED DBMS: Advanced concepts

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Distributed Transaction Management	1	14-8-19		<b>TLM1</b>	CO3	T1	
22.	Distributed Transaction Management	1	17-8-19		<b>TLM1</b>	CO3	T1	
23.	Distributed Concurrency control	1	19-8-19		<b>TLM2</b>	CO3	T1	

24.	Distributed Concurrency control	1	21-8-19		<b>TLM2</b>	CO3	T1	
25.	Distributed Deadlock Management	1	26-8-19		<b>TLM1</b>	CO3	T1	
26.	Distributed Deadlock Management	1	28-8-19		<b>TLM1</b>	CO3	T1	
27.	Distributed Database Recovery	1	31-8-19		<b>TLM1</b>	CO3	T1	
28.	Distributed query optimization	1	4-9-19		<b>TLM1</b>	CO3	T1	
29.	Distributed query optimization	1	7-9-19		<b>TLM1</b>	CO3	T1	
30.	Review/Tutorial-III	1	7-9-19		<b>TLM3, TLM6</b>	CO3		
No. of classes required to complete UNIT-III		9			No. of classes taken:			

#### UNIT-IV: Parallel databases

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
31.	Introduction to Parallel databases	1	9-9-19		<b>TLM1</b>	CO4	T2	
32.	architectures for parallel databases	1	11-9-19		<b>TLM1</b>	CO4	T2	
33.	Parallel Query Evaluation	1	14-9-19		<b>TLM1</b>	CO4	T2	
34.	data partitioning and parallelising sequential operator evaluation code	1	16-9-19		<b>TLM1</b>	CO4	T2	
35.	Parallelising individual operations	1	18-9-19		<b>TLM1</b>	CO4	T2	
36.	parallel Query optimization	1	21-9-19		<b>TLM1</b>	CO4	T2	
37.	Review/Tutorial-IV	1	21-9-19		<b>TLM3, TLM6</b>	CO4		

No. of classes required to complete UNIT-IV	8			No. of classes taken:
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### UNIT-V : Object Database System

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
38.	Abstract data types	1	23-9-19		<b>TLM1</b>	CO5	T2	
39.	Objects identity and reference types	1	25-9-19		<b>TLM1</b>	CO5	T2	
40.	Inheritance	1	28-9-19		<b>TLM1</b>	CO5	T2	
41.	Database design for ORDBMS	1	30-9-19		<b>TLM1</b>	CO5	T2	
42.	ODMG data model	1	5-10-19		<b>TLM1</b>	CO5	T2	
43.	ODL	1	9-10-19		<b>TLM1</b>	CO5	T2	
44.	OQL	1	12-10-19		<b>TLM1</b>	CO5	T2	
45.	Review/Tutorial-V	1	12-10-19		<b>TLM3, TLM6</b>	CO5		
No. of classes required to complete UNIT-V		8			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
46.								
47.								

### Teaching Learning Methods

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

### ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17-06-2019	03-08-2019	7W
I Mid Examinations	05-08-2019	10-08-2019	1W
II Phase of Instructions	12-08-2019	12-10-2019	9W
II Mid Examinations	14-10-2019	19-10-2019	1W
Preparation and Practicals	21-10-2019	31-10-2019	1.5W

Semester End Examinations	1-11-2019	16-11-2019	2W
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**EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment1 & Quiz – 1	1	A1=5,Q1=10
Assignment2 & Quiz – 2	2	A2=5,Q2=10
I-Mid Examination	1,2	B1=20
Assignment3 & Quiz – 3	3	A3=5,Q3=10
Assignment4 & Quiz – 4	4	A4=5,Q4=10
Assignment5 & Quiz – 5	5	A5=5,Q5=10
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment Marks: $A=(A1+A2+A3+A4+A5)/5$ Evaluation of Quiz Marks: $Q=(Q1+Q2+Q3+Q4+Q5)/10$	1,2,3,4,5	A=5, Q=10
Evaluation of Mid Marks: $B=75\%$ of $\text{Max}(B1,B2)+25\%$ of $\text{Min}(B1,B2)$	1,2,3,4,5	B=20
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B+Q=40</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>C=60</b>
<b>Total Marks: A+B+C</b>	<b>1,2,3,4,5</b>	<b>100</b>

Course Instructor

Course Coordinator

Module Coordinator

HOD

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**COURSE HANDOUT**

**PROGRAM** : B.Tech., V-Sem., C.S.E  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : Advanced Data Base Management Systems-17CI13  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : K N Prasanthi  
**COURSE COORDINATOR** : K N Prasanthi

**PRE-REQUISITE:** The student should have the knowledge of database management systems and algorithms.

**Course Educational objectives:** To introduce basic concepts of different types of databases like distributed databases, object oriented databases and parallel databases and to give basics of designing different types of databases.

**Course Outcomes(COs):** By the completion of the course, the students should be able to:

**CO1:** Outline the concepts of relational database system.

**CO2:** Understand the basic concepts in distributed databases.

**CO3:** Analyze the advanced concepts of distributed databases.

**CO4:** Understand the design issues in parallel databases.

**CO5:** Apply the concepts of object oriented databases to solve real world problems.

**Assessment of Course Outcomes(CO's)and Programme outcomes(PO's)**

**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
<b>CO1</b>	2	1	-	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO2</b>	3	2	1	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO3</b>	2	2	2	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO4</b>	2	1	1	-	-	-	-	-	-	-	-	1	-	3	-
<b>CO5</b>	2	1	2	1	-	-	-	-	-	-	-	1	-	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).

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4. [https://onlinecourses.nptel.ac.in/noc18\\_cs15](https://onlinecourses.nptel.ac.in/noc18_cs15)
5. [www.nptelvideos.in/2012/11/database-management-system.html](http://www.nptelvideos.in/2012/11/database-management-system.html)
6. [nptel.ac.in/courses/106104135/](http://nptel.ac.in/courses/106104135/)
7. [freevideolectures.com](http://freevideolectures.com) > Computer Science > IISc Bangalore

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

**UNIT-I : RELATIONAL MODEL ISSUES:**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction	1	17-6-19		<b>TLM1</b>	CO1 to CO5	-	
2.	ER model	1	18-6-19		<b>TLM1</b>	CO1	T1	
3.	Normalization	1	21-6-19		<b>TLM1</b>	CO1	T1	
4.	Query processing	1	24-6-19		<b>TLM1</b>	CO1	T1	
5.	Query processing	1	25-6-19		<b>TLM1</b>	CO1	T1	
6.	query optimization	1	28-6-19		<b>TLM1</b>	CO1	T1	
7.	query optimization	1	1-7-19		<b>TLM1</b>	CO1	T1	
8.	transaction processing	1	2-7-19		<b>TLM1</b>	CO1	T1	
9.	Database tuning	1	5-7-19		<b>TLM1</b>	CO1	T1	
10.	comparison of different databases	1	8-7-19		<b>TLM1</b>	CO1	T1	
11.	Review/Tutorial	1	9-7-19		<b>TLM1</b>	CO1	T1	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

**UNIT-II: DISTRIBUTED DBMS Concepts 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
12.	Introduction	1	12-7-19		<b>TLM1</b>	CO2	T1	
13.	Overview of Networking	1	15-7-19		<b>TLM1</b>	CO2	T1	
14.	Functions and architectures of a DDBMS I	1	16-7-19		<b>TLM1</b>	CO2	T1	
15.	Functions and architectures of a DDBMS	1	19-7-19		<b>TLM1</b>	CO2	T1	
16.	Distributed Relational Database Design	1	22-7-19		<b>TLM1</b>	CO2	T1	
17.	Distributed Relational Database Design	1	23-7-19		<b>TLM1</b>	CO2	T1	
18.	Transparencies in a DDBMS	1	26-7-19		<b>TLM1</b>	CO2	T1	
19.	Transparencies in a DDBMS	1	29-7-19		<b>TLM1</b>	CO2	T1	
20.	Review/Tutorial-II	1	30-7-19					
No. of classes required to complete UNIT-II		9			No. of classes taken:			

### UNIT-III: DISTRIBUTED DBMS: Advanced concepts

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
21.	Distributed Transaction Management	1	2-8-19		<b>TLM1</b>	CO3	T1	
22.	Distributed Transaction Management	1	13-8-19		<b>TLM1</b>	CO3	T1	
23.	Distributed Concurrency control	1	16-8-19		<b>TLM2</b>	CO3	T1	

24.	Distributed Concurrency control	1	19-8-19		<b>TLM2</b>	CO3	T1	
25.	Distributed Deadlock Management	1	20-8-19		<b>TLM1</b>	CO3	T1	
26.	Distributed Deadlock Management	1	23-8-19		<b>TLM1</b>	CO3	T1	
27.	Distributed Database Recovery	1	26-8-19		<b>TLM1</b>	CO3	T1	
28.	Distributed query optimization	1	27-8-19		<b>TLM1</b>	CO3	T1	
29.	Distributed query optimization	1	30-8-19		<b>TLM1</b>	CO3	T1	
30.	Review/Tutorial-III	1	3-9-19		<b>TLM3, TLM6</b>	CO3		
No. of classes required to complete UNIT-III		9			No. of classes taken:			

#### UNIT-IV: Parallel databases

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
31.	Introduction to Parallel databases	1	6-9-19		<b>TLM1</b>	CO4	T2	
32.	architectures for parallel databases	1	9-9-19		<b>TLM1</b>	CO4	T2	
33.	Parallel Query Evaluation	1	13-9-19		<b>TLM1</b>	CO4	T2	
34.	data partitioning and parallelising sequential operator evaluation code	1	16-9-19		<b>TLM1</b>	CO4	T2	
35.	Parallelising individual operations	1	17-9-19		<b>TLM1</b>	CO4	T2	
36.	parallel Query optimization	1	20-9-19		<b>TLM1</b>	CO4	T2	
37.	Review/Tutorial-IV	1	23-9-19		<b>TLM3, TLM6</b>	CO4		



No. of classes required to complete UNIT-IV	8			No. of classes taken:
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### UNIT-V : Object Database System

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
38.	Abstract data types	1	24-9-19		<b>TLM1</b>	CO5	T2	
39.	Objects identity and reference types	1	27-9-19		<b>TLM1</b>	CO5	T2	
40.	Inheritance	1	30-9-19		<b>TLM1</b>	CO5	T2	
41.	Database design for ORDBMS	1	1-10-19		<b>TLM1</b>	CO5	T2	
42.	ODMG data model	1	4-10-19		<b>TLM1</b>	CO5	T2	
43.	ODL	1	7-10-19		<b>TLM1</b>	CO5	T2	
44.	OQL	1	11-10-19		<b>TLM1</b>	CO5	T2	
45.	Review/Tutorial-V	1	11-10-19		<b>TLM3, TLM6</b>	CO5		
No. of classes required to complete UNIT-V		8			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
46.								
47.								

### Teaching Learning Methods

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

### ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	17-06-2019	03-08-2019	7W
I Mid Examinations	05-08-2019	10-08-2019	1W
II Phase of Instructions	12-08-2019	12-10-2019	9W
II Mid Examinations	14-10-2019	19-10-2019	1W
Preparation and Practicals	21-10-2019	31-10-2019	1.5W
Semester End Examinations	1-11-2019	16-11-2019	2W

**EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment1 & Quiz – 1	1	A1=5,Q1=10
Assignment2 & Quiz – 2	2	A2=5,Q2=10
I-Mid Examination	1,2	B1=20
Assignment3 & Quiz – 3	3	A3=5,Q3=10
Assignment4 & Quiz – 4	4	A4=5,Q4=10
Assignment5 & Quiz – 5	5	A5=5,Q5=10
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment Marks: $A=(A1+A2+A3+A4+A5)/5$ Evaluation of Quiz Marks: $Q=(Q1+Q2+Q3+Q4+Q5)/10$	1,2,3,4,5	A=5, Q=10
Evaluation of Mid Marks: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	1,2,3,4,5	B=20
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B+Q=40</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>C=60</b>
<b>Total Marks: A+B+C</b>	<b>1,2,3,4,5</b>	<b>100</b>

Course Instructor

Course Coordinator

Module Coordinator

HOD



<b>CO4</b>	<b>2</b>	<b>1</b>	<b>3</b>	-	-	-	-	-	-	-	-	-	-	-	<b>3</b>
<b>CO5</b>	-	<b>1</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	-	<b>1</b>	-	-	-	<b>3</b>

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

**BOS APPROVED TEXT BOOKS:**

**T1** Grady Booch, James Rumbaugh, Ivar Jacobson “The Unified Modeling Language User Guide, Pearson Education, 2<sup>nd</sup> edition, ISBN: 0-201-57168-4, 1998 (Unit-1 to Unit-3).

**T2** Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, “Design Patterns: Elements of Reusable Object-Oriented Software”, Addison-Wesley Professional, 1st Edition, ASIN: B000SEIBB8, 1994 (Unit-4 to Unit-5).

**BOS APPROVED REFERENCE BOOKS:**

**R1** Meilir Page-Jones, “Fundamentals of Object-Oriented Design in UML”, Pearson Education, 1st Edition, and ISBN: 9788177586770, 8177586777, and 2007.

**R2** Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra, “Head First Design Patterns: A Brain-Friendly Guide”, O’Reily – SPD, 1<sup>st</sup> Edition, ISBN: 9789352132775, 9352132777, 2014.

**R3** <https://www.tutorialspoint.com/uml/>

**R4** [https://sourcemaking.com/design\\_patterns](https://sourcemaking.com/design_patterns)

**COURSE DELIVERY PLAN (LESSON PLAN): Section-A**

**UNIT – 1: INTRODUCTION TO UML**

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.	<b>Why we model:</b> History of UML, The importance of Modeling	1	17/06/19		TLM1	CO1	T1	
24.	Principles of Modeling and Object Oriented Modeling	1	18/06/19		TLM1	CO1	T1	
25.	<b>Introducing the UML:</b> Overview of the UML	1	20/06/19		TLM1	CO1	T1	
26.	Conceptual Model of the UML & Building Blocks: Things – Part 1	1	24/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
27.	Building Blocks: Things – Part 2	1	25/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
28.	Relationships and UML Diagrams	1	27/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
29.	Rules of the UML & Common Mechanisms in the UML	1	01/07/19		TLM1, TLM2	CO1	T1	
30.	Extensible Mechanisms and UML Architecture	1	02/07/19		TLM1, TLM2, TLM8	CO1	T1	
31.	Software Development Life Cycle	1	04/07/19		TLM1	CO1	T1	

<b>No. of classes required to complete UNIT-I:</b>	<b>09</b>	<b>No. of classes taken:</b>
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### UNIT – 2: STRUCTURAL MODELING

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.	<b>Basic Structural Modeling:</b> Classes	1	08/07/19		TLM1, TLM2	CO2	T1	
33.	Relationships	1	09/07/19		TLM1, TLM2	CO2	T1	
34.	Common Mechanisms	1	11/07/19		TLM1, TLM2	CO2	T1	
35.	Different Diagrams	1	15/07/19		TLM1, TLM2	CO2	T1	
36.	<b>Advanced Structural Modeling:</b> Advanced Classes	2	16/07/19, 18/07/19		TLM1, TLM2	CO2	T1, R1	
37.	Advanced Relationships	2	22/07/19, 23/07/19		TLM1, TLM2	CO2	T1, R1	
38.	Interfaces, Types and Roles	1	25/07/19		TLM1, TLM2	CO2	T1, R1	
39.	Packages	1	29/07/19		TLM1, TLM2, TLM8	CO2	T1, R1	
40.	Class Diagrams	1	30/07/19		TLM1, TLM2, TLM8	CO2	T1, R3	
41.	Object Diagrams	1	01/08/19		TLM1, TLM2	CO2	T1, R3	
<b>No. of classes required to complete UNIT-II:</b>		<b>12</b>	<b>No. of classes taken:</b>					

### UNIT – 3: BEHAVIORAL MODELING

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
42.	<b>Basic Behavioral Modeling:</b> Interactions	1	13/08/19		TLM1, TLM2	CO3	T1	
43.	Interaction Diagrams	1	19/08/19		TLM1, TLM2, TLM8	CO3	T1	
44.	Use Cases	1	20/08/19		TLM1, TLM2	CO3	T1	
45.	Use Case Diagrams	1	22/08/19		TLM1, TLM2, TLM8	CO3	T1, R3	
46.	Activity Diagrams	1	26/08/19		TLM1, TLM2, TLM8	CO3	T1, R3	
47.	<b>Advanced Behavioral Modeling:</b> Events and Signals	1	27/08/19		TLM1, TLM2	CO3	T1	
48.	State Machines	1	29/08/19		TLM1, TLM2	CO3	T1	
49.	Time and Space	1	03/09/19		TLM1, TLM2	CO3	T1	

50.	State Chart Diagrams	1	05/09/19		TLM1, TLM2, TLM8	CO3	T1, R3	
51.	<b>Architectural Modeling:</b> Component and Deployment Diagrams	1	09/09/19		TLM1, TLM2	CO3	T1, R3	
<b>No. of classes required to complete UNIT-III</b>		<b>10</b>	<b>No. of classes taken:</b>					

#### UNIT – 4: INTRODUCTION TO DESIGN PATTERNS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
52.	What is Design Pattern? Design Patterns in Smalltalk MVC	1	12/09/19		TLM1, TLM2	CO4	T2	
53.	Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog	1	16/09/19		TLM1, TLM2	CO4	T2	
54.	How Design Patterns Solve Design Problems	2	17/09/19, 19/09/19		TLM1, TLM2	CO4	T2	
55.	How to select a Design Pattern, How to use a Design Pattern	1	23/09/19		TLM1, TLM2	CO4	T2	
<b>No. of classes required to complete UNIT-IV</b>		<b>05</b>	<b>No. of classes taken:</b>					

#### UNIT – 5: TYPES OF PATTERNS

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
56.	<b>Creational Patterns:</b> Abstract Factory	1	24/09/19		TLM1, TLM2	CO5	T2, R4	
57.	Builder and Factory method	1	26/09/19		TLM1, TLM2	CO5	T2, R4	
58.	<b>Structural Patterns:</b> Adapter and Decorator	1	30/09/19		TLM1, TLM2	CO5	T2, R4	
59.	Façade	1	01/10/19		TLM1, TLM2	CO5	T2, R4	
60.	<b>Behavioral Patterns:</b> Chain of Responsibility	1	03/10/19		TLM1, TLM2	CO5	T2, R4	
61.	State and Strategy	1	10/10/19		TLM1, TLM2	CO5	T2, R4	
<b>No. of classes required to complete UNIT-V</b>		<b>06</b>	<b>No. of classes taken:</b>					

#### 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
62.	Singleton Design Pattern	1						
63.	Flyweight Design Pattern	1						
64.	Visitor Design Pattern	1						

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

### **EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Descriptive Examination	1, 2	B1=20
I-Mid Online Quiz Examination	1, 2	C1 = 10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Descriptive Examination	3, 4, 5	B2=20
II-Mid Online Quiz Examination	3, 4, 5	C2 = 10
<b>Evaluation of Assignment/Quiz Marks: <math>A = (A1+A2+A3+A4+A5)/5</math></b>	<b>1,2,3,4,5</b>	<b>A=5</b>
<b>Evaluation of Mid Descriptive Marks: <math>B = 75\% \text{ of Max}(B1,B2) + 25\% \text{ of Min}(B1,B2)</math></b>	<b>1,2,3,4,5</b>	<b>B=20</b>
<b>Evaluation of Mid Online Quiz Marks: <math>C = \text{Average}(C1, C2)</math></b>	<b>1,2,3,4,5</b>	<b>C=10</b>
<b>Cumulative Internal Examination : <math>A+B+C</math></b>	<b>1,2,3,4,5</b>	<b>A+B+C=35</b>
<b>Attendance</b>	-	<b>D = 0 to 5</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: <math>A+B+C+D+E</math></b>	<b>1,2,3,4,5</b>	<b>100</b>

### **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:**

- a. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- b. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- c. **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.
- d. **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.
- e. **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.
- f. **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.
- g. **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.
- h. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- i. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- j. **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.
- k. **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.
- l. **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.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>
<b>Signature</b>				



<b>CO4</b>	<b>2</b>	<b>1</b>	<b>3</b>	-	-	-	-	-	-	-	-	-	-	<b>3</b>
<b>CO5</b>	-	<b>1</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	-	<b>1</b>	-	-	<b>3</b>

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

**BOS APPROVED TEXT BOOKS:**

**T1** Grady Booch, James Rumbaugh, Ivar Jacobson “The Unified Modeling Language User Guide, Pearson Education, 2<sup>nd</sup> edition, ISBN: 0-201-57168-4, 1998 (Unit-1 to Unit-3).

**T2** Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, “Design Patterns: Elements of Reusable Object-Oriented Software”, Addison-Wesley Professional, 1st Edition, ASIN: B000SEIBB8, 1994 (Unit-4 to Unit-5).

**BOS APPROVED REFERENCE BOOKS:**

**R1** Meilir Page-Jones, “Fundamentals of Object-Oriented Design in UML”, Pearson Education, 1st Edition, and ISBN: 9788177586770, 8177586777, and 2007.

**R2** Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra, “Head First Design Patterns: A Brain-Friendly Guide”, O’Reily – SPD, 1<sup>st</sup> Edition, ISBN: 9789352132775, 9352132777, 2014.

**R3** <https://www.tutorialspoint.com/uml/>

**R4** [https://sourcemaking.com/design\\_patterns](https://sourcemaking.com/design_patterns)

**COURSE DELIVERY PLAN (LESSON PLAN): Section-B**

**UNIT – 1: INTRODUCTION TO UML**

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.	<b>Why we model:</b> History of UML, The importance of Modeling	1	17/06/19		TLM1	CO1	T1	
66.	Principles of Modeling and Object Oriented Modeling	1	18/06/19		TLM1	CO1	T1	
67.	<b>Introducing the UML:</b> Overview of the UML	1	20/06/19		TLM1	CO1	T1	
68.	Conceptual Model of the UML & Building Blocks: Things – Part 1	1	24/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
69.	Building Blocks: Things – Part 2	1	25/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
70.	Relationships and UML Diagrams	1	27/06/19		TLM1, TLM2, TLM8	CO1	T1, R1	
71.	Rules of the UML & Common Mechanisms in the UML	1	01/07/19		TLM1, TLM2	CO1	T1	
72.	Extensible Mechanisms and UML Architecture	1	02/07/19		TLM1, TLM2, TLM8	CO1	T1	
73.	Software Development Life Cycle	1	04/07/19		TLM1	CO1	T1	

<b>No. of classes required to complete UNIT-I:</b>	<b>09</b>	<b>No. of classes taken:</b>
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### UNIT – 2: STRUCTURAL MODELING

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
74.	<b>Basic Structural Modeling:</b> Classes	1	08/07/19		TLM1, TLM2	CO2	T1	
75.	Relationships	1	09/07/19		TLM1, TLM2	CO2	T1	
76.	Common Mechanisms	1	11/07/19		TLM1, TLM2	CO2	T1	
77.	Different Diagrams	1	15/07/19		TLM1, TLM2	CO2	T1	
78.	<b>Advanced Structural Modeling:</b> Advanced Classes	2	16/07/19, 18/07/19		TLM1, TLM2	CO2	T1, R1	
79.	Advanced Relationships	2	22/07/19, 23/07/19		TLM1, TLM2	CO2	T1, R1	
80.	Interfaces, Types and Roles	1	25/07/19		TLM1, TLM2	CO2	T1, R1	
81.	Packages	1	29/07/19		TLM1, TLM2, TLM8	CO2	T1, R1	
82.	Class Diagrams	1	30/07/19		TLM1, TLM2, TLM8	CO2	T1, R3	
83.	Object Diagrams	1	01/08/19		TLM1, TLM2	CO2	T1, R3	
<b>No. of classes required to complete UNIT-II:</b>		<b>12</b>	<b>No. of classes taken:</b>					

### UNIT – 3: BEHAVIORAL MODELING

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.	<b>Basic Behavioral Modeling:</b> Interactions	1	13/08/19		TLM1, TLM2	CO3	T1	
85.	Interaction Diagrams	1	19/08/19		TLM1, TLM2, TLM8	CO3	T1	
86.	Use Cases	1	20/08/19		TLM1, TLM2	CO3	T1	
87.	Use Case Diagrams	1	22/08/19		TLM1, TLM2, TLM8	CO3	T1, R3	
88.	Activity Diagrams	1	26/08/19		TLM1, TLM2, TLM8	CO3	T1, R3	
89.	<b>Advanced Behavioral Modeling:</b> Events and Signals	1	27/08/19		TLM1, TLM2	CO3	T1	
90.	State Machines	1	29/08/19		TLM1, TLM2	CO3	T1	
91.	Time and Space	1	03/09/19		TLM1, TLM2	CO3	T1	

92.	State Chart Diagrams	1	05/09/19		TLM1, TLM2, TLM8	CO3	T1, R3	
93.	<b>Architectural Modeling:</b> Component and Deployment Diagrams	1	09/09/19		TLM1, TLM2	CO3	T1, R3	
<b>No. of classes required to complete UNIT-III</b>		<b>10</b>	<b>No. of classes taken:</b>					

#### UNIT – 4: INTRODUCTION TO DESIGN PATTERNS

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
94.	What is Design Pattern? Design Patterns in Smalltalk MVC	1	12/09/19		TLM1, TLM2	CO4	T2	
95.	Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog	1	16/09/19		TLM1, TLM2	CO4	T2	
96.	How Design Patterns Solve Design Problems	2	17/09/19, 19/09/19		TLM1, TLM2	CO4	T2	
97.	How to select a Design Pattern, How to use a Design Pattern	1	23/09/19		TLM1, TLM2	CO4	T2	
<b>No. of classes required to complete UNIT-IV</b>		<b>05</b>	<b>No. of classes taken:</b>					

#### UNIT – 5: TYPES OF PATTERNS

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
98.	<b>Creational Patterns:</b> Abstract Factory	1	24/09/19		TLM1, TLM2	CO5	T2, R4	
99.	Builder and Factory method	1	26/09/19		TLM1, TLM2	CO5	T2, R4	
100.	<b>Structural Patterns:</b> Adapter and Decorator	1	30/09/19		TLM1, TLM2	CO5	T2, R4	
101.	Façade	1	01/10/19		TLM1, TLM2	CO5	T2, R4	
102.	<b>Behavioral Patterns:</b> Chain of Responsibility	1	03/10/19		TLM1, TLM2	CO5	T2, R4	
103.	State and Strategy	1	10/10/19		TLM1, TLM2	CO5	T2, R4	
<b>No. of classes required to complete UNIT-V</b>		<b>06</b>	<b>No. of classes taken:</b>					

#### 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
104.	Singleton Design Pattern	1						
105.	Flyweight Design Pattern	1						
106.	Visitor Design Pattern	1						

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

### **EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Descriptive Examination	1, 2	B1=20
I-Mid Online Quiz Examination	1, 2	C1 = 10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Descriptive Examination	3, 4, 5	B2=20
II-Mid Online Quiz Examination	3, 4, 5	C2 = 10
<b>Evaluation of Assignment/Quiz Marks: <math>A = (A1+A2+A3+A4+A5)/5</math></b>	<b>1,2,3,4,5</b>	<b>A=5</b>
<b>Evaluation of Mid Descriptive Marks: <math>B = 75\% \text{ of Max}(B1,B2) + 25\% \text{ of Min}(B1,B2)</math></b>	<b>1,2,3,4,5</b>	<b>B=20</b>
<b>Evaluation of Mid Online Quiz Marks: <math>C = \text{Average}(C1, C2)</math></b>	<b>1,2,3,4,5</b>	<b>C=10</b>
<b>Cumulative Internal Examination : <math>A+B+C</math></b>	<b>1,2,3,4,5</b>	<b>A+B+C=35</b>
<b>Attendance</b>	-	<b>D = 0 to 5</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: <math>A+B+C+D+E</math></b>	<b>1,2,3,4,5</b>	<b>100</b>

### **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:**

- m. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- n. **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.
- o. **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.
- p. **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.
- q. **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.
- r. **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.
- s. **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.
- t. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- u. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- v. **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.
- w. **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.
- x. **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.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Mr. Shaik Johny Basha</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>
<b>Signature</b>				





## LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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

Approved by AICET, New Delhi. Accredited by NAAC & NBA, Certified by ISO 9001:2015

<http://www.lbrce.ac.in>, [tselbreddy@gmail.com](mailto:tselbreddy@gmail.com), Phone: 08659-222933, Fax: 08659-222931

### DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## COURSE HANDOUT

**PROGRAM** : B.Tech., V-Sem., CSE  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : WEB TECHNOLOGIES – 17CI14  
**L-T-P STRUCTURE** : 3-1-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : N. SRINIVASARAO  
**COURSE COORDINATOR** : N. SrinivasaRao  
**PRE-REQUISITE:** C, C++, JAVA & DBMS

**COURSE OBJECTIVE:** Students will be familiarized with the tools and web technologies necessary for business application design and development. This course covers client side and server side scripting languages to develop static and dynamic web applications.

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

After the completion of this course, student will be able to:

CO1: Design web pages by using HTML and DHTML.

CO2: Develop user defined tags and transfer data between components by using XML and Java Beans.

CO3: Create data driven web applications by applying database connectivity techniques.

CO4: Design and implement dynamic Webpages using server side components like servlets.

CO5: Understand concepts of JSP and struts framework and apply them in solving real world Problems.

### **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
<b>CO1</b>	2	1	3	-	2	1	-	-	-	-	-	1	3	-	-
<b>CO2</b>	2	1	3	-	2	1	-	-	-	-	-	1	3	1	-
<b>CO3</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	-
<b>CO4</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	1

<b>CO5</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	1
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**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:**

<b>T1</b>	Chris Bates ,Web Programming, building internet applications, WILEY Dreamtech, 2nd edition.
<b>T2</b>	MartyHall and Larry Brown , “Core Servlets and Java Server Pages Volume 1: Core Technologies”, Pearson, 2 <sup>nd</sup> Edition, 2004.
<b>T2</b>	Bill Siggelkow, ”Jakarta Struts Cookbook” , O’Reilly Media, 2005.

**BOS APPROVED REFERENCE BOOKS:**

<b>R1</b>	Robert W Sebesta, “Programming the World Wide Web”, Pearson Education, 8 <sup>th</sup> Edition, 2015.
<b>R2</b>	A.A.Puntambekar, “Web Technologies”, Technical Publications, 2009.
<b>R3</b>	Harvey M. Deitel, Paul J. Deitel, “Internet and World Wide Web How to program”, Pearson Education Asia, 5 <sup>th</sup> Edition, 2008.
<b>R4</b>	Subramnyam Allamraju, Cedit Buest, “Professional java server programming J2EE 1.3 Edition”, Apress Publications, 1.3 Edition, 2001.

**COURSE DELIVERY PLAN (LESSON PLAN): Section-A**

**UNIT-I: HTML, CSS, & JAVA SCRIPT**

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
107.	Introduction & COs explanation	1	17/06/19		TLM1, TLM5	CO1	T1, R1	
108.	<b>Introduction to HTML</b>	1	19/06/19		TLM1, TLM5	CO1	T1, R1	
109.	HTML basic tags: Text Formatting Tags, List tags and its types.	1	21/06/19		TLM1, TLM5	CO1	T1, R1	
110.	Table Tags and its Attributes, Image Tag and its Attributes.	1	22/06/19		TLM1, TLM5	CO1	T1, R1	
111.	Links - Internal & External Links Framesets - Nested Frames.	1	24/06/19		TLM1, TLM5	CO1	T1, R1	
112.	HTML Form Elements and its attributes.	1	26/06/19		TLM1, TLM5	CO1	T1, R1	
113.	<b>Cascading Style Sheets:</b> Explanation, Importance, Basics	1	28/06/19		TLM1, TLM5	CO1	T1, R1	
114.	Types of Cascading Style Sheets	1	29/06/19		TLM1, TLM5	CO1	T1, R1	
115.	<b>Introduction to Java Script</b>	1	01/07/19		TLM1, TLM5	CO1	T1, R1	
116.	Usage of Objects in Java Script.	1	03/07/19		TLM1, TLM5	CO1	T1, R1	
117.	Regular expressions in Java Script, Java Script Form Validation.	1	05/07/19		TLM1, TLM5	CO1	T1, R1	
118.	TUTORIAL - 1	1	06/07/19		TLM3	CO1	---	
119.	Assignment/Quiz-1	1	08/07/19		TLM6	CO1	---	

No. of classes required to complete UNIT-I	13	No. of classes taken:
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### UNIT-II: XML & JAVA BEANS

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
120.	<b>XML Fundamentals</b>	1	10/07/19		TLM1, TLM5	CO2	T1, R1	
121.	Anatomy of Basic XML program	1	12/07/19		TLM1, TLM5	CO2	T1, R1	
122.	Well-formed ness and Validity of XML	1	13/07/19		TLM1, TLM5	CO2	T1, R1	
123.	Document type definition (DTD), its types with example programs.	1	15/07/19		TLM1, TLM5	CO2	T1, R1	
124.	XML Schema with examples.	1	17/07/19		TLM1, TLM5	CO2	T1, R1	
125.	Presenting XML using XSLT.	1	19/07/19		TLM1, TLM5	CO2	T1, R1	
126.	Using XML Processors: DOM and SAX with example programs.	1	20/07/19		TLM1, TLM5	CO2	T1, R1	
127.	<b>Java Beans : Introduction to Java Beans</b>	1	22/07/19		TLM1, TLM5	CO2	T1, R1	
128.	Java Beans API, persistence.	1	24/07/19		TLM1, TLM5	CO2	T1, R1	
129.	BDK with example programs	1	26/07/19		TLM1, TLM5	CO2	T1, R1	
130.	EJB Introduction	1	27/07/19		TLM1, TLM5	CO2	T1, R1	
131.	TUTORIAL-2	1	29/07/19		TLM3	CO2	---	
132.	Assignment/Quiz-2	1	31/07/19		TLM6	CO2	---	
No.of classes required to complete UNIT-II		13	No. of classes taken:					

### UNIT-III: JDBC

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
133.	<b>Introduction to JDBC</b>	1	02/08/19		TLM1, TLM5	CO3	T2, R2	
134.	Types of Drivers	1	03/08/19		TLM1, TLM5	CO3	T2, R2	
135.	Java.sql package (classes & Interfaces in the java.sql package)	1	14/08/19		TLM1, TLM5	CO3	T2, R2	
136.	Driver Registration & Loading & Connection establishment	1	16/08/19		TLM1, TLM5	CO3	T2, R2	
137.	Query and Statement preparation & Execution of the query	1	17/08/19		TLM1, TLM5	CO3	T2, R2	
138.	Create, insert & delete operations using JDBC	1	19/08/19		TLM1, TLM5	CO3	T2, R2	
139.	Types of Statements	1	21/08/19		TLM1, TLM5	CO3	T2, R2	
140.	ResultSet types	1	23/08/19		TLM1, TLM5	CO3	T2, R2	
141.	TUTORIAL-3	1	26/08/19		TLM3	CO3	---	

142.	Assignment/Quiz-3	1	28/08/19		TLM6	CO3	---	
No. of classes required to complete UNIT-III		10	No. of classes taken:					

#### UNIT-IV: SERVLETS

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
143.	<b>Introduction to Web Servers and Servlets</b>	1	30/08/19		TLM1, TLM5	CO4	T2, R2	
144.	Lifecycle of a Servlet with example.	1	31/08/19		TLM1, TLM5	CO4	T2, R2	
145.	The Servlet API, javax.servlet and javax.servlet.http packages.	1	04/09/19		TLM1, TLM5	CO4	T2, R2	
146.	ServletConfig and ServletContext interfaces with example programs.	1	06/09/19		TLM1, TLM5	CO4	T2, R2	
147.	RequestDispatcher Interface usage.	1	07/09/19		TLM1, TLM5	CO4	T2, R2	
148.	Database interaction through Servlet Pages.	1	09/09/19		TLM1, TLM5	CO4	T2, R2	
149.	Insertion, deletion and searching operations on database through servlet pages.	1	11/09/19		TLM1, TLM5	CO4	T2, R2	
150.	Dynamic web application example.	1	13/09/19		TLM1, TLM5	CO4	T2, R2	
151.	Http Request & Responses.	1	14/09/19		TLM1, TLM5	CO4	T2, R2	
152.	Session Tracking with example program.	1	16/09/19		TLM1, TLM5	CO4	T2, R2	
153.	Cookies concept with example program.	1	20/09/19		TLM1, TLM5	CO4	T2, R2	
154.	TUTORIAL-4	1	18/09/19		TLM3	CO4	---	
155.	Assignment/Quiz-4	1	21/09/19		TLM6	CO4	---	
No. of classes required to complete UNIT-III		13	No. of classes taken:					

#### UNIT-V: JSP & STRUTS

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
156.	<b>Introduction to JSP,</b> Components of JSP and its life cycle.	1	23/09/19		TLM1, TLM5	CO5	T2, R2	
157.	Scripting elements of JSP.	1	25/09/19		TLM1, TLM5	CO5	T2, R2	
158.	JSP Implicit Objects.	1	27/09/19		TLM1, TLM5	CO5	T2, R2	
159.	JSP Directive elements.	1	28/09/19		TLM1, TLM5	CO5	T2, R2	
160.	Action elements in JSP.	1	30/09/19		TLM1, TLM5	CO5	T2, R2	
161.	Error Handling and Debugging.	1	04/10/19		TLM1, TLM5	CO5	T2, R2	
162.	Accessing Database through JSP	1	05/10/19		TLM1, TLM5	CO5	T2, R2	

	pages							
163.	Introduction to Struts, MVC Design Pattern	1	07/10/19		TLM1, TLM5	CO5	T3, R2	
164.	Struts main components, Controller Components	1	09/10/19		TLM1, TLM5	CO5	T3, R2	
165.	TUTORIAL-5	1	11/10/19		TLM3	CO5	---	
166.	Assignment/Quiz-5	1	12/10/19		TLM6	CO5	---	
No. of classes required to complete UNIT-IV		11	No. of classes taken:					

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

#### **ACADEMIC CALENDAR:**

<b>Description</b>	<b>From</b>	<b>To</b>	<b>Weeks</b>
I Phase of Instructions	17-06-2019	03-08-2019	7 W
I Mid Examinations	05-08-2019	10-08-2019	1 W
II Phase of Instructions	12-08-2019	12-10-2019	9 W
II Mid Examinations	14-10-2019	19-10-2019	1 W
Preparation and Practicals	21-10-2019	31-10-2019	1 ½ W
Semester End Examinations	01-11-2019	16-11-2019	2 W

#### **EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
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
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	1,2,3,4,5	B=20

Evaluation of Online Quiz Marks: $C=75\%$ of $\text{Max}(C1,C2)+25\%$ of $\text{Min}(C1,C2)$	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
<b>Cumulative Internal Examination : A+B+C+D</b>	<b>1,2,3,4,5</b>	<b>A+B+C+D=40</b>
<b>Semester End Examinations: E</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: A+B+C+D+E</b>	<b>1,2,3,4,5</b>	<b>100</b>

Course Instructor

Course Coordinator

Module Coordinator

HOD

## 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:**

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

- aa. **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.
- bb. **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.
- cc. **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.
- dd. **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.
- ee. **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.
- ff. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- gg. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- hh. **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.
- ii. **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.
- jj. **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.





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

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<http://www.lbrce.ac.in>, [cselbreddy@gmail.com](mailto:cselbreddy@gmail.com), Phone: 08659-222933, Fax: 08659-222931

### DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## COURSE HANDOUT

**PROGRAM** : B.Tech., V-Sem., CSE  
**ACADEMIC YEAR** : 2019-20  
**COURSE NAME & CODE** : WEB TECHNOLOGIES – 17CI14  
**L-T-P STRUCTURE** : 3-1-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : N. SRINIVASARAO  
**COURSE COORDINATOR** : N. SrinivasaRao  
**PRE-REQUISITE:** C, C++, JAVA & DBMS

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

After the completion of this course, student will be able to:

CO1: Design web pages by using HTML and DHTML.

CO2: Develop user defined tags and transfer data between components by using XML and Java Beans.

CO3: Create data driven web applications by applying database connectivity techniques.

CO4: Design and implement dynamic Webpages using server side components like servlets.

CO5: Understand concepts of JSP and struts framework and apply them in solving real world Problems.

### **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
<b>CO1</b>	2	1	3	-	2	1	-	-	-	-	-	1	3	-	-
<b>CO2</b>	2	1	3	-	2	1	-	-	-	-	-	1	3	1	-
<b>CO3</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	-
<b>CO4</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	1

<b>CO5</b>	2	2	3	-	2	1	-	-	-	-	-	1	3	3	1
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**Note:** Enter Correlation Levels **1** or **2** or **3**. If there is no correlation, put ‘-’  
**1-** Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

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<b>T2</b>	MartyHall and Larry Brown , “Core Servlets and Java Server Pages Volume 1: Core Technologies”, Pearson, 2 <sup>nd</sup> Edition, 2004.
<b>T2</b>	Bill Siggelkow, ”Jakarta Struts Cookbook” , O’Reilly Media, 2005.

**BOS APPROVED REFERENCE BOOKS:**

<b>R1</b>	Robert W Sebesta, “Programming the World Wide Web”, Pearson Education, 8 <sup>th</sup> Edition, 2015.
<b>R2</b>	A.A.Puntambekar, “Web Technologies”, Technical Publications, 2009.
<b>R3</b>	Harvey M. Deitel, Paul J. Deitel, “Internet and World Wide Web How to program”, Pearson Education Asia, 5 <sup>th</sup> Edition, 2008.
<b>R4</b>	Subramnyam Allamraju, Cedit Buest, “Professional java server programming J2EE 1.3 Edition”, Apress Publications, 1.3 Edition, 2001.

**COURSE DELIVERY PLAN (LESSON PLAN): Section-B**

**UNIT-I: HTML, CSS, & JAVA SCRIPT**

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
167.	Introduction & COs explanation	1	17/06/19		TLM1, TLM5	CO1	T1, R1	
168.	<b>Introduction to HTML</b>	1	18/06/19		TLM1, TLM5	CO1	T1, R1	
169.	HTML basic tags: Text Formatting Tags, List tags and its types.	1	20/06/19		TLM1, TLM5	CO1	T1, R1	
170.	Table Tags and its Attributes, Image Tag and its Attributes.	1	21/06/19		TLM1, TLM5	CO1	T1, R1	
171.	Links - Internal & External Links Framesets - Nested Frames.	1	24/06/19		TLM1, TLM5	CO1	T1, R1	
172.	HTML Form Elements and its attributes.	1	25/06/19		TLM1, TLM5	CO1	T1, R1	
173.	<b>Cascading Style Sheets:</b> Explanation, Importance, Basics	1	27/06/19		TLM1, TLM5	CO1	T1, R1	
174.	Types of Cascading Style Sheets	1	28/06/19		TLM1, TLM5	CO1	T1, R1	
175.	<b>Introduction to Java Script</b>	1	01/07/19		TLM1, TLM5	CO1	T1, R1	
176.	Usage of Objects in Java Script.	1	02/07/19		TLM1, TLM5	CO1	T1, R1	
177.	Regular expressions in Java Script, Java Script Form Validation.	1	04/07/19		TLM1, TLM5	CO1	T1, R1	
178.	TUTORIAL - 1	1	05/07/19		TLM3	CO1	---	
179.	Assignment/Quiz-1	1	08/07/19		TLM6	CO1	---	

No. of classes required to complete UNIT-I	13	No. of classes taken:
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### UNIT-II: XML & JAVA BEANS

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
180.	<b>XML Fundamentals</b>	1	09/07/19		TLM1, TLM5	CO2	T1, R1	
181.	Anatomy of Basic XML program	1	11/07/19		TLM1, TLM5	CO2	T1, R1	
182.	Well-formed ness and Validity of XML	1	12/07/19		TLM1, TLM5	CO2	T1, R1	
183.	Document type definition (DTD), its types with example programs.	1	15/07/19		TLM1, TLM5	CO2	T1, R1	
184.	XML Schema with examples.	1	16/07/19		TLM1, TLM5	CO2	T1, R1	
185.	Presenting XML using XSLT.	1	18/07/19		TLM1, TLM5	CO2	T1, R1	
186.	Using XML Processors: DOM and SAX with example programs.	1	19/07/19		TLM1, TLM5	CO2	T1, R1	
187.	<b>Java Beans : Introduction to Java Beans</b>	1	22/07/19		TLM1, TLM5	CO2	T1, R1	
188.	Java Beans API, persistence.	1	23/07/19		TLM1, TLM5	CO2	T1, R1	
189.	BDK with example programs	1	25/07/19		TLM1, TLM5	CO2	T1, R1	
190.	EJB Introduction	1	26/07/19		TLM1, TLM5	CO2	T1, R1	
191.	TUTORIAL-2	1	29/07/19		TLM3	CO2	---	
192.	Assignment/Quiz-2	1	30/07/19		TLM6	CO2	---	
No.of classes required to complete UNIT-II		13	No. of classes taken:					

### UNIT-III: JDBC

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
193.	<b>Introduction to JDBC</b>	1	01/08/19		TLM1, TLM5	CO3	T2, R2	
194.	Types of Drivers	1	02/08/19		TLM1, TLM5	CO3	T2, R2	
195.	Java.sql package (classes & Interfaces in the java.sql package)	1	13/08/19		TLM1, TLM5	CO3	T2, R2	
196.	Driver Registration & Loading & Connection establishment	1	16/08/19		TLM1, TLM5	CO3	T2, R2	
197.	Query and Statement preparation & Execution of the query	1	19/08/19		TLM1, TLM5	CO3	T2, R2	
198.	Create, insert & delete operations using JDBC	1	20/08/19		TLM1, TLM5	CO3	T2, R2	
199.	Types of Statements	1	22/08/19		TLM1, TLM5	CO3	T2, R2	
200.	ResultSet types	1	23/08/19		TLM1, TLM5	CO3	T2, R2	
201.	TUTORIAL-3	1	26/08/19		TLM3	CO3	---	

202.	Assignment/Quiz-3	1	27/08/19		TLM6	CO3	---	
No. of classes required to complete UNIT-III		10	No. of classes taken:					

#### UNIT-IV: SERVLETS

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
203.	<b>Introduction to Web Servers and Servlets</b>	1	29/08/19		TLM1, TLM5	CO4	T2, R2	
204.	Lifecycle of a Servlet with example.	1	30/08/19		TLM1, TLM5	CO4	T2, R2	
205.	The Servlet API, javax.servlet and javax.servlet.http packages.	1	03/09/19		TLM1, TLM5	CO4	T2, R2	
206.	ServletConfig and ServletContext interfaces with example programs.	1	05/09/19		TLM1, TLM5	CO4	T2, R2	
207.	RequestDispatcher Interface usage.	1	06/09/19		TLM1, TLM5	CO4	T2, R2	
208.	Database interaction through Servlet Pages.	1	09/09/19		TLM1, TLM5	CO4	T2, R2	
209.	Insertion, deletion and searching operations on database through servlet pages.	1	12/09/19		TLM1, TLM5	CO4	T2, R2	
210.	Dynamic web application example.	1	13/09/19		TLM1, TLM5	CO4	T2, R2	
211.	Http Request & Responses.	1	16/09/19		TLM1, TLM5	CO4	T2, R2	
212.	Session Tracking with example program.	1	16/09/19		TLM1, TLM5	CO4	T2, R2	
213.	Cookies concept with example program.	1	17/09/19		TLM1, TLM5	CO4	T2, R2	
214.	TUTORIAL-4	1	19/09/19		TLM3	CO4	---	
215.	Assignment/Quiz-4	1	20/09/19		TLM6	CO4	---	
No. of classes required to complete UNIT-III		13	No. of classes taken:					

#### UNIT-V: JSP & STRUTS

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
216.	<b>Introduction to JSP,</b> Components of JSP and its life cycle.	1	23/09/19		TLM1, TLM5	CO5	T2, R2	
217.	Scripting elements of JSP.	1	24/09/19		TLM1, TLM5	CO5	T2, R2	
218.	JSP Implicit Objects.	1	26/09/19		TLM1, TLM5	CO5	T2, R2	
219.	JSP Directive elements.	1	27/09/19		TLM1, TLM5	CO5	T2, R2	
220.	Action elements in JSP.	1	30/09/19		TLM1, TLM5	CO5	T2, R2	
221.	Error Handling and Debugging.	1	01/10/19		TLM1, TLM5	CO5	T2, R2	
222.	Accessing Database through JSP	1	03/10/19		TLM1, TLM5	CO5	T2, R2	

	pages							
223.	Introduction to Struts, MVC Design Pattern	1	04/10/19		TLM1, TLM5	CO5	T3, R2	
224.	Struts main components, Controller Components	1	07/10/19		TLM1, TLM5	CO5	T3, R2	
225.	TUTORIAL-5	1	08/10/19		TLM3	CO5	---	
226.	Assignment/Quiz-5	1	10/10/19		TLM6	CO5	---	
227.	Revision (Previous year Question papers discussion)	1	11/10/19		-	-	-	
No. of classes required to complete UNIT-IV		11	No. of classes taken:					

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

#### ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	17-06-2019	03-08-2019	7 W
I Mid Examinations	05-08-2019	10-08-2019	1 W
II Phase of Instructions	12-08-2019	12-10-2019	9 W
II Mid Examinations	14-10-2019	19-10-2019	1 W
Preparation and Practicals	21-10-2019	31-10-2019	1 ½ W
Semester End Examinations	01-11-2019	16-11-2019	2 W

#### 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
Online Quiz-1	1,2	C1=10
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
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	1,2,3,4,5	B=20

Evaluation of Online Quiz Marks: $C=75\%$ of $\text{Max}(C1,C2)+25\%$ of $\text{Min}(C1,C2)$	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
<b>Cumulative Internal Examination : A+B+C+D</b>	<b>1,2,3,4,5</b>	<b>A+B+C+D=40</b>
<b>Semester End Examinations: E</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: A+B+C+D+E</b>	<b>1,2,3,4,5</b>	<b>100</b>

Course Instructor

Course Coordinator

Module Coordinator

HOD

## 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:

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

ll. **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.

mm. **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.

nn. **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.

oo. **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.

- pp. **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.
- qq. **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.
- rr. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ss. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- tt. **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.
- uu. **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.
- vv. **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.

# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

## DEPARTMENT OF COMPUTER SCIENCE AND 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.

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### COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-A/S
<b>ACADEMIC YEAR</b>	: 2019-20
<b>COURSE NAME &amp; CODE</b>	: Automata Theory & Compiler Design – 17CI15
<b>L-T-P STRUCTURE</b>	: 3-0-0
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: T N V S PRAVEEN
<b>COURSE COORDINATOR</b>	: Dr D VEERAAIAH

**PRE-REQUISITE:** Knowledge in Discrete mathematics (set theory and graph theory) and programming language.

#### **COURSE OBJECTIVE:**

To introduce students to the mathematical foundations of computation like automata theory, the theory of formal languages and grammars, the notion of algorithm, decidability, complexity, and computability. Understand the theory and practice of compiler implementation.

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

**CO1:** Design Finite Automata and Regular expression for regular languages.

**CO2:** Design Context free grammar and push down automata for CFL.

**CO3:** Design and implement lexical analyzer and syntax analyzer.

**CO4:** Create framework for syntax directed translation schemes and understand the runtime organization of the program.

**CO5:** Analyze various code optimization techniques and code generation algorithms.

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

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

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



**BOS APPROVED TEXT BOOKS:**

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

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

**BOS APPROVED REFERENCE BOOKS:**

1.Sipser —Introduction to Theory of Computational ,Thomson,2nd Edition

2.Mishra and Chandrashekar, Theory of Computer Science –Automata languages and computation —2nd edition, PHI

3.ParagH.Dave, HimanshuB.Dave —Compilers Principles and Practicel , Person Education, First Edition, 2012.

4.Andrew W.appel —Modern compiler implementation in C Cambridge, Revised Edition, 2010.

5.<http://nptel.ac.in/courses/111103016/> (Video lectures for Automata theory and formal languages)

6.<http://nptel.ac.in/courses/106108052/> (Video lectures for Compiler design)

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

**UNIT – 1: Introduction to Automata and formal language theory, Finite state Machine, Regular expressions**

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
228.	Basic Mathematical notations and techniques	1	19-06-19		TLM1	CO1	T1	
229.	Classification of Automata, definitions and its applications.	1	20-06-19		TLM1 TLM4	CO1	T1	
230.	Deterministic Finite state Automaton (DFA)	1	21-06-19		TLM1 TLM4	CO1	T1	
231.	Nondeterministic Finite state Automaton (NFA), Equivalence of NFA and	2	22-06-19 26-06-19		TLM1 TLM4	CO1	T1, R1	

	DFA							
232.	Minimization of DFA, examples.	2	27-06-19 28-06-19		TLM1 TLM4	CO1	T1, R1	
233.	Equivalence of Regular expressions and Finite Automata	1	29-06-19		TLM1 TLM4	CO1	T1, R1	
234.	Pumping lemma	1	03-07-19		TLM1 TLM4	CO1	T1, R1	
235.	Closure properties.	1	04-07-19		TLM1 TLM4	CO1	T1	
236.	<b>TUTORIAL – 1</b>	1	05-07-19		TLM3	CO1	---	
237.	<b>Assignment / Quiz – 1</b>	1	06-07-19		TLM6	CO1	---	
<b>No. of classes required to complete UNIT-I:</b>		<b>12</b>	<b>No. of classes taken:</b>					

### UNIT – 2: Introduction to Grammar, Pushdown Automata

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
238.	Context free Grammar (CFG)	1	10-07-19		TLM1 TLM4	CO2	T1	
239.	Derivation, parse tree, ambiguity	1	11-07-19		TLM1 TLM4	CO2	T1	
240.	Simplification of CFG	1	12-07-19		TLM1 TLM4	CO2	T1	
241.	Chomsky Normal Form (CNF) and Greibach Normal Form (GNF)	2	17-07-19 18-07-19		TLM1 TLM4	CO2	T1	
242.	Push Down Automata-Definition	1	19-07-19		TLM1 TLM4	CO2	T1, R2	
243.	Equivalence of Context Free Languages.	2	20-07-19 24-07-19		TLM1 TLM4	CO2	T1, R2	
244.	Deterministic Pushdown Automaton.	1	25-07-19		TLM1	CO2	T1, R2	

					TLM4			
245.	Pumping lemma of Context Free languages.	1	26-07-19		TLM1 TLM4	CO2	T1, R2	
246.	Properties of Context Free languages.	1	27-07-19		TLM1 TLM4	CO2	T1, R2	
247.	<b>TUTORIAL – 2</b>	1	31-07-19		TLM3	CO2	---	
248.	<b>Assignment / Quiz – 2</b>	1	01-08-19		TLM6	CO2	---	
<b>No. of classes required to complete UNIT-II:</b>		<b>13</b>	<b>No. of classes taken:</b>					

### UNIT – 3: Introduction to compiler, Lexical Analysis, Syntax Analysis

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
249.	Basic Language processing system, phases of a compiler	1	02-08-19		TLM1 TLM4	CO3	T2, R2	
250.	Bootstrapping.	1	03-08-19		TLM1 TLM4	CO3	T2, R2	
251.	The role of a Lexical analyzer, input buffering	2	14-08-19 15-08-19		TLM1 TLM4	CO3	T2	
252.	Specification and Recognition of tokens	1	16-08-19		TLM1 TLM4	CO3	T2, R2	
253.	LEX tool	1	17-08-19		TLM1 TLM4	CO3	T2, R2	
254.	The role of a Parser top down parsing-recursive descent and predictive parsing	3	21-08-19 22-08-19 23-08-19		TLM1 TLM4	CO3	T2, R2	
255.	Bottom -up parsing-Handle pruning, shift-reduce parsing	1	24-08-19		TLM1 TLM4		T2, R2	
256.	LR parsers-SLR, CLR and	4	28-08-19 29-08-19		TLM1		T2, R2	

	LALR, YACC tool.		30-08-19 31-08-19		TLM4			
257.	<b>TUTORIAL – 3</b>	1	04-09-19		TLM3	CO3	---	
258.	<b>Assignment / Quiz – 3</b>	1	06-09-19		TLM6	CO3	---	
<b>No. of classes required to complete UNIT-III:</b>		<b>16</b>	<b>No. of classes taken:</b>					

**UNIT – 4: Syntax-Directed translation (SDT), Intermediate Code Representations, Run-time Environment**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
259.	Attribute grammar, Syntax-Directed Definitions (SDD), and Translation schemes	2	07-09-19 09-09-19		TLM1 TLM4	CO4	T2, R2	
260.	Syntax tree, three-address code and static single-Assignment.	1	11-09-19		TLM1 TLM4	CO4	T2, R3	
261.	Translation of expressions and statements.	1	13-09-19		TLM1 TLM4	CO4	T2, R2	
262.	Storage organization	1	14-09-19		TLM1 TLM4	CO4	T2	
263.	Storage allocation strategies	1	16-09-19		TLM1 TLM4	CO4	T2	
264.	Access to non-local data, Parameter passing techniques.	1	18-09-19		TLM1 TLM4	CO4	T2	
265.	<b>TUTORIAL – 4</b>	1	20-09-19		TLM1 TLM4	CO4	T2	
266.	<b>Assignment / Quiz – 4</b>	1	20-09-19		TLM1 TLM4	CO4	T2	
<b>No. of classes required to complete UNIT-IV</b>		<b>9</b>	<b>No. of classes taken:</b>					

### UNIT – 5: Basics of Code optimization, Code generation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly	
267.	Basic blocks and flow graphs.	1	21-09-19		TLM1 TLM4	CO5	T2, R2		
268.	The principal sources of optimization	1	23-09-19		TLM1 TLM4	CO5	T2, R4		
269.	Optimization of Basic blocks	1	25-09-19		TLM1 TLM4	CO5	T2, R2		
270.	Loops in flow graph	1	27-09-19		TLM1 TLM4	CO5	T2, R2		
271.	Issues in the design of a code generator	1	28-09-19		TLM1 TLM4	CO5	T2, R6		
272.	Generic code generation algorithm	1	30-09-19		TLM1 TLM4	CO5	T2		
273.	Register allocation and assignment	1	04-10-19		TLM1 TLM4	CO5	T2		
274.	DAG representation of basic blocks	1	05-10-19		TLM1 TLM4	CO5	T2		
275.	Peep hole optimization Generating code from DAG.	1	07-10-19		TLM1 TLM4	CO5	T2,R6		
276.	<b>TUTORIAL – 5</b>	1	09-10-19		TLM3	CO5	---		
277.	<b>Assignment / Quiz – 5</b>	1	11-10-19		TLM6	CO5	---		
<b>No. of classes required to complete UNIT-V</b>		<b>11</b>	<b>No. of classes taken:</b>						

#### 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
278.	Minimization of FSM	1	19/06/19					
279.	LALR related examples	1	22/09/19					
280.	DAG examples	1	03/10/19					

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

### 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
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B=25</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>C=75</b>
<b>Total Marks: A+B+C</b>	<b>1,2,3,4,5</b>	<b>100</b>

### 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:**

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

- xx. **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.
- yy. **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.
- zz. **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.
- aaa. **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.
- bbb. **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.
- ccc. **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.
- ddd. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- eee. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- fff. **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.
- ggg. **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.
- hhh. **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**



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

## DEPARTMENT OF COMPUTER SCIENCE AND 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.

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### COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-B/S
<b>ACADEMIC YEAR</b>	: 2019-20
<b>COURSE NAME &amp; CODE</b>	: Automata Theory & Compiler Design – 17CI15
<b>L-T-P STRUCTURE</b>	: 2-2--
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: Dr D VEERAAIAH
<b>COURSE COORDINATOR</b>	: Dr D VEERAAIAH

**PRE-REQUISITE:** Knowledge in Discrete mathematics (set theory and graph theory) and programming language.

#### **COURSE OBJECTIVE:**

To introduce students to the mathematical foundations of computation like automata theory, the theory of formal languages and grammars, the notion of algorithm, decidability, complexity, and computability. Understand the theory and practice of compiler implementation.

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

**CO1:** Design Finite Automata and Regular expression for regular languages.

**CO2:** Design Context free grammar and push down automata for CFL.

**CO3:** Design and implement lexical analyzer and syntax analyzer.

**CO4:** Create framework for syntax directed translation schemes and understand the runtime organization of the program.

**CO5:** Analyze various code optimization techniques and code generation algorithms.

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

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

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

**BOS APPROVED TEXT BOOKS:**

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

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

**BOS APPROVED REFERENCE BOOKS:**

1.Sipser —Introduction to Theory of Computation| ,Thomson,2nd Edition

2.Mishra and Chandrashekar, |Theory of Computer Science –Automata languages and computation —2nd edition, PHI

3.ParagH.Dave, HimanshuB.Dave —Compilers Principles and Practice| , Person Education, First Edition, 2012.

4.Andrew W.appel —Modern compiler implementation in C| Cambridge, Revised Edition, 2010.

5.<http://nptel.ac.in/courses/111103016/> (Video lectures for Automata theory and formal languages)

6.<http://nptel.ac.in/courses/106108052/> (Video lectures for Compiler design)

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

**UNIT – 1: Introduction to Automata and formal language theory, Finite state Machine,**

**Regular expressions**

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
281.	Basic Mathematical notations and techniques	1	17-06-19		TLM1	CO1	T1	
282.	Classification of Automata, definitions and its applications.	1	19-06-19		TLM1 TLM4	CO1	T1	
283.	Deterministic Finite state Automaton (DFA)	1	21-06-19		TLM1 TLM4	CO1	T1	

284.	Nondeterministic Finite state Automaton (NFA), Equivalence of NFA and DFA	2	22-06-19 24-06-19		TLM1 TLM4	CO1	T1, R1	
285.	Minimization of DFA, examples.	2	26-06-19 28-06-19		TLM1 TLM4	CO1	T1, R1	
286.	Equivalence of Regular expressions and Finite Automata	1	29-06-19		TLM1 TLM4	CO1	T1, R1	
287.	Pumping lemma	1	01-07-19		TLM1 TLM4	CO1	T1, R1	
288.	Closure properties.	1	03-07-19		TLM1 TLM4	CO1	T1	
289.	<b>TUTORIAL – 1</b>	1	05-07-19		TLM3	CO1	---	
290.	<b>Assignment / Quiz – 1</b>	1	06-07-19		TLM6	CO1	---	
<b>No. of classes required to complete UNIT-I:</b>		<b>12</b>	<b>No. of classes taken:</b>					

### UNIT – 2: Introduction to Grammar, Pushdown Automata

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
291.	Context free Grammar (CFG)	1	08-07-19		TLM1 TLM4	CO2	T1	
292.	Derivation, parse tree, ambiguity	1	10-07-19		TLM1 TLM4	CO2	T1	
293.	Simplification of CFG,	1	12-07-19		TLM1 TLM4	CO2	T1	
294.	Chomsky Normal Form (CNF) and Greibach	2	15-07-19 17-07-19		TLM1 TLM4	CO2	T1	

	Normal Form (GNF)							
295.	Push Down Automata- Definition	1	19-07-19		TLM1 TLM4	CO2	T1, R2	
296.	Equivalence of Context Free Languages.	2	20-07-19 22-07-19		TLM1 TLM4	CO2	T1, R2	
297.	Deterministic Pushdown Automaton.	1	24-07-19		TLM1 TLM4	CO2	T1, R2	
298.	Pumping lemma of Context Free languages.	1	26-07-19		TLM1 TLM4	CO2	T1, R2	
299.	Properties of Context Free languages.	1	27-07-19		TLM1 TLM4	CO2	T1, R2	
300.	<b>TUTORIAL – 2</b>	1	29-07-19		TLM3	CO2	---	
301.	<b>Assignment / Quiz – 2</b>	1	31-07-19		TLM6	CO2	---	
<b>No. of classes required to complete UNIT-II:</b>		<b>13</b>	<b>No. of classes taken:</b>					

### UNIT – 3: Introduction to compiler, Lexical Analysis, Syntax Analysis

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
302.	Basic Language processing system, phases of a compiler	1	02-08-19		TLM1 TLM4	CO3	T2, R2	
303.	Bootstrapping.	1	03-08-19		TLM1 TLM4	CO3	T2, R2	
304.	The role of a Lexical analyser, input buffering	2	12-08-19 14-08-19		TLM1 TLM4	CO3	T2	
305.	Specification and Recognition of tokens	1	16-08-19		TLM1 TLM4	CO3	T2, R2	

306.	LEX tool	1	17-08-19		TLM1 TLM4	CO3	T2, R2	
307.	The role of a Parser top down parsing-recursive descent and predictive parsing	2	19-08-19 21-08-19		TLM1 TLM4	CO3	T2, R2	
308.	Bottom -up parsing-Handle pruning, shift-reduce parsing	1	23-08-19		TLM1 TLM4		T2, R2	
309.	LR parsers-SLR, CLR and LALR, YACC tool.	2	24-08-19 26-08-19		TLM1 TLM4		T2, R2	
310.	<b>TUTORIAL – 3</b>	1	28-08-19		TLM3	CO3	---	
311.	<b>Assignment / Quiz – 3</b>	1	30-08-19		TLM6	CO3	---	
<b>No. of classes required to complete UNIT-III:</b>		<b>13</b>	<b>No. of classes taken:</b>					

**UNIT – 4: Syntax-Directed translation (SDT), Intermediate Code Representations, Run-time Environment**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
312.	Attribute grammar, Syntax-Directed Definitions (SDD), and Translation schemes	2	31-08-19 02-09-19		TLM1 TLM4	CO4	T2, R2	
313.	Applications of SDT's.	1	04-09-19		TLM1 TLM4	CO4	T2, R3	
314.	Syntax tree, three-address code and static single-Assignment.	2	06-09-19 07-09-19		TLM1 TLM4	CO4	T2, R2	
315.	Translation of expressions and statements.	1	09-09-19		TLM1 TLM4	CO4	T2	

316.	Storage organization	1	11-09-19		TLM1 TLM4	CO4	T2	
317.	Storage allocation strategies	1	13-09-19		TLM1 TLM4	CO4	T2	
318.	Access to non-local data	1	14-09-19		TLM1 TLM4	CO4	T2	
319.	Parameter passing techniques.	1	16-09-19		TLM1 TLM4	CO4	T2	
320.	<b>TUTORIAL – 4</b>	1	18-09-19		TLM3	CO4	---	
321.	<b>Assignment / Quiz – 4</b>	1	20-09-19		TLM6	CO4	---	
<b>No. of classes required to complete UNIT-IV</b>		<b>12</b>	<b>No. of classes taken:</b>					

#### UNIT – 5: Basics of Code optimization, Code generation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
322.	Basic blocks and flow graphs.	1	21-09-19		TLM1 TLM4	CO5	T2, R2	
323.	The principal sources of optimization	1	23-09-19		TLM1 TLM4	CO5	T2, R4	
324.	Optimization of Basic blocks	1	25-09-19		TLM1 TLM4	CO5	T2, R2	
325.	Loops in flow graph	1	27-09-19		TLM1 TLM4	CO5	T2, R2	
326.	Issues in the design of a code generator	1	28-09-19		TLM1 TLM4	CO5	T2, R6	
327.	Generic code generation algorithm	1	30-09-19		TLM1 TLM4	CO5	T2	
328.	Register allocation and assignment	1	04-10-19		TLM1 TLM4	CO5	T2	
329.	DAG representation of basic blocks	1	05-10-19		TLM1 TLM4	CO5	T2	

330.	Peep hole optimization Generating code from DAG.	1	07-10-19		TLM1 TLM4	CO5	T2,R6	
331.	<b>TUTORIAL – 5</b>	1	09-10-19		TLM3	CO5	---	
332.	<b>Assignment / Quiz – 5</b>	1	11-10-19		TLM6	CO5	---	
<b>No. of classes required to complete UNIT-V</b>		<b>11</b>	<b>No. of classes taken:</b>					

#### 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
333.	Minimization of FSM	1	19/06/19					
334.	LALR related examples	1	22/09/19					
335.	DAG examples	1	03/10/19					

#### Teaching Learning Methods

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

#### 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
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B=25</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>C=75</b>
<b>Total Marks: A+B+C</b>	<b>1,2,3,4,5</b>	<b>100</b>

#### 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:**

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

jjj. **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.

kkk. **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.

lll. **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.

mmm. **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.

nnn. **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.

ooo. **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.

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

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

rrr. **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.

sss. **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.

ttt. **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**

# LAKIREDDY BALI REDDY CLLEGE OF ENGINEERING (A)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Autonomous & Affiliated to JNTU, Kakinada & Approved by AICTE, New Delhi,

NAAC & NBA Accredited, Certified by ISO 9001:2015)

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

### COURSE HANDOUT

**PROGRAM** : B.Tech., V-Sem., CSE-A/S

**ACADEMIC YEAR** : 2019-20

**COURSE NAME & CODE** : Operating Systems & 17CS04

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

**COURSE CREDITS** : 3

**COURSE INSTRUCTOR** : K.Rangachary

**COURSE COORDINATOR:** Dr. D.Jangan Mohan Reddy

**PRE-REQUISITE:** Knowledge of Computers fundamentals, Data structures & CO.

#### **COURSE OBJECTIVE:**

The main objective of the course is to provide basic knowledge of computer operating system structure and functioning. Students able to understand how Operating Systems evolved with advent of computer architecture. Comprehend the different CPU scheduling algorithms, page replacement algorithms and identify best one.

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

After the completion of this course, student will be able to:

<b>CO1</b>	Identify the functional aspects and implementation methods (system call and system programs) of different modules in a general purpose operating system.
<b>CO2</b>	Examine the process management using scheduling algorithm, IPC multithreading
<b>CO3</b>	Analyze the process synchronization methods and deadlock handling approaches employed in operating systems.
<b>CO4</b>	Evaluate memory management strategies such as paging and segmentation, virtual memory, swapping and page replacement algorithms.
<b>CO5</b>	Analyze the implementation strategies of file systems regarding directory, allocation, free-space management and file recovery.

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

		PROGRAM OUTCOMES												PROGRAM SPECIFIC OUTCOMES		
		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
COURSE OUTCOMES	CO1	3	1	-	-	-	-	-	-	-	-	-	1	1	-	-
	CO2	2	3	1	1	-	-	-	-	-	-	-	1	2	-	-

	CO3	3	3	2	1	-	-	-	-	-	-	-	1	2	-	-
	CO4	3	3	2	1	-	-	-	-	-	-	-	1	2	-	-
	CO5	2	2	3	-	-	-	-	-	-	-	-	1	2	-	-

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

**BOS APPROVED TEXT BOOKS:**

**T1** Silberschatz& Galvin, —Operating System Conceptsl, Wiley, 7th edition, 2007

**BOS APPROVED REFERENCE BOOKS:**

**R1** William Stallings, —Operating Systems, PHI, 5th Edition, 2004.

**R2** Charles Crowley, —Operating Systems: A Design-Oriented Approachl, TMH Publications, 1998.

**R3** Andrew S.Tanenbaum, —Modern Operating Systems, PHI, 2nd edition, 1995.

**R4** <http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/index.html>

**R5** <https://www.youtube.com/watch?v=jciGIvn7UfM&list=PLTgavEZk0mZX7P2WVuE6hN9qVnkTgrAc9>

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

**UNIT – 1: INTRODUCTION & OPERATING-SYSTEM STRUCTURES**

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
336.	Discussion of Course objective and COs of the subject	1	17-06-2019		TLM1	--	--	
337.	Introduction to Operating Systems, Evolution Operating Systems, Computer-System Organization, Computer-System Architecture	2	19-06-2019, 20-06-2019		TLM1	CO1	T1	
338.	Operating System Structures, Operating-System Operations	1	21-06-2019		TLM1	CO1	T1	
339.	Process Management, Memory Management	1	24-06-2019		TLM, TLM2	CO1	T1	
340.	Storage Management, Protection and Security	1	26-06-2019		TLM1, TLM2	CO1	T1,R4	
341.	Distributed Systems Special-Purpose Systems	1	27-06-2019		TLM1	CO1	T1,R4	

342.	User Operating-System Interface Difference between CLI and GUI	1	28-06-2019		TLM1	CO1	T1		
343.	System Calls, Types of System Calls, System Programs	1	01-07-2019		TLM1, TLM2	CO1	T1, R1		
344.	Operating-System Design and Implementation	1	03-07-2019		TLM1	CO1	T1		
345.	Virtual Machines, Operating-System Generation and System Boot	2	04-07-2019, 05-07-2019		TLM1, TLM2	CO1	T1		
346.	<b>TUTORIAL – 1</b>	1	08-07-2019		TLM3	CO1	---		
347.	<b>ASSIGNMENT / QUIZ– 1</b>	1	10-07-2019		TLM6	CO1	---		
<b>No. of classes required to complete UNIT-I:</b>		<b>14</b>	<b>No. of classes taken:</b>						

**UNIT – 2: PROCESSES-CONCEPT AND MULTITHREADED PROGRAMMING AND PROCESS SCHEDULING**

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
348	Introduction to Processes in Operating Systems, Explanation about Process State Diagram, Process Scheduling	2	11-7-2019, 12-07-2019		TLM1	CO2	T1	
349	Operations on Processes, Inter-process Communication	1	15-07-2019		TLM1, TLM2	CO2	T1	
350	Examples of IPC Systems, Communication in Client-Server Systems	2	17-07-2019, 18-07-2019		TLM1, TLM2	CO2	T1	
351	Introduction Multithreading Programming, Multithreading Models, Thread Libraries	2	19-07-2019, 22-07-2019		TLM1, TLM2	CO2	T1	
352	Threading Issues, Introduction Process Scheduling	1	24-07-2019		TLM1, TLM2	CO2	T1, R2	
353	Scheduling Criteria, Scheduling Algorithms	3	25-07-2019, 26-07-2019		TLM1, TLM2, TLM3	CO2	T1, R4, R5	

			29-07-2019					
354	Multiple-Processor Scheduling	1	31-07-2019		TLM1	CO2	T1,R5	
355	<b>TUTORIAL – 2</b>	1	01-08-2019		TLM3	CO2	---	
356	<b>ASSIGNMENT / QUIZ – 2</b>	1	02-08-2019		TLM6	CO2	---	
<b>No. of classes required to complete UNIT-II:</b>		<b>14</b>	<b>No. of classes taken:</b>					
<b>I MID EXAMINATIONS :</b>				<b>05-08-2019 to 10-08-2019</b>				

### UNIT – 3: SYNCHRONIZATION AND DEADLOCKS

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
357	The Critical-Section Problem, Peterson's Solution	1	14-08-2019		TLM1, TLM2	CO3	T1, R2	
358	Synchronization Hardware, Semaphores	1	16-08-2019		TLM1, TLM2, TLM8	CO3	T1, R2	
359	Classic Problems of Synchronization	1	19-08-2019		TLM9	CO3	T1	
360	Monitors, Synchronization Examples	1	21-08-2019		TLM1, TLM2	CO3	T1, R2	
361	Atomic Transactions, System Model	1	22-08-2019		TLM1, TLM2, TLM8	CO3	T1, R2	
362	Deadlock Characterization, Methods for Handling Deadlocks	1	23-08-2019		TLM1	CO3	T1,R4	
363	Deadlock Prevention	1	26-08-2019		TLM1	CO3	T1,R4	
364	Deadlock Avoidance	1	28-08-2019		TLM3	CO3	T1,R4	
365	Deadlock Detection, Recovery from deadlock	1	29-08-2019		TLM3	CO3	T1,R4	
366	<b>TUTORIAL – 3</b>	1	30-08-2019		TLM3	CO3	--	
367	<b>ASSIGNMENT / QUIZ – 3</b>	1	04-09-2019		TLM6	CO3	---	
<b>No. of classes required to complete UNIT-III:</b>		<b>11</b>	<b>No. of classes taken:</b>					

**UNIT – 4: MEMORY MANAGEMENT STRATEGIES, VIRTUAL MEMORY 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
368.	Swapping	1	05-09-2019		TLM1	CO4	T1	
369.	Contiguous Memory Allocation	1	06-09-2019		TLM1	CO4	T1	
370.	Paging, Structure of the Page Table	1	09-09-2019		TLM1	CO4	T1	
371.	Segmentation	1	11-09-2019		TLM1	CO4	T1	
372.	Demand Paging	1	12-09-2019		TLM1	CO4	T1	
373.	Page Replacement	1	13-09-2019		TLM1	CO4	T1	
374.	Allocation of Frames	1	16-09-2019		TLM1	CO4	T1	
375.	Thrashing, Memory-Mapped Files, Allocating Kernel Memory	1	18-09-2019		TLM1, TLM2	CO4	T1	
376.	<b>TUTORIAL – 4</b>	1	19-09-2019		TLM3	CO4	--	
377.	<b>ASSIGNMENT/ QUIZ 4</b>	1	20-09-2019		TLM6	CO4	--	
<b>No. of classes required to complete UNIT-IV</b>		<b>10</b>	<b>No. of classes taken:</b>					

**UNIT – 5: IMPLEMENTING FILE SYSTEM**

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
378	The Concept of a File, Access Methods	1	23-09-2019		TLM1	CO5	T1	
379	Directory Structure, File-System Mounting	1	25-09-2019		TLM1	CO5	T1	
380	File Sharing, Protection	1	26-09-2019		TLM1, TLM2	CO5	T1	
381	File-System Structure	1	27-09-2019		TLM1, TLM2	CO5	T1	
382	File-System Implementation	1	30-09-2019		TLM1, TLM2	CO5	T1	

383	Directory Implementation	1	03-10-2019		TLM1	CO5	T1	
384	Allocation Methods	1	04-10-2019		TLM1	CO5	T1,R4	
385	Free-Space Management	1	07-10-2019		TLM1	CO5	T1,R4	
386	Efficiency and Performance, Recovery	1	09-10-2019		TLM1	CO5	T1	
387	<b>TUTORIAL – 5</b>	1	10-10-2019		TLM3	CO5	--	
388	<b>ASSIGNMENT/QUIZ5</b>	1	11-10-2019		TLM6	CO5	--	
<b>No. of classes required to complete UNIT-V</b>		<b>11</b>	<b>No. of classes taken:</b>					
<b>ii MID EXAMINATIONS :</b>				<b>14-10-2019 to 19-10-2019</b>				

**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
389.	Latest operating systems and their structures and functionality	1	11-10-2019					

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

**EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
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 $\text{Max}(B1,B2)+25\%$ of $\text{Min}(B1,B2)$	1,2,3,4,5	B=10
Evaluation of Mid Marks: $C=75\%$ of $\text{Max}(C1,C2)+25\%$ of $\text{Min}(C1,C2)$	1,2,3,4,5	C=20
Attendance	-	D=5
<b>Cumulative Internal Examination : A+B+C+D</b>	<b>1,2,3,4,5</b>	<b>A+B+C+D=40</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: A+B+C+D+E</b>	<b>1,2,3,4,5</b>	<b>100</b>

## **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:**

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

vvv. **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.

www. **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.

xxx. **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.

yyy. **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.

- zzz. **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.
- aaaa. **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.
- bbbb. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- cccc. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- dddd. **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.
- eeee. **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.
- ffff. **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**



**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**  
Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution  
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada  
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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

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## **COURSE HANDOUT**

PROGRAM : B.Tech. V-Sem., CSE (Section - B)

ACADEMIC YEAR : 2019-20

COURSE NAME & CODE : **Operating Systems&17CS04**

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr. JAGAN MOHAN REDDY, Assoc. Prof

COURSE COORDINATOR : Dr. JAGAN MOHAN REDDY, Assoc. Prof

PRE-REQUISITE : Knowledge of Computer Fundamentals, Data Structure and  
CO

### **Course Objectives:**

The main objective of the course is to provide basic knowledge of computer operating system structure and function. Students will be able to understand how OS evolved with advent of computer architecture. Comprehend the different CPU scheduling algorithms, page replacement algorithms and identify best one.

### **Course Outcomes (CO): After the completion of this course, students will be able to:**

**CO1:** Identify the functional aspects and implementation methods (system calls and system programs of different modules in general purpose operating systems).

**CO2:** Evaluate scheduling and communication methods of processes handled by OS through examples.

**CO3:**Analyse the process synchronization methods and deadlock handling approaches employed in OS.

**CO4:** Evaluate memory management strategies such as paging and segmentation, virtual memory, swapping, and page replacement algorithms.

**CO5:** Analyse the implementation strategies of file systems regarding directory, allocation, free space management and file recovery.

**COURSE ARTICULATION MATRIX (Correlation between Cos&POs):**

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	-	-	-	-	-	-	-	-	1
CO2	2	3	1	1	-	-	-	-	-	-	-	1
CO3	3	3	2	1	-	-	-	-	-	-	-	1
CO4	3	3	2	1	-	-	-	-	-	-	-	1
CO5	2	2	3	-	-	-	-	-	-	-	-	1

**BOS APPROVED TEXT BOOKS:**

<b>T1</b>	Silberschatz& Galvin, “Operating System Concepts”, 7th edition, Wiley.
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**BOS APPROVED REFERENCE BOOKS:**

<b>R1</b>	William Stallings-“Operating Systems”- 5th Edition - PHI
<b>R2</b>	Charles Crowley, ‘Operating Systems: A Design-Oriented Approach’, TMH Publications, 1998edition.
<b>R3</b>	Andrew S.Tanenbaum, ‘Modern Operating Systems’, 2nd edition, 1995, PHI.

Unit	Content	Text Book
<b>I</b>	<b>IntroductionComputer:</b> System Organization, Computer-System Architecture, Operating SystemStructure, Operating-System Operations, Process Management, Memory Management, StorageManagement, Protection and Security, Distributed Systems, Special-Purpose Systems	<b>T1</b>
	<b>Operating-System Structures:</b> Operating-System Services , User Operating-System Interface, SystemCalls , Types of System Calls, System Programs , Operating-System Design and Implementation,Operating-System Structure, Virtual Machines, Operating-System Generation, System Boot.	<b>T1</b>
<b>II</b>	<b>Processes-Concept:</b> Process Scheduling, Operations on Processes,	<b>T1</b>

	Inter-process Communication, Examples of IPC Systems, Communication in Client-Server Systems	
	<b>Multithreaded Programming:</b> Multithreading Models, Thread Libraries, Threading Issues. <b>Process Scheduling:</b> Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.	<b>T1</b>
<b>III</b>	<b>Synchronization:</b> The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples, and Atomic Transactions.	<b>T1</b>
	<b>Deadlocks:</b> System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention. Deadlock Avoidance, Deadlock Detection, Recovery from deadlock.	<b>T1</b>
<b>IV</b>	<b>Memory Management Strategies:</b> Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation.	<b>T1</b>
	<b>Virtual Memory Management:</b> Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory.	
<b>V</b>	<b>File Systems:</b> The concept of a file, access methods, directory structure, file system mounting, file sharing, protection.	<b>T1</b>
	<b>Implementing File System:</b> File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery.	<b>T1</b>

### COURSE DELIVERY PLAN (LESSON PLAN):

#### UNIT-I: Operating System Concepts

S.No.	Topics to be covered	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
390.	Introduction to Operating Systems	Week – 1,2,3	Week – 1,2,3	TLM1	CO1	T1	
391.	Computer-System Organization, Computer-System Architecture, Operating System Structure			TLM1	CO1	T1	
392.	Operating-System Operations, Process Management			TLM1, TLM2	CO1	T1	
393.	Memory Management, Storage Management			TLM1, TLM2	CO1	T1	

394.	Protection and Security, Distributed Systems, Special-Purpose Systems			TLM1, TLM2	CO1	T1	
395.	Operating-System Services , User Operating-System Interface, System Calls			TLM1, TLM2	CO1	T1	
7.	Operating-System Design and Implementation, Operating-System Structure			TLM1, TLM2	CO1	T1	
8.	Virtual Machines, Operating-System Generation, System Boot			TLM1, TLM2	CO1	T1	

### UNIT- II:Process Management

S.No.	Topics to be covered	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Processes-Concept, Process Scheduling	Week 4,5,6 & 7	Week 4,5,6 & 7	TLM1	CO2	T1	
2.	Operations on Processes			TLM1	CO2	T1	
3.	Inter-process Communication,			TLM1, TLM2	CO2	T1	
4.	Examples of IPC Systems, Communication in Client-Server Systems			TLM1, TLM2	CO2	T1	
5.	Multithreaded Programming- Multithreading Models			TLM1, TLM2	CO2	T1	
6.	Thread Libraries, Threading Issues			TLM1, TLM2	CO2	T1	
7.	Process Scheduling: Scheduling Criteria			TLM1, TLM2	CO2	T1	
8.	Scheduling Algorithms			TLM1,	CO2	T1	

				TLM2			
9.	Multiple-Processor Scheduling			TLM1, TLM2	CO2	T1	

### UNIT- III:Synchronization

S.No.	Topics to be covered	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Synchronization: The Critical-Section Problem	Week 8,9 & 10	Week 8,9 & 10	TLM1, TLM2	CO3	T1	
2.	Peterson's Solution, Synchronization Hardware			TLM1, TLM2	CO3	T1	
3.	Semaphores, Classic Problems of Synchronization			TLM1, TLM2	CO3	T1	
4.	Monitors, Synchronization Examples and Atomic Transactions			TLM1, TLM2	CO3	T1	
5.	Deadlocks- System Model, Deadlock Characterization			TLM1, TLM2	CO3	T1	
6.	Methods for Handling Deadlocks, Deadlock Prevention			TLM1, TLM2	CO3	T1	
7.	Deadlock Avoidance, Deadlock Detection, Recovery from deadlock						

### UNIT- IV:Memory Management

S.No.	Topics to be covered	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Memory Management Strategies Swapping	Week 11,12 & 13	Week 11,12 & 13	TLM1	CO4	T1	

2.	Contiguous Memory Allocation			TLM1, TLM2	CO4	T1	
3.	Paging, Structure of the Page Table			TLM1, TLM2	CO4	T1	
4.	Segmentation			TLM1, TLM2	CO4	T1	
5.	Virtual Memory Management Demand Paging			TLM1, TLM2	CO4	T1	
6.	Page Replacement, Allocation of Frames			TLM1, TLM2	CO4	T1	
7.	Thrashing, Memory-Mapped Files,			TLM1, TLM2	CO4	T1	
8.	Allocating Kernel Memory			TLM1, TLM2	CO4	T1	

### UNIT- V:File Systems

S.No.	Topics to be covered	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	File Systems: The concept of a file, access methods, directory structure	Week 14, 15 & 16	Week 14, 15 & 16	TLM1	CO5	T1	
2.	File system mounting, file sharing, protection			TLM1, TLM2	CO5	T1	
3.	Implementing File System: File-System Structure, File- System Implementation			TLM1, TLM2	CO5	T1	
4.	Directory Implementation, Allocation Methods			TLM1, TLM2	CO5	T1	
5.	Free-Space Management, Efficiency and Performance, Recovery.			TLM1, TLM2	CO5	T1	

**NOTE:** The rest of the class work can be tough through practical oriented.

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

**ACADEMIC CALENDAR:**

<b>Description</b>	<b>From</b>	<b>To</b>	<b>Weeks</b>
I Phase of Instructions	17/06/2019	03/08/2019	7 W
I Mid Examinations	05/8/2019	10/08/2019	1 W
II Phase of Instructions	12/08/2019	12/10/2019	9 W
II Mid Examinations	14/10/2019	09/10/2019	1 W
Practical	21/10/2019	31/10/2019	11/2W
Semester End Examinations	01/11/2019	06/11/2019	2 W

**Course Instructor**

**Course Coordinator**

**Module Coordinator**

**HOD**



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,

Accredited by NAAC and NBA, Certified by ISO 9001:2015)

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

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### COURSE HANDOUT

**PROGRAM** : B.Tech. V-Sem., CSE  
**ACADEMIC YEAR** : 2019 -20  
**COURSE NAME & CODE** : ADVANCED GRAPH ALGORITHMS -17CS90  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : Mr. G Balu NarasimhaRao  
**COURSE COORDINATOR** : Mr. G Balu NarasimhaRao  
**MODULE COORDINATOR**: Dr. Ch. Venkata Narayana  
**PRE-REQUISITE**: Discrete mathematics, basic concepts of graphs and of graph algorithms

#### **COURSE OBJECTIVE:**

The main objective of this course is aimed to cover a variety of different problems in Graph Theory. In this course students will come across a number of theorems and proofs. Theorems will be stated and proved formally using various techniques

**COURSE OUTCOMES (CO):** After the completion of this course, student will be able to:

**CO1:** To understand and apply the fundamental concepts in graph theory.

**CO2:** To learn to model problems using graphs and to solve these problems algorithmically.

**CO3:** Understand basic properties of Matchings

**CO4:** Understand various versions of connectedness of a graph, understand structural theorems.

**CO5:** Know about many different coloring problems for graphs. Be able to formulate applied problems as coloring problems.

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

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

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

**TEXT BOOK/S:**

1. D.B. West, Introduction to Graph Theory, Prentice Hall, 2001.

**REFERENCES:**

1. Jon Kleinberg and Eva Tardos, Algorithm Design, Addison-Wesley, 2005.
2. J.A.Bondy and U.S.R.Murty: Graph Theory, Springer, 2008.
3. R.Diestel: Graph Theory, Springer (Low Price Edition) 2000.
4. F.Harary: Graph Theory, Narosa, (1988)
5. C. Berge: Graphs and Hyper graphs, North Holland/Elsevier, (1973)

**COURSE DELIVERY PLAN (LESSON PLAN): Section-A**

**UNIT – 1**

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
396.	Introduction to Graphs & its Applications	1	17/06/19		TLM1	CO1	T1	
397.	Basics of Paths, Cycles, and Trails	1	18/06/19		TLM1	CO1	T1	
398.	Connection, Bipartite Graphs,	1	20/06/19		TLM1	CO1	T1	
399.	Eulerian Circuits,	2	24/06/19, 25/06/19		TLM1	CO1	T1, R1	
400.	Vertex Degrees and Counting	1	27/06/19		TLM1	CO1	T1, R1	
401.	Degree-sum formula	1	01/07/19		TLM1	CO1	T1, R1	
402.	The Chinese Postman Problem	1	02/07/19		TLM1	CO1	T1	
403.	Graphic Sequences.	1	04/07/19		TLM1	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>09</b>	<b>No. of classes taken:</b>					

**UNIT – 2**

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
404	Trees and Distance	1	08/07/19		TLM1	CO2	T1	
405	Properties of Trees	1	9/07/19		TLM1	CO2	T1	
406	Spanning Trees and Enumeration	2	11/07/19, 15/07/19		TLM1	CO2	T1	

407	Optimization and Trees.	2	16/07/19, 18/07/19		TLM1	CO2	T1	
408	Matrix-tree computation	1	22/07/19		TLM1	CO2	T1, R1	
409	Cayley's Formula	1	23/07/19		TLM1	CO2	T1, R1	
410	Prufer code	1	25/07/19		TLM1	CO2	T1, R1	
<b>No. of classes required to complete UNIT-II:</b>		<b>09</b>	<b>No. of classes taken:</b>					

### UNIT - 3

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
411.	Matchings and Covers	1	29/07/19		TLM1	CO3	T1	
412.	Hall's Condition, Min-Max Theorem	1	30/07/19		TLM1	CO3	T1	
413.	Independent Sets, Covers and Maximum Bipartite Matching	2	01/08/19, 13/08/19		TLM1	CO3	T1	
414.	Augmenting Path Algorithm	1	19/08/19		TLM1	CO3	T1, R1	
415.	Weighted Bipartite Matching, Hungarian Algorithm	2	20/08/19, 22/08/19		TLM1	CO3	T1, R1	
416.	Stable Matchings and Faster Bipartite Matching	1	26/08/19		TLM1	CO3	T1	
417.	Factors & Perfect Matching in General Graphs	1	27/08/19		TLM1	CO3	T1	
418.	Matching in General Graphs:	1	29/08/19		TLM1	CO3	T1	
419.	Edmonds' Blossom Algorithm	1	03/09/19		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>11</b>	<b>No. of classes taken:</b>					

### UNIT - 4

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
420.	Connectivity and Paths: Cuts and Connectivity	1	05/09/19		TLM1	CO4	T1	
421.	k-Connected Graphs	1	09/09/19		TLM1	CO4	T1	
422.	Network Flow Ford-Fulkerson Labeling Algorithm,	1	12/09/19		TLM1	CO4	T1	
423.	Max-Flow Min-cut Theorem, Menger's Proof using Max-Flow Min-Cut Theorem.	2	16/09/19, 17/09/19		TLM1	CO4	T1	

424.	Vertex Coloring and Upper Bounds	1	19/09/19		TLM1	CO4	T1	
425.	Brooks' Theorem and Color-Critical Graphs	1	23/09/19		TLM1	CO4	T1	
426.	Counting Proper Colorings	1	24/09/19		TLM1	CO4	T1	
<b>No. of classes required to complete UNIT-IV</b>		<b>08</b>	<b>No. of classes taken:</b>					

### UNIT - 5

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
427.	Planar Graphs, Characterization of Planar Graphs	1	26/09/19		TLM1	CO5	T2, R4	
428.	Kuratowski's Theorem, Wagner's Theorem	2	30/09/19, 01/10/19		TLM1	CO5	T2, R4	
429.	Line Graphs and Edge-coloring	1	03/10/19		TLM1	CO5	T2, R4	
430.	Hamiltonian Graph, Traveling Salesman Problem	1	07/10/19		TLM1	CO5	T2, R4	
431.	NP-Completeness, Dominating Sets.	1	10/10/19		TLM1	CO5	T2, R4	
<b>No. of classes required to complete UNIT-V</b>		<b>06</b>	<b>No. of classes taken:</b>					

### 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
432.	Graph Monors	1						
433.	Decomposition Tree Algorithms	2						
434.	Permutation Graphs	1						

### Teaching Learning Methods

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

**EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Descriptive Examination	1, 2	B1=20
I-Mid Online Quiz Examination	1, 2	C1 = 10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Descriptive Examination	3, 4, 5	B2=20
II-Mid Online Quiz Examination	3, 4, 5	C2 = 10
<b>Evaluation of Assignment/Quiz Marks: <math>A = (A1+A2+A3+A4+A5)/5</math></b>	<b>1,2,3,4,5</b>	<b>A=5</b>
<b>Evaluation of Mid Descriptive Marks: <math>B = 75\% \text{ of Max}(B1,B2) + 25\% \text{ of Min}(B1,B2)</math></b>	<b>1,2,3,4,5</b>	<b>B=20</b>
<b>Evaluation of Mid Online Quiz Marks: <math>C = \text{Average}(C1, C2)</math></b>	<b>1,2,3,4,5</b>	<b>C=10</b>
<b>Cumulative Internal Examination : <math>A+B+C</math></b>	<b>1,2,3,4,5</b>	<b>A+B+C=35</b>
<b>Attendance</b>	-	<b>D = 0 to 5</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: <math>A+B+C+D+E</math></b>	<b>1,2,3,4,5</b>	<b>100</b>

**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:**

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

hhhh. **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.

iiii. **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.

jjjj. **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.

kkkk. **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.

llll. **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.

mmmm. **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.

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

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

pppp. **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.

qqqq. **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.

**rrrr. 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.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	Mr. G Balu NarasimhaRao	Mr. G Balu NarasimhaRao	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana
<b>Signature</b>				

# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,

Accredited by NAAC and NBA, Certified by ISO 9001:2015)

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

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### COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech. V-Sem., CSE
<b>ACADEMIC YEAR</b>	: 2019 -20
<b>COURSE NAME &amp; CODE</b>	: ADVANCED GRAPH ALOGRITHMS -17CS90
<b>L-T-P STRUCTURE</b>	: 3-0-0
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: Mr. G Balu NarasimhaRao
<b>COURSE COORDINATOR</b>	: Mr. G Balu NarasimhaRao
<b>MODULE COORDINATOR</b>	: Dr. Ch. Venkata Narayana
<b>PRE-REQUISITE</b>	: Discrete mathematics, basic concepts of graphs and of graph algorithms

#### **COURSE OBJECTIVE:**

The main objective of this course is aimed to cover a variety of different problems in Graph Theory. In this course students will come across a number of theorems and proofs. Theorems will be stated and proved formally using various techniques

**COURSE OUTCOMES (CO):** After the completion of this course, student will be able to:

**CO1:** To understand and apply the fundamental concepts in graph theory.

**CO2:** To learn to model problems using graphs and to solve these problems algorithmically.

**CO3:** Understand basic properties of Matchings

**CO4:** Understand various versions of connectedness of a graph, understand structural theorems.

**CO5:** Know about many different coloring problems for graphs. Be able to formulate applied problems as coloring problems.

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

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



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

**TEXT BOOK/S:**

2. D.B. West, Introduction to Graph Theory, Prentice Hall, 2001.

**REFERENCES:**

6. Jon Kleinberg and Eva Tardos, Algorithm Design, Addison-Wesley, 2005.
7. J.A.Bondy and U.S.R.Murty: Graph Theory, Springer, 2008.
8. R.Diestel: Graph Theory, Springer (Low Price Edition) 2000.
9. F.Harary: Graph Theory, Narosa, (1988)
10. C. Berge: Graphs and Hyper graphs, North Holland/Elsevier, (1973)

**COURSE DELIVERY PLAN (LESSON PLAN): Section-B**

**UNIT – 1**

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
435.	Introduction to Graphs & its Applications	1	18/06/19		TLM1	CO1	T1	
436.	Basics of Paths, Cycles, and Trails	1	19/06/19		TLM1	CO1	T1	
437.	Connection, Bipartite Graphs,	1	21/06/19		TLM1	CO1	T1	
438.	Eulerian Circuits,	2	25/06/19, 26/06/19		TLM1	CO1	T1, R1	
439.	Vertex Degrees and Counting	1	28/06/19		TLM1	CO1	T1, R1	
440.	Degree-sum formula	1	02/07/19		TLM1	CO1	T1, R1	
441.	The Chinese Postman Problem	1	03/07/19		TLM1	CO1	T1	
442.	Graphic Sequences.	1	05/07/19		TLM1	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>09</b>	<b>No. of classes taken:</b>					

**UNIT – 2**

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
443	Trees and Distance	1	09/07/19		TLM1	CO2	T1	
444	Properties of Trees	1	10/07/19		TLM1	CO2	T1	
445	Spanning Trees and Enumeration	2	12/07/19, 16/07/19		TLM1	CO2	T1	

446	Optimization and Trees.	2	17/07/19, 19/07/19		TLM1	CO2	T1	
447	Matrix-tree computation	1	23/07/19		TLM1	CO2	T1, R1	
448	Cayley's Formula	1	24/07/19		TLM1	CO2	T1, R1	
449	Prufer code	1	26/07/19		TLM1	CO2	T1, R1	
<b>No. of classes required to complete UNIT-II:</b>		<b>09</b>	<b>No. of classes taken:</b>					

### UNIT - 3

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
450.	Matchings and Covers	1	30/07/19		TLM1	CO3	T1	
451.	Hall's Condition, Min-Max Theorem	1	31/07/19		TLM1	CO3	T1	
452.	Independent Sets, Covers and Maximum Bipartite Matching	2	02/08/19, 13/08/19		TLM1	CO3	T1	
453.	Augmenting Path Algorithm	1	14/08/19		TLM1	CO3	T1, R1	
454.	Weighted Bipartite Matching, Hungarian Algorithm	2	16/08/19, 20/08/19		TLM1	CO3	T1, R1	
455.	Stable Matchings and Faster Bipartite Matching	1	21/08/19		TLM1	CO3	T1	
456.	Factors & Perfect Matching in General Graphs	1	23/08/19		TLM1	CO3	T1	
457.	Matching in General Graphs:	1	27/08/19		TLM1	CO3	T1	
458.	Edmonds' Blossom Algorithm	1	28/08/19		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>11</b>	<b>No. of classes taken:</b>					

### UNIT - 4

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
459.	Connectivity and Paths: Cuts and Connectivity	1	30/08/19		TLM1	CO4	T1	
460.	k-Connected Graphs	1	03/09/19		TLM1	CO4	T1	
461.	Network Flow Ford-Fulkerson Labeling Algorithm,	1	14/09/19		TLM1	CO4	T1	
462.	Max-Flow Min-cut Theorem, Menger's Proof using Max-Flow Min-Cut Theorem.	2	06/09/19, 11/09/19		TLM1	CO4	T1	

463.	Vertex Coloring and Upper Bounds	1	13/09/19		TLM1	CO4	T1	
464.	Brooks' Theorem and Color-Critical Graphs	2	17/09/19, 18/09/19		TLM1	CO4	T1	
465.	Counting Proper Colorings	1	20/09/19		TLM1	CO4	T1	
<b>No. of classes required to complete UNIT-IV</b>		<b>09</b>	<b>No. of classes taken:</b>					

### UNIT - 5

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
466.	Planar Graphs, Characterization of Planar Graphs	2	24/09/19, 25/09/19		TLM1	CO5	T2, R4	
467.	Kuratowski's Theorem, Wagner's Theorem	2	27/09/19, 01/10/19		TLM1	CO5	T2, R4	
468.	Line Graphs and Edge-coloring	1	04/10/19		TLM1	CO5	T2, R4	
469.	Hamiltonian Graph, Traveling Salesman Problem	1	09/10/19		TLM1	CO5	T2, R4	
470.	NP-Completeness, Dominating Sets.	1	11/10/19		TLM1	CO5	T2, R4	
<b>No. of classes required to complete UNIT-V</b>		<b>07</b>	<b>No. of classes taken:</b>					

### 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
471.	Graph Monors	1						
472.	Decomposition Tree Algorithms	2						
473.	Permutation Graphs	1						

### Teaching Learning Methods

<b>TLM1</b>	Chalk and Talk	<b>TLM4</b>	Problem Solving	<b>TLM7</b>	Seminars or GD
<b>TLM2</b>	PPT	<b>TLM5</b>	Programming	<b>TLM8</b>	Lab Demo
<b>TLM3</b>	Tutorial	<b>TLM6</b>	Assignment or Quiz	<b>TLM9</b>	Case Study

**EVALUATION PROCESS:**

<b>Evaluation Task</b>	<b>COs</b>	<b>Marks</b>
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Descriptive Examination	1, 2	B1=20
I-Mid Online Quiz Examination	1, 2	C1 = 10
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Descriptive Examination	3, 4, 5	B2=20
II-Mid Online Quiz Examination	3, 4, 5	C2 = 10
<b>Evaluation of Assignment/Quiz Marks: <math>A = (A1+A2+A3+A4+A5)/5</math></b>	<b>1,2,3,4,5</b>	<b>A=5</b>
<b>Evaluation of Mid Descriptive Marks: <math>B = 75\% \text{ of Max}(B1,B2) + 25\% \text{ of Min}(B1,B2)</math></b>	<b>1,2,3,4,5</b>	<b>B=20</b>
<b>Evaluation of Mid Online Quiz Marks: <math>C = \text{Average}(C1, C2)</math></b>	<b>1,2,3,4,5</b>	<b>C=10</b>
<b>Cumulative Internal Examination : <math>A+B+C</math></b>	<b>1,2,3,4,5</b>	<b>A+B+C=35</b>
<b>Attendance</b>	-	<b>D = 0 to 5</b>
<b>Semester End Examinations</b>	<b>1,2,3,4,5</b>	<b>E=60</b>
<b>Total Marks: <math>A+B+C+D+E</math></b>	<b>1,2,3,4,5</b>	<b>100</b>

**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:**

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

tttt. **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.

uuuu. **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.

vvvv. **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.

www. **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.

xxxx. **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.

yyyy. **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.

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

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

bbbb. **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.

cccc. **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.

dddd. **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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
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<b>Name of the Faculty</b>	Mr. G Balu NarasimhaRao	Mr. G Balu NarasimhaRao	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana
<b>Signature</b>				



## LESSON PLAN

<b>Department</b> :	<b>CSE</b>	<b>Program</b> :	<b>B.Tech</b>
<b>Course</b> :	<b>UML &amp; DP LAB (17CS62)</b>	<b>SEM</b> :	<b>V</b>
<b>Section</b> :	<b>A/Sec</b>	<b>A.Y.</b> :	<b>2019-20</b>

**1. Prerequisite:** Knowledge in Basics of C++ or JAVA Programming

### 2. Course Educational Objectives (CEOs):

The main objective of this course is that a student will be familiar with principles behind the Object Oriented Design and able to apply those principles in a project setting. Students will analyze applications and know how to take a pragmatic approach to software design and development.

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

**CO1:** Analyze Software Requirements for the given Software Application using Use Cases of UML.

**CO2:** Develop the UML Diagrams to view Software System in Static and Dynamic Aspects.

**CO3:** Select a Design Pattern related to their problem and draw the Class and Object Diagrams using the UML notations.

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

### 4. Course Articulation Matrix:

Course Code	CO	PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
L183	CO1	-	-	-	1	3	-	-	-	2	1	-	2	1	-	3
	CO2	-	-	-	1	3	-	-	-	2	1	-	2	-	1	3
	CO3	-	-	-	1	3	-	-	-	2	1	-	2	1	-	3
	CO4	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-

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

### 5. Schedule:

S.NO	Programs to be Covered	No.of Classes		Date	DM
		As per the Schedule	Taken		
1.	Basics of UML	2			5
2.	Basics of Tool used for Drawing Diagrams like Gliffy, Umbrello, Rational Rose etc.	2			5
3.	Usecase Diagrams for 6 Case Studies	2			5

4.	Class Diagrams for 6 Case Studies	2			5
5.	Object Diagrams for 6 Case Studies	2			5
6.	Sequence Diagrams for 6 Case Studies	2			5
7.	Communication Diagrams for 6 Case Studies	2			5
8.	Activity Diagrams for 6 Case Studies	2			5
9.	State Chart Diagrams for 6 Case Studies	2			5
10.	Component Diagrams for 6 Case Studies	2			5
11.	Deployment Diagrams for 6 Case Studies	2			5
12.	Class Diagram/Object Diagram: i) Drawing Editor ii) Converter	2			5
13.	Class Diagram/Object Diagram: i) Media Player ii) Pizza Toppings Selection	2			5
14.	Class Diagram/Object Diagram: Quiz Competition	2			
15.	REVISION	2			

**Contents beyond the Syllabus:**

S. No.	Programs to be Covered	No. of Classes		Date	DM
		As per the Schedule	Taken		
1.	Payroll System Case Study	2			5
2.	Hospital Management System	2			5
3.	Student Admission Procedure	2			5

**Delivery Methods (DM):**

1. Chalk & Talk
2. ICT Tools
3. Tutorial
4. Assignment/Test/Quiz
5. Laboratory/Field Visit
6. Web based Learning

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr. Ch. V. Narayana	Dr. Ch. V. Narayana	Dr. Ch. V. Narayana	Dr. Ch. V. Narayana
Signature				

**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.

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## **PROGRAMME OUTCOMES (POs):**

### **Engineering Graduates will be able to:**

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

fffff. **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.

ggggg. **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.

hhhhh. **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.

iiiiii. **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.

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

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

nnnnn. **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.

ooooo. **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.

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

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

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

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<b>Name of the Faculty</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>
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## LESSON PLAN

<b>Department</b> :	<b>CSE</b>	<b>Program</b> :	<b>B.Tech</b>
<b>Course</b> :	<b>UML &amp; DP LAB (17CS62)</b>	<b>SEM</b> :	<b>V</b>
<b>Section</b> :	<b>B/Sec</b>	<b>A.Y.</b> :	<b>2019-20</b>

**1. Prerequisite:** Knowledge in Basics of C++ or JAVA Programming

### 2. Course Educational Objectives (CEOs):

The main objective of this course is that a student will be familiar with principles behind the Object Oriented Design and able to apply those principles in a project setting. Students will analyze applications and know how to take a pragmatic approach to software design and development.

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

**CO1:** Analyze Software Requirements for the given Software Application using Use Cases of UML.

**CO2:** Develop the UML Diagrams to view Software System in Static and Dynamic Aspects.

**CO3:** Select a Design Pattern related to their problem and draw the Class and Object Diagrams using the UML notations.

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

### 4. Course Articulation Matrix:

Course Code	CO	PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
L183	CO1	-	-	-	1	3	-	-	-	2	1	-	2	1	-	3
	CO2	-	-	-	1	3	-	-	-	2	1	-	2	-	1	3
	CO3	-	-	-	1	3	-	-	-	2	1	-	2	1	-	3
	CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

### 5. Schedule:

S.NO	Programs to be Covered	No.of Classes		Date	DM
		As per the Schedule	Taken		
16.	Basics of UML	2			5
17.	Usecase Diagrams for 6 Case Studies	2			5
18.	Class Diagrams for 6 Case Studies	2			5

19.	Object Diagrams for 6 Case Studies	2			5
20.	Interaction Diagrams for 6 Case Studies	2			5
21.	Activity Diagrams for 6 Case Studies	2			5
22.	State Chart Diagrams for 6 Case Studies	2			5
23.	Component Diagrams for 6 Case Studies	2			5
24.	Deployment Diagrams for 6 Case Studies	2			5
25.	Class Diagram/Object Diagram: i) Drawing Editor ii) Converter	2			5
26.	Class Diagram/Object Diagram: i) Media Player ii) Pizza Toppings Selection	2			5
27.	Class Diagram/Object Diagram: Quiz Competition	2			5
28.	REVISION	2			5

#### Contents beyond the Syllabus:

S. No.	Programs to be Covered	No. of Classes		Date	DM
		As per the Schedule	Taken		
1.	Payroll System Case Study	2			5
2.	Hospital Management System	2			5
3.	Student Admission Procedure	2			5

#### Delivery Methods (DM):

1. Chalk & Talk
2. ICT Tools
3. Tutorial
4. Assignment/Test/Quiz
5. Laboratory/Field Visit
6. Web based Learning

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr. Sk. Johny Basha	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana
Signature				

#### 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.

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**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:**

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aaaaa. **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.

bbbbb. **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.


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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.

<b>Title</b>	<b>Course Instructor</b>	<b>Course Coordinator</b>	<b>Module Coordinator</b>	<b>Head of the Department</b>
<b>Name of the Faculty</b>	<b>Mr. Sk. Johny Basha</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>	<b>Dr. Ch. Venkata Narayana</b>
<b>Signature</b>				

	<b>LESSON PLAN</b>	<b>Date:</b>
	<b>Sub. Name : WEB TECHNOLOGIES LAB – 17CI66</b> <b>Branch: CSE: Semester &amp; Section: V &amp; A</b>	<b>17/06/2019</b>  <b>To</b> <b>12/10/2019</b>

### WEB TECHNOLOGIES LAB – 17CI66

<b>Lecture</b>	<b>: 2 Periods/week</b>	<b>Internal Marks</b>	<b>: 40</b>
		<b>External Marks</b>	<b>: 60</b>
<b>Credits</b>	<b>: 2</b>	<b>External Examinations</b>	<b>: 3 Hrs</b>

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#### Course Educational Objectives:

The main objective of the course is, student will be familiar with client server architecture and able to develop interactive, dynamic web applications by using java technologies.

#### Course Outcomes:

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


**CO1:** Design and implement static & dynamic websites.

**CO2:** Create reusable components by using Java Beans.

**CO3:** Design and implement data driven web applications.

**Pre requisite:** C, C++, JAVA & DBMS

<b>Lakireddy Bali Reddy College of Engineering</b>	
<b>Department of CSE</b>	
<b>Outcome based lesson plan</b>	
Academic year: 2019-2020	Course: WEB TECHNOLOGIES LAB

	Programme: B.Tech	Exp No: 1 to 14
	Year & Sem: III & I (V sem)	Section: A

S.No	Teaching Learning Process (TLP)	Delivery Methods (DM)	Assessment Methods (AM)
1	Solving Real world problem	Chalk & Talk	Assignments
2	Explaining application before theory	ICT tools	Quiz
3	Solving problems	Group discussions	Tutorials
4	Designing of Cycles	Industrial visit	Surprise Tests
5	Problems on environmental, economics, health & safety	Field work	Mid Exams
6	Problems on professional & ethics	Case studies	Model Exam
7	Seminar	Mini Projects	QAs
8	Problems using software	Numerical treatment	
9	Self study	Design / Exercises	

### Detailed Lesson Plan

S.NO	TOPIC TO BE COVERED	Date		TLP	DM	AM
		Tentative	Actual			
1	Introduction to Web Architecture and Web Technologies.	18/06/19		1	1,2	2,4,6
2	Cycle-1	25/06/19		1	1,2	
3	Cycle-2	02/07/19		1	1,2	
4	Cycle-3	09/07/19		1	1,2	
5	Cycle-4	16/07/19		1	1,2	
6	Cycle-5	23/07/19		1	1,2	
7	Cycle-6	30/07/19		1	1,2	
8	Cycle-7	13/08/19		1	1,2	
09	Cycle-8	20/08/19		1	1,2	



10	Cycle-9	27/08/19		1	1,2,7
11	Cycle-10	03/09/19		1	1,2,7
12	Cycle-11	17/09/19		1	1,2,7
13	Cycle-12	24/09/19		1	1,2,7
14	Cycle-13	01/10/19		1	1,2,7
15	Cycle-14	09/10/19		1	1,2,7
16	Internal Exam	22/10/19			

**Assessment Summary:**

Assessment Task	Weight age (Marks)	Course Outcomes			
		CO1	CO2	CO3	CO4
Day-Day Performance	20				
Viva	05				
Internal Test	10				
Attendance	5				
End Exam	60				
Total	10				

**Mapping Course Outcomes with Programme Outcomes:**

Course Code	COs	Programme Outcomes														
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
<b>17CI66</b>	CO1	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
	CO2	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-

	CO3	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
	CO4	-	-	-	-		-	-	2	2	2	-	-	-	-	-

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

	Instructor	Course Coordinator	Module Coordinator	HOD
Name	N. Srinivasa Rao	N. Srinivasa Rao	Dr. D. Veeraiah	Dr. Ch.V.Narayana
Sign with Date				

### **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.

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	Programme: B.Tech	Exp No: 1 to 14
	Year & Sem: III & I (V sem)	Section: B

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1	Solving Real world problem	Chalk & Talk	Assignments
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### Detailed Lesson Plan

S.NO	TOPIC TO BE COVERED	Date		TLP	DM	AM
		Tentative	Actual			
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8	Cycle-7	22/08/19		1	1,2	
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11	Cycle-10	12/09/19		1	1,2
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Attendance	5				
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