



# 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 AND SCIENCE ENGINEERING

### COURSE HANDOUT

#### Part-A

**PROGRAM** : B.Tech., V-Sem., SEC-A  
**ACADEMIC YEAR** : 2021-22  
**COURSE NAME & CODE** : **ENGINEERING ECONAMICS & ACCOUNTANCY- 17HS01**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **B.KALYAN KUMAR**  
**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 Guptha, 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	20.09.2021		<b>TLM1</b>	CO1	T1	
2.	Economics- definitions, nature & scope	01	21.09.2021		<b>TLM1</b>		T1	
3.	Branches of economics, engineering economics –	01	24.09.2021		<b>TLM1</b>	CO1	T1	
4.	features and scope.	01	27.09.2021		<b>TLM1</b>	CO1	T1	
5.	Demand- types, determinants, law of demand	01	28.09.2021		<b>TLM1</b>	CO1	T1	
6.	Elasticity of demand – significance-	01	01.10.2021		<b>TLM1</b>	CO3	T1	
7.	Types of elasticity of demand	01	04.10.2021		<b>TLM2</b>	CO1	T1	
8.	Demand forecasting types- factor governing-	01	05.10.2021		<b>TLM1</b>	CO1	T1	
9.	Methods of demand forecasting.	01	08.10.2021		<b>TLM2</b>	CO1	T1	
10.	TUTORIAL-1	01	11.10.2021		<b>TLM3</b>	CO1	T1	
11.	Assignment/Quiz – 1	01	18.10.2021		<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	19.10.2021		<b>TLM1</b>	CO1	T1	
2.	Production function- isoquant and isocost.	01	22.10.2021		<b>TLM1</b>	CO1	T1	
3.	MRTS, least cost combination of inputs , law of returns	01	25.10.2021		<b>TLM2</b>	CO1	T1	

4.	Internal and external economies of scale	01	26.10.2021		<b>TLM1</b>	CO1	T1	
5.	Cost analysis: cost concepts, cost & output relationship in short run & long run,	01	29.10.2021		<b>TLM2</b>	CO1	T1	
6.	Break even analysis, determination of BEP	01	01.11.2021		<b>TLM1</b>	CO1	T1	
7.	Significance & limitation of BEA.	01	02.11.2021		<b>TLM1</b>	CO1	T1	
8.	TUTORIAL-2	01	05.11.2021		<b>TLM3</b>	CO1	T1	
9.	Assignment/Quiz – 2	01	8.11.2021		<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	15.11.2021		<b>TLM1</b>	CO3	T1	
2.	Types of markets, features & price output determinations under perfect competitions.	01	16.11.2021		<b>TLM1</b>	CO3	T1	
3.	Monopoly, monopolistic competitions, oligopoly markets.	01	19.11.2021		<b>TLM2</b>	CO3	T1	
4.	Pricing policies-	01	22.11.2021		<b>TLM1</b>	CO3	T1	
5.	Pricing objectives-methodes		23.11.2021			CO3	T1	
6.	Applications in business	01	26.11.2021		<b>TLM3, TLM9</b>	CO3	T1	
7.	Assignment/Quiz – 3	01	29.12.2021		<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	03.12.2021		<b>TLM1</b>	CO2	T1	
2.	Capital & its significance-types of capital	01	06.12.2021		<b>TLM1</b>	CO2	T1	
3.	Estimation of fixed cost and working capital	01	07.12.2021		<b>TLM1</b>	CO2	T1	
4.	Components of working capital & factors determining the need of working capital	01	10.12.2021		<b>TLM1</b>	CO4	T1	
5.	Sources of raising working capital.	01	13.12.2021		<b>TLM9</b>	CO2	T1	
6.	Capital budgeting significance- process	01	14.12.2021		<b>TLM1</b>	CO4	T1	

7.	Techniques of capital budgeting	01	17.12.2021		<b>TLM2</b>	CO4	T1	
8.	Non discounted cash flow techniques		20.12.2021			CO4	T1	
9.	Discounted cash flow techniques.	01	21.12.2021		<b>TLM1</b>	CO2	T1	
10.	TUTORIAL-4	01	24.12.2021		<b>TLM3</b>	CO2	T1	
11.	Assignment/Quiz – 4	01	27.12.2021		<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	28.12.2021		<b>TLM1</b>	CO5	T1	
2.	Accounting significance- book keeping- double entry system	01	03.01.2022		<b>TLM1</b>	CO5	T1	
3.	Journal- ledger- trail balance	01	04.01.2022		<b>TLM2</b>	CO5	T1	
4.	Final accounts with simple adjustments.	01	07.01.2022		<b>TLM1</b>	CO5	T1	
5.	Financial statement analysis through ratios.	01	07.01.2022		<b>TLM1</b>	CO5	T1	
6.	TUTORIAL-5, Assignment/Quiz – 5	01	07.01.2022		<b>TLM3</b>	CO5	T1	
No. of classes required to complete UNIT-V		06			No. of classes taken:			

Teaching Learning Methods			
<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:

Description	From	To	Weeks
I Phase of Instructions	20.09.2021	06.11.2021	7W
I Mid Examinations	08.11.2021	13.11.2021	1W
II Phase of Instructions	15.11.2021	15.01.2022	9W
II Mid Examinations	17.01.2022	22.01.2022	1W
Preparation and Practicals	24.01.2022	29.01.2022	1 W
Semester End Examinations	31.01.2022	12.02.2022	2W

### EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=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.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Graduate of the Information Technology will have the ability to

1. Organize, Analyze and Interpret the data to extract meaningful conclusions.
2. Design, Implement and evaluate a computer-based system to meet desired needs.
3. Develop IT application services with the help of different current engineering tools.

B.Kalyan Kumar	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>



# 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**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-A/S
<b>ACADEMIC YEAR</b>	: 2021-22
<b>COURSE NAME &amp; CODE</b>	: <b>HUMAN COMPUTER INTERACTION-17CI12</b>
<b>L-T-P STRUCTURE</b>	: 3
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: Mr. J NAGESWARA RAO
<b>COURSE COORDINATOR</b>	: Mr. J NAGESWARA RAO
<b>PRE-REQUISITE</b>	: Knowledge of Computer and Its Architecture.

### **Course Educational Objective (CEO):**

To provide basic methodologies and processes for designing interfaces.

To improve the interaction between users and computers by making computers more usable and receptive to the user 's needs.

To provide relevant principles of behaviour, mostly derived from cognitive science and psychology and other sources that describe human ethologic in particular environment, especially technological ones.

To make the students familiar with developing new interfaces and interaction techniques.

**Course Outcomes (COs):** After the completion of this course, student will be able to:

CO1: Identify the elements of good user interface design through effective GUI.

CO2: Identify the importance of human characteristics and understanding business functions.

CO3: Analyze screen design principles for making good decisions based on technological considerations in interface design.

CO4: Select the window, device and screen based controls through navigation schemes.

CO5: Identify the basic components and interaction devices to interact with the computers.

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

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

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

**TEXT BOOK:**

Wilbert O Galitz, 『The Essential Guide to User Interface Design』, Wiley DreamaTech, Third Edition, 2007.

**REFERENCES:**

1. Ben Shneiderman, Catherine Plaisant, —Designing the User Interface, Fourth Edition, Pearson Education, 2008.
2. ALAN DIX, JANET FINLAY, GREGORY D. ABOWD, RUSSELL BEALE, —Human Computer Interaction, Third Edition, PEARSON, 2009.
3. <http://ps.fragnel.edu.in/~dipalis/prgdwnl/eguid.pdf>
4. <https://www.alljntuworld.in/download/human-computer-interaction-materials-notes/>
5. [http://www.crectirupati.com/sites/default/files/lecture\\_notes/HCI-notes.pdf](http://www.crectirupati.com/sites/default/files/lecture_notes/HCI-notes.pdf)

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-C****UNIT –I: Introduction to Graphical User Interface**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Introduction :</b> Importance of user Interface, Overview of user Interface	1	20-09-2021		<b>TLM1</b>	
2.	Importance of good design	1	23-09-2021		<b>TLM1 /TLM4</b>	
3.	Benefits of good design, A brief history of Screen design	1	25-09-2021		<b>TLM1 /TLM4</b>	
4.	<b>The graphical user interface</b> – popularity of graphics	1	30-09-2021		<b>TLM1 /TLM4</b>	
5.	the concept of direct manipulation	1	04-10-2021		<b>TLM1 /TLM4</b>	
6.	graphical system Characteristics	1	07-10-2021		<b>TLM1 /TLM4</b>	
7.	Web user – Interface popularity	1	09-10-2021		<b>TLM1 /TLM4</b>	
8.	Characteristics- Principles of user interface.	1	18-10-2021		<b>TLM1 /TLM4</b>	
9.	Tutorial	1	21-10-2021		<b>TLM1 /TLM4</b>	
<b>No. of classes required to complete UNIT-I</b>		09				



**UNIT –II: Design process**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Design process –</b> Human interaction with computers	1	23-10-2021		<b>TLM1</b>	
2.	Importance of human characteristics	1	25-10-2021		<b>TLM1</b>	
3.	Human consideration	1	28-10-2021		<b>TLM1 /TLM4</b>	
4.	Human interaction speeds	1	30-11-2021		<b>TLM1 /TLM4</b>	
5.	Understanding business junctions	1	01-11-2021		<b>TLM1 /TLM4</b>	
6.	Tutorial	1	06-11-2021		<b>TLM1 /TLM4</b>	
No. of classes required to complete <b>UNIT-II</b>		06				

**UNIT –III: Screen Designing**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Screen Designing :</b> Design goals	1	15-11-2021			
2.	Screen planning and purpose	1	18-11-2021		<b>TLM1</b>	
3.	organizing screen elements	1	20-11-2021		<b>TLM1 /TLM4</b>	
4.	ordering of screen data and content	1	22-11-2021		<b>TLM1 /TLM4</b>	
5.	screen navigation and flow	1	25-11-2021		<b>TLM1 /TLM4</b>	
6.	Visually pleasing composition	1	27-11-2021		<b>TLM1 /TLM4</b>	
7.	amount of information	1	29-11-2021		<b>TLM1</b>	
8.	Distinctiveness, focus and emphasis	1	02-12-2021		<b>TLM1</b>	
9.	Tutorial	1	04-12-2021		<b>TLM1</b>	
No. of classes required to complete <b>UNIT-III</b>		09				

**UNIT –IV: Windows**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Windows</b> – New and Navigation schemes	1	06-12-2021		<b>TLM1</b>	
2.	Structure of Menus, Functions of Menus	1	09-12-2021		<b>TLM1 /TLM4</b>	
3.	Phrasing the Menu, Selecting Menu Choices	1	11-12-2021		<b>TLM1 /TLM4</b>	
4.	Navigating Menus, Kinds of Graphical Menus	1	13-12-2021		<b>TLM1 /TLM4</b>	
5.	selection of window, Components of Window	1	16-12-2021		<b>TLM1 /TLM4</b>	
6.	Window Presentation Styles, Types of Windows,	1	18-12-2021		<b>TLM1 /TLM4</b>	
7.	Selection of devices based controls	1	20-12-2021			
8.	Tutorial	1	23-12-2021		<b>TLM 3 /TLM 6</b>	
No. of classes required to complete <b>UNIT-IV</b>		08				

**UNIT-V: Components**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Components</b> – text and messages,	1	27-12-2021		<b>TLM1</b>	
2.	<b>Text for web pages,</b> Icons and increases , Kinds of Icons,	1	30-12-2021		<b>TLM1 /TLM4</b>	
3.	characteristics of Icons	1	01-01-2022		<b>TLM1 /TLM4</b>	
4.	Multimedia, Colors uses. problems with choosing colors	1	03-01-2022		<b>TLM1 /TLM4</b>	
5.	Keyboard and function keys, pointing devices,	1	06-01-2022		<b>TLM1 /TLM4</b>	
6.	Digitization and generation, Drivers.	1	08-01-2022		<b>TLM 3 /TLM 6</b>	
7.	Tutorial	1	10-01-2022			
No. of classes required to complete <b>UNIT-V</b>		07				

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

## PART-C

### EVALUATION PROCESS (R17 Regulations):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

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

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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
<b>J.NAGESWARA RAO</b>	<b>J.NAGESWARA RAO</b>	<b>DR.CH.V.NARAYANA</b>	<b>DR. D.VEERAI AH</b>



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr. D. Veeraiah

**Course Name & Code** : UML& DESIGN PATTERNS& 17CS03

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech.-CSE/V Sem/Sec-A

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

**PREREQUISITE:** Knowledge in basics of C++ and JAVA Programming

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The main objective of this course is that the students become familiar with all phases of OOAD and master the main features of the UML. The students know about the main concepts of Object Technologies and how to apply them at work and develop the ability to analyze and solve challenging problem in various domains. Student will use systematic approach that focus and describe abstract systems of interaction between classes and objects.

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

<b>CO1</b>	<b>Select</b> the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.
<b>CO2</b>	<b>Apply</b> basic and Advanced Structural Modeling Concepts for designing real time applications.
<b>CO3</b>	<b>Analyze</b> Dynamic Aspects of a Software System using Behavioral Diagrams and Runtime environment of Software Systems.
<b>CO4</b>	<b>Identify</b> the Design Patterns to solve Object Oriented Design Problems
<b>CO5</b>	<b>Implement</b> Creational Patterns, Structural Patterns and Behavioral Patterns for given applications

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	3
CO2	-	-	2	1	2	-	-	-	-	-	-	-	1	-	3
CO3	-	-	2	1	2	-	-	-	-	-	-	-	-	-	3
CO4	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	-	1	2	2	-	-	-	-	-	-	1	-	-	-	3
			1 - Low			2 -Medium			3 - High						

### SYLLABUS

#### **UNIT - I: Introduction to UML:**

**Why We Model:** History of UML, The Importance of Modeling, Principles of Modeling, and Object Oriented Modeling

**Introducing the UML:** An Overview of the UML, Conceptual Model of the UML, Architecture, and Software Development Life Cycle.

#### **UNIT - II: Structural Modeling:**

**Basic Structural Modeling:** Classes, Relationships, Common Mechanisms, Diagrams and Class Diagrams.

**Advanced Structural Modeling:** Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, and Object Diagrams.

**UNIT – III: Behavioral Modeling:**

**Basic Behavioral Modeling:** Interactions, Interaction Diagrams, Use Cases, Use Case Diagrams, Activity Diagrams.

**Advanced Behavioral Modeling:** Events and Signals, State Machines, Time and Space, State Diagrams.

**Architectural Modeling:** Component and Deployment Diagrams.

**UNIT – IV: Introduction to Design Patterns:**

What is Design pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to select a Design Pattern, How to use a Design Pattern.

**UNIT – V: Types of Patterns:**

**Creational Patterns:** Abstract Factory, Builder and Factory method

**Structural Patterns:** Adapter, Decorator, and Facade.

**Behavioral Patterns:** Chain of Responsibility, State, and Strategy.

**TEXTBOOKS:**

- T1** Grady Booch, James Rumbaugh, Ivar Jacobson “The Unified Modeling Language User Guide, Pearson Education, 2nd 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).

**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, 1st Edition, ISBN: 9789352132775, 9352132777, 2014.
- R3** <https://www.tutorialspoint.com/uml/>
- R4** [https://sourcemaking.com/design\\_patterns](https://sourcemaking.com/design_patterns)
- R1** Meilir Page-Jones, “Fundamentals of Object-Oriented Design in UML”, Pearson Education, 1st Edition, and ISBN: 9788177586770, 8177586777, and 2007.

**PART-B**

**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	HOD Sign Weekly
1.	<b>Why we model:</b> History of UML, The importance of Modeling	1	23/09/2021		TLM1, TLM2	CO1	
2.	Principles of Modeling and Object Oriented Modeling	1	25/09/2021		TLM1, TLM2	CO1	
3.	<b>Introducing the UML:</b> Overview of the UML	1	28/09/2011		TLM1, TLM2	CO1	
4.	Conceptual Model of the UML & Building Blocks: Things – Part 1	1	30/09/2021		TLM1, TLM2	CO1	
5.	Building Blocks: Things – Part 2	1	05/10/2021		TLM1, TLM2	CO1	
6.	Relationships and UML Diagrams	1	07/10/2021		TLM1, TLM2	CO1	
7.	Rules of the UML & Common Mechanisms in the UML	1	09/10/2021		TLM1, TLM2	CO1	
8.	Extensible Mechanisms	1	21/10/2021		TLM1,	CO1	

	and UML Architecture				TLM2		
9.	Software Development Life Cycle	1	23/10/2021		TLM1, TLM2	C01	
<b>No. of classes required to complete UNIT-I: 9</b>				<b>No. of classes taken:</b>			

### UNIT-II: 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	HOD Sign Weekly
10	<b>Basic Structural Modeling:</b> Classes	1	26/10/2021		TLM1, TLM2	C02	
11	Relationships	1	26/10/2021		TLM1, TLM2	C02	
12	Common Mechanisms	1	28/10/2021		TLM1, TLM2	C02	
13	Diagrams	1	30/10/2021		TLM1, TLM2, TLM8	C02	
14	Class Diagrams	1	30/10/2021		TLM1, TLM2, TLM8	C02	
15	Advanced Relationships	1	02/11/2021		TLM1, TLM2,	C02	
16	Interfaces, Types and Roles	1	02/11/2021		TLM1, TLM2	C02	
17	Packages	1	02/11/2021		TLM1, TLM2, TLM8	C02	
18	Class Diagrams	1	06/11/2021		TLM1, TLM2, TLM8	C02	
19	Object Diagrams	1	06/11/2021		TLM1, TLM2, TLM8	C02	
<b>No. of classes required to complete UNIT-II: 5</b>				<b>No. of classes taken:</b>			

### UNIT-III: 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	HOD Sign Weekly
11	<b>Basic Behavioral Modeling:</b> Interactions	1	16/11/2021		TLM1, TLM2	C03	
12	Interaction Diagrams	1	18/11/2021		TLM1, TLM2, TLM8	C03	
13	Use Cases	1	20/11/2021		TLM1, TLM2	C03	
14	Use Case Diagrams,	1	23/11/2021		TLM1, TLM2,	C03	

					TLM8		
15	Activity Diagrams	1	25/11/2021		TLM1, TLM2, TLM8	C03	
16	<b>Advanced Behavioral Modeling:</b> Events and Signals	1	27/11/2021		TLM1, TLM2	C03	
17	State Machines	1	30/11/2021		TLM1, TLM2	C03	
18	Time and Space	1	02/12/2021		TLM1, TLM2	C03	
19	State Diagrams.	1	04/12/2021		TLM1, TLM2, TLM8	C03	
20	<b>Architectural Modeling:</b> Component and Deployment Diagrams	1	07/12/2021		TLM1, TLM2, TLM8	C03	
<b>No. of classes required to complete UNIT-III: 10</b>				<b>No. of classes taken:</b>			

#### UNIT-IV: 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	HOD Sign Weekly
21	What is Design pattern?,	1	09/12/2021		TLM1, TLM2	C04	
22	Design Patterns in Smalltalk MVC	1	11/12/2021		TLM1, TLM2	C04	
23	Describing Design Patterns	1	14/12/2021		TLM1, TLM2	C04	
24	TheCatalog of Design Patterns, Organizing the Catalog	1	16/12/2021		TLM1, TLM2	C04	
25	How Design Patterns Solve Design Problems	1	18/12/2021		TLM1, TLM2	C04	
26	How to select a Design Pattern,	1	21/12/2021		TLM1, TLM2	C04	
27	How to use a Design Pattern	1	23/12/2021		TLM1, TLM2	C04	
<b>No. of classes required to complete UNIT-IV: 7</b>				<b>No. of classes taken:</b>			

#### UNIT-V: 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	HOD Sign Weekly
25	<b>Creational Patterns:</b> Abstract Factory	1	25/12/2021		TLM1, TLM2	C05	
26	Builder method	1	28/12/2021		TLM1,	C05	



					TLM2	
27	Factory method	1	30/12/2021		TLM1, TLM2	
28	<b>Structural Patterns:</b> Adapter	1	04/01/2022		TLM1, TLM2	CO5
29	Decorator	1	06/01/2022		TLM1, TLM2	CO5
30	Façade	1	08/01/2022		TLM1, TLM2	
31	<b>Behavioral Patterns:</b> Chain of Responsibility	1	11/01/2022		TLM1, TLM2	CO5
32	State and Strategy	1	13/01/2022		TLM1, TLM2	CO5
<b>No. of classes required to complete UNIT-V: 8</b>					<b>No. of classes taken:</b>	

<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-1	20-09-2021	06-11-2022	7W
<b>I Mid Examinations</b>	<b>08-11-2021</b>	<b>13-11-2022</b>	<b>1W</b>
II Phase of Instructions	15-11-2021	15-01-2022	9W
<b>II Mid Examinations</b>	<b>17-01-2022</b>	<b>22-01-2022</b>	<b>1W</b>
Preparation and Practical's	24-01-2022	29-01-2022	1W

### **PART-C**

#### **EVALUATION PROCESS (R17 Regulation):**

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

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

## PART-D

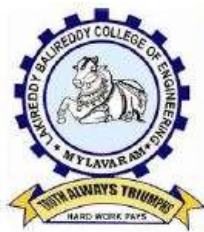
### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

<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. D. Veeraiah</b>	<b>Dr. D. Veeraiah</b>	<b>Dr. Ch. V.Narayana</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : N. SRINIVASA RAO  
Course Name & Code : Web Technologies - 17CI14  
L-T-P Structure : 3-0-0 Credits : 3  
Program/Sem/Sec : B.Tech., CSE., V-Sem., A Sec. A.Y : 2021-22

**PRE-REQUISITE:**C, JAVA & DBMS

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

<b>CO 1</b>	Design web pages by using HTML and DHTML.
<b>CO 2</b>	Develop user defined tags and transfer data between components by using XML and Java Beans.
<b>CO 3</b>	Create data driven web applications by applying database connectivity techniques.
<b>CO 4</b>	Design and implement dynamic Webpages using server-side components like servlets.
<b>CO 5</b>	Understand concepts of JSP and struts framework and apply them in solving real world Problems.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<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

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

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

**TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEYDreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.
- T3** Bill Siggelkow, "Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

- R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.
- R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****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	HOD Sign Weekly
1.	Introduction, COs.	1	20/09/2021		TLM2 TLM5	
2.	Versions of HTML, Text formatting tags, images, lists, Links, marquee tag.	1	22/09/2021		TLM2 TLM5	
3.	Tables, concept.	1	25/09/2021		TLM2 TLM5	
4.	HTML Forms.	1	27/09/2021		TLM2 TLM5	
5.	HTML Frames.	1	29/09/2021		TLM2 TLM5	
6.	CSS Rule, selectors.	1	04/10/2021		TLM2 TLM5	
7.	Types of CSS.	1	06/10/2021		TLM2 TLM5	
8.	Properties in CSS.	1	09/10/2021		TLM2 TLM5	
9.	JavaScript, objects in JS. Assignment I	1	11/10/2021		TLM2 TLM5 TLM6	
10.	Dynamic HTML with JS, Form validation using JS.	1	18/10/2021		TLM2 TLM5	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

**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	HOD Sign Weekly
11.	Introduction to XML, XML Well formed-ness Rules	1	20/10/2021		TLM2 TLM5	
12.	XML DTD and its types.	1	23/10/2021		TLM2 TLM5	
13.	XML Schema.	1	25/10/2021		TLM2 TLM5	
14.	Presenting XML, XML.	1	27/10/2021		TLM2 TLM5	
15.	Processors: DOM & SAX.	1	30/10/2021		TLM2 TLM5	
16.	Introduction to JavaBeans, Persistence.	1	01/11/2021		TLM2 TLM5 TLM6	
17.	JavaBean API. Assignment II.	1	03/11/2021		TLM2 TLM5	
18.	EJB Introduction.	1	06/11/2021		TLM2 TLM5	
No. of classes required to complete UNIT-II :08				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	HOD Sign Weekly
19.	JDBC Introduction, Types of JDBC Drivers.	1	15/11/2021		TLM2 TLM5	
20.	Java.sql.* package, Procedure to establish database connection	1	17/11/2021		TLM2 TLM5	
21.	JDBC steps,	1	20/11/2021		TLM2 TLM5	
22.	DB operations: Create, Insert.	1	22/11/2021		TLM2 TLM5	
23.	DB operations: Delete, Update.	1	24/11/2021		TLM2 TLM5	
24.	Types of Statements.	1	27/11/2021		TLM2 TLM5	
25.	ResultSet Types. Assignment III.	1	29/11/2021		TLM2 TLM5 TLM6	
26.	Example Programs using JDBC.	1	01/12/2021		TLM2 TLM5	
No. of classes required to complete UNIT-III :08				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	HOD Sign Weekly
27.	Introduction to Servlets, Servlet Lifecycle.	1	04/12/2021		TLM2 TLM5	
28.	Servlet API: javax.servlet.*, javax.servlet.http.*.	1	06/12/2021		TLM2 TLM5	
29.	Servlet Request, Response.	1	08/12/2021		TLM2 TLM5	
30.	GenericServlet, ServletConfig.	1	11/12/2021		TLM2 TLM5	
31.	ServletContext, RequestDispatcher.	1	13/12/2021		TLM2 TLM5	
32.	HTTPServlet, Request, Response.	1	15/12/2021		TLM2 TLM5	
33.	HTTPSession, Cookie concept, Assignment IV.	1	18/12/2021		TLM2 TLM5 TLM6	
34.	Database access by using Servlets	1	20/12/2021		TLM2 TLM5	
No. of classes required to complete UNIT-IV: 08				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	HOD Sign Weekly
35.	Intro., Lifecycle of JSP.	1	22/12/2021		TLM2 TLM5	
36.	Scripting elements, Implicit objects.	1	27/12/2021		TLM2 TLM5	
37.	Directive elements, Action elements.	1	29/12/2021		TLM2 TLM5	
38.	Error handling, debugging.	1	03/01/2022		TLM2 TLM5	
39.	Access database from JSP pages.	1	05/01/2022		TLM2 TLM5	
40.	Strut Framework.	1	08/01/2022		TLM2 TLM5	
41.	MVC design pattern. Assignment V.	1	10/01/2022		TLM2 TLM5 TLM6	
42.	Strut main components, Controller components	1	12/01/2022		TLM2 TLM5	
No. of classes required to complete UNIT-V: 08				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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

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



## PART-D

### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor  
(Mr. N. SrinivasaRao)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y. V. B. Reddy)

HOD  
(Dr. D. Veeraiah)



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution

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

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

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-A/S
<b>ACADEMIC YEAR</b>	: 2021-22
<b>COURSE NAME &amp; CODE</b>	: Automata Theory & Compiler Design – 17CI15
<b>L-T-P STRUCTURE</b>	: 3- -
<b>COURSE CREDITS</b>	3
<b>COURSE INSTRUCTOR</b>	: Dr.D.VENKATA SUBBAIAH
<b>COURSE COORDINATOR</b>	: Dr.D.VENKATA SUBBAIAH
<b>PRE-REQUISITE</b>	: 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:**

1. John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.
2. 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: Finite Automata and 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
1.	Basic Mathematical notations and techniques	1	20-09-2021		TLM1	CO1	T1,R1	
2.	classification of automata , definition and its applications	1	23-09-2021		TLM1 /TLM4	CO1	T1,R1	
3.	Deterministic Finite Automata	1	24-09-2021		TLM1 /TLM4	CO1	T1,R1	
4.	Nondeterministic Finite Automata	1	27-09-2021		TLM1 /TLM4	CO1	T1,R1	
5.	Equivalence of NFA and DFA (Conversion of NFA to DFA)	1	30-09-2021		TLM1 /TLM4	CO1	T1,R1	
6.	Minimization of DFA	1	01-10-2021		TLM1 /TLM4	CO1	T1,R2	
7.	Regular Expression(REs), Equivalence of RE and Finite Automata( Conversion of RE to FA)	1	04-10-2021		TLM1 /TLM4	CO1	T1,R2	
8.	Conversion of Finite automata to Regular expression	1	07-10-2021		TLM1 /TLM4	CO1	T1,R1	
9.	Pumping lemma for Regular language and closure properties	1	08-10-2021		TLM1 /TLM4	CO1	T1,R1	
No. of classes required to complete UNIT-I		9			No. of classes taken:			

## UNIT - 2: Context-free grammars and pushdown automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion (DD-MM-YY)	Actual Date of Completion (DD-MM-YY)	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Classification Of Grammars and introduction to Context-free grammar	1	11-10-2021		TLM1	CO2	T1,R1	
2.	Derivations and parse trees, and ambiguity	1	18-10-2021		TLM1 /TLM4	CO2	T1,R2	
3.	Simplification CFG: removing unit productions, null productions and useless productions	2	21-10-2021 & 22-10-2021		TLM1 /TLM4	CO2	T1,R2	
4.	Convert CFG to CNF and CFG to GNF	1	25-10-2021		TLM1 /TLM4	CO2	T1,R2	
5.	Pushdown automata- Deterministic and Nondeterministic	2	28-10-2021 & 29-10-2021		TLM1 /TLM4	CO2	T1,R1	
6.	Equivalence of PDA and CFG	1	01-11-2021		TLM1 /TLM4	CO2	T1,R2	
7.	Pumping lemma of context free language and properties of CFLs	2	04-11-2021 & 05-11-2021		TLM1 /TLM4	CO2	T1,R2	
No. of classes required to complete <b>UNIT-2</b>		10			No. of classes taken:			

**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 Outcomes	Text Book followed	HOD Sign Weekly
1.	Introduction to Language translator, Basic language Processing system	1	15-11-2021		TLM1/ TLM2	CO4	T2,R4	
2.	Phases of a compiler and example	1	18-11-2021		TLM2 /TLM4	CO4	T2,R4	
3.	Lexical analyzer - definitions, Specification of tokens	1	19-11-2021		TLM2 /TLM4	CO4	T2,R4	
4.	recognition of tokens ,and input buffering	1	22-11-2021		TLM2 /TLM4	CO4	T2,R4	
5.	Design of Lexical analyzer using LEX tool	1	25-11-2021		TLM2 /TLM4	CO4	T2,R4	
6.	Role of parser, top-down parser design methods- Recursive descent and predictive parser	1	26-11-2021		TLM2 /TLM4	CO4	T2,R4	
7.	Bottom-up parsing- Handle pruning, shift-reduce parsing	1	29-11-2021		TLM2 /TLM4	CO4	T2,R4	
8.	LR parsers- SLR,CLR and LALR parser design methods and YACC tool	1	02-12-2021		TLM2 /TLM4	CO4	T2,R4	
No. of classes required to complete <b>UNIT-3</b>		8			No. of classes taken:			

**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
10.	Attribute Grammar-Syntax directed definition	1	03-12-2021		TLM1/ TLM2	CO4	T2,R4	
11.	Translation schemes	1	06-12-2021		TLM2 /TLM4	CO4	T2,R4	
13.	Applications of SDTs – syntax tree; Intermediate code generation – syntax tree, 3-address code, and SSA	1	09-12-2021		TLM2  /TLM4	CO4	T2,R4	
14.	Translation of statements and expressions	1	10-10-2020		TLM2 /TLM4	CO4	T2,R4	
15.	Run-time storage organization and storage allocation strategies	1	13-12-20201		TLM2 /TLM4	CO4	T2,R4	
16.	Access to non-local data	1	16-12-2021		TLM2 /TLM4	CO4	T2,R4	
17.	parameter passing techniques	1	17-12-2021		TLM2 /TLM4	CO4	T2,R4	
No. of classes required to complete <b>UNIT-4</b>		7			No. of classes taken:			

**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
1.	Construction basic blocks and flow graphs	1	20-12-2021		TLM2 /TLM4	CO5	T2,R3	
2.	The principal sources of optimization	1	23-12-2021		TLM2 /TLM4	CO5	T2,R3	
3.	Optimization of Basic Blocks	1	24-12-2021		TLM2 /TLM4	CO5	T2,R4	
4.	Loops in flow graph	1	27-12-2021		TLM2 /TLM4	CO5	T2,R4	
5.	Issues in the design of a code generator and generic code generation algorithm	2	30-12-2021& 31-12-2021		TLM2 /TLM4	CO5	T2,R3	
6.	Register allocation and Assignment Peephole optimization	1	03-1-2022		TLM2 /TLM4	CO5	T2,R3	
7.	DAG representation of basic blocks and generating the code from DAG	1	06-01-2022		TLM2 /TLM4	CO5	T2,R3	
No. of classes required to complete UNIT-5		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
1	Introduction to Turing machine	1	7-01-2022					
2	Decidability and Undecidability	1	10-01-2022					



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: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	1,2,3,4,5	B=20
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B=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:**

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

norms of the engineering practice.

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

**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>	Dr D Venkata Subbaiah	Dr D Venkata Subbaiah	Dr D Venkata Subbaiah	Dr. D VEERAI AH
<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

**PROGRAM** : B.Tech. V-Sem., CSE-A/S  
**ACADEMIC YEAR** : 2021 -22  
**COURSE NAME & CODE** : OPERATING SYSTEMS -17CS04  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : Dr. CH VENKATA NARAYANA  
**COURSE COORDINATOR** : Dr. Ch. Venkata Narayana  
**MODULE COORDINATOR**: Dr. Ch. Venkata Narayana  
**PRE-REQUISITE**: Knowledge of Computer fundamentals, Data Structures & CO.

#### **COURSE OBJECTIVE:**

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

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

**CO1:** Identify the functional aspects and implementation methods (system call And System programs of different modules in a general-purpose operating System).

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

**CO3:** Analyse the process synchronization methods and deadlock handling Approaches employed in operating systems.

**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 & PSOs):**

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	-	-	-	-	-	-	-	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)

**TEXT BOOK/S:**

1. Silberschatz & Galvin, —Operating System Concepts, Wiley, 7th edition, 2007.

**REFERENCES:**

1. William Stallings, —Operating Systems, PHI, 5th Edition, 2004.
2. Charles Crowley, —Operating Systems: A Design-Oriented Approach, TMH Publications, 1998.
3. Andrew S. Tanenbaum, —Modern Operating Systems, PHI, 2nd edition, 1995.
4. <http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/index.html>
5. <https://www.youtube.com/watch?v=jciGIvn7UfM&list=PLTgavEZk0mZX7P2WVuE6hN9qVnkTgrAc9>

**COURSE DELIVERY PLAN (LESSON PLAN): Section-C****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
1.	Computer system organization and architecture	1	20/09/21		TLM2	CO1	T1	
2.	Operating system structure and operations	1	22/09/21		TLM2	CO1	T1	
3.	Process management and memory management	1	24/09/21		TLM2	CO1	T1	
4.	Storage management and protection and security	1	27/09/21		TLM2	CO1	T1, R1	
5.	Distributed systems and special purpose systems	1	29/09/21		TLM2	CO1	T1, R1	
6.	Operating system services and user operating system interfaces	1	01/10/21		TLM2	CO1	T1, R1	
7.	System calls and types of system calls	1	04/10/21		TLM2	CO1	T1	
8.	System programs, OS design and implementation	1	06/10/21		TLM2	CO1	T1	
9.	OS structure and Virtual Machine	1	08/10/21		TLM2	CO1	T1	
10.	OS generation and System Boot	1	11/10/21		TLM2	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>10</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
11.	Concepts and process scheduling	1	18/10/21		TLM2	CO2	T1	

12.	Operations on process	1	22/10/21		TLM2	CO2	T1	
13.	IPC and examples on IPC	1	25/10/21		TLM2	CO2	T1	
14.	Communication in client server systems	1	27/10/21		TLM2	CO2	T1	
15.	Multithreading Models, Thread libraries and Thread issues	1	29/10/21		TLM2	CO2	T1, R1	
16.	Scheduling Criteria	1	01/11/21		TLM2	CO2	T1, R1	
17.	Scheduling algorithms	1	03/11/21		TLM2	CO2	T1, R1	
18.	Multi-Processor Scheduling	1	5/11/21		TLM2	CO2	T1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
19.	The Critical section problem, Peterson's solutions	1	15/11/21		TLM1	CO3	T1	
20.	Synchronization hardware	1	17/11/21		TLM1	CO3	T1	
21.	Semaphores, Classic problems of Synchronization	1	19/11/21		TLM1	CO3	T1	
22.	Monitors, Synchronization examples and atomic transactions	1	22/11/21		TLM1	CO3	T1, R1	
23.	System model and deadlock characterization	1	24/11/21		TLM1	CO3	T1, R1	
24.	Methods for Handling deadlocks and deadlock prevention	1	26/11/21		TLM1	CO3	T1	
25.	Deadlock Avoidance	1	29/11/21		TLM1	CO3	T1	
26.	Deadlock detection	1	01/12/21		TLM1	CO3	T1	
27.	Recovery from deadlock	1	03/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
28.	Swapping	1	06/12/21		TLM1	CO4	T1	
29.	Contiguous Memory Allocation	1	08/12/21		TLM1	CO4	T1	
30.	Paging and structure of a page table	1	10/12/21		TLM1	CO4	T1	
31.	Segmentation	1	13/12/21		TLM1	CO4	T1	

32.	Demand paging	1	15/12/21		TLM1	CO4	T1	
33.	Page replacement and allocation of frames	1	17/12/21		TLM1	CO4	T1	
34.	Thrashing	1	20/12/21		TLM1	CO4	T1	
35.	Memory mapped files		22/12/21					
36.	Allocating kernel memory		24/12/21					
<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
37.	The Concept of a file and access methods	1	27/12/21		TLM2	CO5	T1	
38.	File System structure	1	29/12/21		TLM2	CO5	T1	
39.	File system implementation	1	31/12/21		TLM2	CO5	T1	
40.	Directory implementation	1	3/01/22		TLM2	CO5	T1	
41.	Allocation methods	1	5/01/22		TLM2	CO5	T1	
42.	Free space management	1	7/01/22		TLM2	CO5	T1	
43.	Efficiency of the file system	1	10/01/22		TLM2	CO5	T1	
44.	Performance and recovery	1	12/01/22		TLM2	CO5	T1	
<b>No. of classes required to complete UNIT-V</b>		<b>08</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
45.	Realtime systems	1						
46.	Network management	1						
47.	Kernel modules	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:**

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



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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

**PSO 1:**

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

**PSO 2:**

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

**PSO 3:**

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

<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>	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
<b>Signature</b>				



**SCHEDULE:**

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Basics of UML	2			DM5
2.	Basics of Tool used for Drawing Diagrams like Gliffy, Umbrello, Rational Rose etc.	2			DM5
3.	Use case Diagrams for CaseStudies	2			DM5
4.	Class Diagrams for 6 Case Studies	2			DM5
5.	Object Diagrams for 6 Case Studies	2			DM5
6.	Sequence Diagrams for 6CaseStudies	2			DM5
7.	Communication Diagrams For 6Case Studies	2			DM5
8.	Activity Diagrams for 6 Case Studies	2			DM5
9.	State Chart Diagrams for 6 CaseStudies	2			DM5
10.	Component Diagrams for 6 CaseStudies	2			DM5
11.	Deployment Diagrams for 6 CaseStudies	2			DM5
12.	Class Diagram/Object Diagram: i) Drawing Editor ii) Converter	2			DM5
13.	Class Diagram/Object Diagram: i) Media Player ii) Pizza Toppings Selection				DM5

**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			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

## PART-C

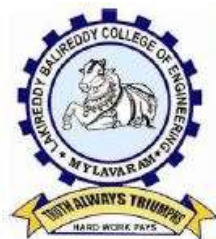
### PROGRAMME OUTCOMES (POs):

PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice
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PO 12	<b>Life-long learning:</b> Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

<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. D. Veeraiah</b>	<b>Dr. D. Veeraiah</b>	<b>Dr. Ch. V. Narayana</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution

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

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

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

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : N. SRINIVASA RAO  
Course Name & Code : Web Technologies Lab - 17CI66  
L-T-P Structure : 0-0-2 Credits : 1  
Program/Sem/Sec : B.Tech., CSE., V-Sem., A Sec. A.Y : 2021-22

**PRE-REQUISITE:**C, JAVA & DBMS

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

<b>CO 1</b>	Design and implement static & dynamic websites.
<b>CO 2</b>	Create reusable components by using Java Beans.
<b>CO 3</b>	Design and implement data driven web applications.
<b>CO 4</b>	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO2</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO3</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

### **TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEYDreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.
- T3** Bill Siggelkow, "Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

- R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.
- R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

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

<b>S.No.</b>	<b>Topics to be covered</b>	<b>No. of Classes Required</b>	<b>Tentative Date of Completion</b>	<b>Actual Date of Completion</b>	<b>Teaching Learning Methods</b>	<b>HOD Sign Weekly</b>
1.	Introduction to Web Technologies Lab, COs.	1	21/09/2021		<b>TLM5 TLM8</b>	
2.	Lab Cycle-1	1	28/09/2021		<b>TLM5 TLM8</b>	
3.	Lab Cycle-2	1	05/10/2021		<b>TLM5 TLM8</b>	
4.	Lab Cycle-3,4	1	26/10/2021		<b>TLM5 TLM8</b>	
5.	Lab Cycle-5	1	02/11/2021		<b>TLM5 TLM8</b>	
6.	Lab Cycle-6	1	16/11/2021		<b>TLM5 TLM8</b>	
7.	Lab Cycle-7	1	23/11/2021		<b>TLM5 TLM8</b>	
8.	Lab Cycle-8	1	30/11/2021		<b>TLM5 TLM8</b>	
9.	Lab Cycle-9	1	07/12/2021		<b>TLM5 TLM8</b>	
10.	Lab Cycle-10	1	14/12/2021		<b>TLM5 TLM8</b>	
11.	Lab Cycle-11	1	21/12/2021		<b>TLM5 TLM8</b>	
12.	Lab Cycle-12	1	28/12/2021		<b>TLM5 TLM8</b>	
13.	Lab Cycle-13	1	04/01/2022		<b>TLM5 TLM8</b>	
14.	Lab Cycle-14	1	11/01/2022		<b>TLM5 TLM8</b>	
15.	Internal Exam	1	25/01/2022		<b>TLM5 TLM8</b>	

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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Day-Day Performance	I1=20
Viva	I2=5
Internal Test	I3=10
Attendance	I4=5
Internal Exam (A = I1+I2+I3+I4)	A=40
End Exam (B)	B=60
Total Marks = A+B	100

### PART-D

#### PROGRAMME OUTCOMES (POs):

<b>PO 1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO 2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO 3</b>	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO 4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
<b>PO 6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
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<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

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

Course Instructor  
(Mr. N. SrinivasaRao)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y. V. B. Reddy)

HOD  
(Dr. D. Veeraiah)

# 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-A sec  
**ACADEMIC YEAR** : 2021 -22  
**COURSE NAME & CODE** : ADVANCED GRAPH ALOGRITHMS -17CS90  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : Dr. S Jayaprada  
**COURSE COORDINATOR** : Dr. S Jayaprada  
**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-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
1.	Introduction to Graphs & its Applications	1	21/09/21		TLM1	CO1	T1	
2.	Basics of Paths, Cycles, and Trails	1	22/09/21		TLM1	CO1	T1	
3.	Connection, Bipartite Graphs,	1	25/09/21		TLM1	CO1	T1	
4.	Eulerian Circuits,	1	28/09/21		TLM1	CO1	T1, R1	
5.	Vertex Degrees and Counting	1	29/09/21		TLM1	CO1	T1, R1	
6.	Degree-sum formula	1	05/10/21		TLM1	CO1	T1, R1	
7.	The Chinese Postman Problem	1	06/10/21		TLM1	CO1	T1	
8.	Graphic Sequences.	1	09/10/21		TLM1	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>08</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
9.	Trees and Distance	1	20/10/21		TLM1	CO2	T1	
10.	Properties of Trees	1	23/10/21		TLM1	CO2	T1	
11.	Spanning Trees and Enumeration	1	26/10/21		TLM1	CO2	T1	
12.	Optimization and Trees.	2	27/10/21, 30/10/21		TLM1	CO2	T1	
13.	Matrix-tree computation	1	02/11/21		TLM1	CO2	T1, R1	
14.	Cayley's Formula	1	03/11/21		TLM1	CO2	T1, R1	
15.	Prufer code	1	06/11/21		TLM1	CO2	T1, R1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
16.	Matchings and Covers	1	16/11/21		TLM1	CO3	T1	
17.	Hall's Condition, Min-Max Theorem	1	17/11/21		TLM1	CO3	T1	
18.	Independent Sets, Covers and Maximum Bipartite Matching	1	20/11/21		TLM1	CO3	T1	
19.	Augmenting Path Algorithm	1	23/11/21		TLM1	CO3	T1, R1	
20.	Weighted Bipartite Matching, Hungarian Algorithm	1	24/11/21		TLM1	CO3	T1, R1	
21.	Stable Matchings and Faster Bipartite Matching	1	27/11/21		TLM1	CO3	T1	
22.	Factors & Perfect Matching in General Graphs	1	30/11/21		TLM1	CO3	T1	
23.	Matching in General Graphs:	1	01/12/21		TLM1	CO3	T1	
24.	Edmonds' Blossom Algorithm	1	04/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
25.	Connectivity and Paths: Cuts and Connectivity	1	07/12/21		TLM1	CO4	T1	
26.	k-Connected Graphs	1	08/12/21		TLM1	CO4	T1	
27.	Network Flow Ford-Fulkerson Labeling Algorithm,	1	14/12/21		TLM1	CO4	T1	
28.	Max-Flow Min-cut Theorem, Menger's Proof using Max-Flow Min-Cut Theorem.	2	15/12/21, 18/12/21		TLM1	CO4	T1	
29.	Vertex Coloring and Upper Bounds	1	21/12/21		TLM1	CO4	T1	
30.	Brooks' Theorem and Color-Critical Graphs	2	22/12/21, 25/12/21		TLM1	CO4	T1	
31.	Counting Proper Colorings	1	28/12/21		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
32.	Planar Graphs, Characterization of Planar Graphs	2	29/12/21, 04/01/22		TLM1	CO5	T2, R4	
33.	Kuratowski's Theorem, Wagner's Theorem	2	05/01/22, 08/01/22		TLM1	CO5	T2, R4	
34.	Line Graphs and Edge-coloring	1	11/01/22		TLM1	CO5	T2, R4	
35.	Hamiltonian Graph, Traveling Salesman Problem	1	12/01/22		TLM1	CO5	T2, R4	
36.	NP-Completeness, Dominating Sets.	1	15/01/22		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
37.	Graph Monors	1						
38.	Decomposition Tree Algorithms	2						
39.	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:**

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

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

**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
Name of the Faculty	Dr. S Jayaprada	Dr. S Jayaprada	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
Signature				



# 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 AND SCIENCE ENGINEERING

### COURSE HANDOUT

#### Part-A

**PROGRAM** : B.Tech., V-Sem., SEC-B  
**ACADEMIC YEAR** : 2021-22  
**COURSE NAME & CODE** : **ENGINEERING ECONAMICS & ACCOUNTANCY- 17HS01**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **B.KALYAN KUMAR**  
**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 Guptha, 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	20.09.2021		<b>TLM1</b>	CO1	T1	
2.	Economics- definitions, nature & scope	01	21.09.2021		<b>TLM1</b>		T1	
3.	Branches of economics, engineering economics –	01	23.09.2021		<b>TLM1</b>	CO1	T1	
4.	features and scope.	01	27.09.2021		<b>TLM1</b>	CO1	T1	
5.	Demand- types, determinants, law of demand	01	28.09.2021		<b>TLM1</b>	CO1	T1	
6.	Elasticity of demand – significance-	01	30.09.2021		<b>TLM1</b>	CO3	T1	
7.	Types of elasticity of demand	01	04.10.2021		<b>TLM2</b>	CO1	T1	
8.	Demand forecasting types- factor governing-	01	05.10.2021		<b>TLM1</b>	CO1	T1	
9.	Methods of demand forecasting.	01	07.10.2021		<b>TLM2</b>	CO1	T1	
10.	TUTORIAL-1	01	11.10.2021		<b>TLM3</b>	CO1	T1	
11.	Assignment/Quiz – 1	01	18.10.2021		<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	19.10.2021		<b>TLM1</b>	CO1	T1	
2.	Production function- isoquant and isocost.	01	21.10.2021		<b>TLM1</b>	CO1	T1	
3.	MRTS, least cost combination of inputs , law of returns	01	25.10.2021		<b>TLM2</b>	CO1	T1	

4.	Internal and external economies of scale	01	26.10.2021		<b>TLM1</b>	CO1	T1	
5.	Cost analysis: cost concepts, cost & output relationship in short run & long run,	01	28.10.2021		<b>TLM2</b>	CO1	T1	
6.	Break even analysis, determination of BEP	01	01.11.2021		<b>TLM1</b>	CO1	T1	
7.	Significance & limitation of BEA.	01	02.11.2021		<b>TLM1</b>	CO1	T1	
8.	TUTORIAL-2	01	04.11.2021		<b>TLM3</b>	CO1	T1	
9.	Assignment/Quiz – 2	01	8.11.2021		<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	15.11.2021		<b>TLM1</b>	CO3	T1	
2.	Types of markets, features & price output determinations under perfect competitions.	01	16.11.2021		<b>TLM1</b>	CO3	T1	
3.	Monopoly, monopolistic competitions, oligopoly markets.	01	18.11.2021		<b>TLM2</b>	CO3	T1	
4.	Pricing policies-	01	22.11.2021		<b>TLM1</b>	CO3	T1	
5.	Pricing objectives-methodes		23.11.2021			CO3	T1	
6.	Applications in business	01	25.11.2021		<b>TLM3, TLM9</b>	CO3	T1	
7.	Assignment/Quiz – 3	01	29.12.2021		<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	03.12.2021		<b>TLM1</b>	CO2	T1	
2.	Capital & its significance-types of capital	01	06.12.2021		<b>TLM1</b>	CO2	T1	
3.	Estimation of fixed cost and working capital	01	07.12.2021		<b>TLM1</b>	CO2	T1	
4.	Components of working capital & factors determining the need of working capital	01	09.12.2021		<b>TLM1</b>	CO4	T1	
5.	Sources of raising working capital.	01	13.12.2021		<b>TLM9</b>	CO2	T1	
6.	Capital budgeting significance- process	01	14.12.2021		<b>TLM1</b>	CO4	T1	

7.	Techniques of capital budgeting	01	16.12.2021		<b>TLM2</b>	CO4	T1	
8.	Non discounted cash flow techniques		20.12.2021			CO4	T1	
9.	Discounted cash flow techniques.	01	21.12.2021		<b>TLM1</b>	CO2	T1	
10.	TUTORIAL-4	01	23.12.2021		<b>TLM3</b>	CO2	T1	
11.	Assignment/Quiz – 4	01	27.12.2021		<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	28.12.2021		<b>TLM1</b>	CO5	T1	
2.	Accounting significance- book keeping- double entry system	01	03.01.2022		<b>TLM1</b>	CO5	T1	
3.	Journal- ledger- trail balance	01	04.01.2022		<b>TLM2</b>	CO5	T1	
4.	Final accounts with simple adjustments.	01	06.01.2022		<b>TLM1</b>	CO5	T1	
5.	Financial statement analysis through ratios.	01	06.01.2022		<b>TLM1</b>	CO5	T1	
6.	TUTORIAL-5, Assignment/Quiz – 5	01	06.01.2022		<b>TLM3</b>	CO5	T1	
No. of classes required to complete UNIT-V		06			No. of classes taken:			

Teaching Learning Methods			
<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:

Description	From	To	Weeks
I Phase of Instructions	20.09.2021	06.11.2021	7W
I Mid Examinations	08.11.2021	13.11.2021	1W
II Phase of Instructions	15.11.2021	15.01.2022	9W
II Mid Examinations	17.01.2022	22.01.2022	1W
Preparation and Practicals	24.01.2022	29.01.2022	1 W
Semester End Examinations	31.01.2022	12.02.2022	2W

### EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=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.

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**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.

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**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.

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**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.

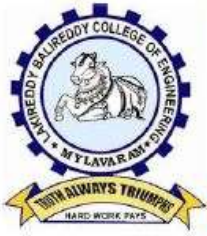
**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Graduate of the Information Technology will have the ability to

1. Organize, Analyze and Interpret the data to extract meaningful conclusions.
2. Design, Implement and evaluate a computer-based system to meet desired needs.
3. Develop IT application services with the help of different current engineering tools.

B.Kalyan Kumar	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>



# 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**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-B/S
<b>ACADEMIC YEAR</b>	: 2021-22
<b>COURSE NAME &amp; CODE</b>	: <b>HUMAN COMPUTER INTERACTION-17CI12</b>
<b>L-T-P STRUCTURE</b>	: 3
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: Mr. A.RAJA GOPAL
<b>COURSE COORDINATOR</b>	: Mr. J NAGESWARA RAO
<b>PRE-REQUISITE</b>	: Knowledge of Computer and Its Architecture.

### **Course Educational Objective (CEO):**

To provide basic methodologies and processes for designing interfaces.

To improve the interaction between users and computers by making computers more usable and receptive to the user 's needs.

To provide relevant principles of behaviour, mostly derived from cognitive science and psychology and other sources that describe human ethologic in particular environment, especially technological ones.

To make the students familiar with developing new interfaces and interaction techniques.

**Course Outcomes (COs):** After the completion of this course, student will be able to:

CO1: Identify the elements of good user interface design through effective GUI.

CO2: Identify the importance of human characteristics and understanding business functions.

CO3: Analyze screen design principles for making good decisions based on technological considerations in interface design.

CO4: Select the window, device and screen based controls through navigation schemes.

CO5: Identify the basic components and interaction devices to interact with the computers.

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

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

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

**TEXT BOOK:**

Wilbert O Galitz, 『The Essential Guide to User Interface Design』, Wiley DreamaTech, Third Edition, 2007.

**REFERENCES:**

1. Ben Shneiderman, Catherine Plaisant, —Designing the User Interface, Fourth Edition, Pearson Education, 2008.
2. ALAN DIX, JANET FINLAY, GREGORY D. ABOWD, RUSSELL BEALE, —Human Computer Interaction, Third Edition, PEARSON, 2009.
3. <http://ps.fragne1.edu.in/~dipalis/prgdwnl/eguid.pdf>
4. <https://www.alljntuworld.in/download/human-computer-interaction-materials-notes/>
5. [http://www.crectirupati.com/sites/default/files/lecture\\_notes/HCI-notes.pdf](http://www.crectirupati.com/sites/default/files/lecture_notes/HCI-notes.pdf)

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-B****UNIT –I: Introduction to Graphical User Interface**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Introduction :</b> Importance of user Interface, Overview of user Interface	1	21-09-2021		<b>TLM1</b>	
2.	Importance of good design	1	22-09-2021		<b>TLM1 /TLM4</b>	
3.	Benefits of good design, A brief history of Screen design	1	24-09-2021		<b>TLM1 /TLM4</b>	
4.	<b>The graphical user interface</b> – popularity of graphics	1	28-09-2021		<b>TLM1 /TLM4</b>	
5.	the concept of direct manipulation	1	29-09-2021		<b>TLM1 /TLM4</b>	
6.	graphical system Characteristics	1	01-10-2021		<b>TLM1 /TLM4</b>	
7.	Web user – Interface popularity	1	05-10-2021		<b>TLM1 /TLM4</b>	
8.	Characteristics- Principles of user interface.	1	06-10-2021		<b>TLM1 /TLM4</b>	
9.	Tutorial	1	08-10-2021		<b>TLM1 /TLM4</b>	
<b>No. of classes required to complete UNIT-I</b>		09				

**UNIT –II: Design process**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Design process</b> – Human interaction with computers	1	20-10-2021		TLM1	
2.	Importance of human characteristics	1	22-10-2021		TLM1	
3.	Importance of human characteristics	1	26-10-2021		TLM1 /TLM4	
4.	Human consideration	1	27-10-2021		TLM1 /TLM4	
5.	Human interaction speeds	1	29-10-2021		TLM1 /TLM4	
6.	Understanding business junctions	1	02-11-2021		TLM1 /TLM4	
7.	Understanding business junctions	1	03-11-2021		TLM1 /TLM4	
8.	Tutorial	1	05-11-2021			
No. of classes required to complete <b>UNIT-II</b>		08				

**UNIT –III: Screen Designing**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Screen Designing :</b> Design goals	1	16-11-2021		TLM1	
2.	Screen planning and purpose	1	17-11-2021		TLM1 /TLM4	
3.	organizing screen elements	1	19-11-2021		TLM1 /TLM4	
4.	ordering of screen data and content ,	1	23-11-2021		TLM1 /TLM4	
5.	screen navigation and flow	1	24-11-2021		TLM1 /TLM4	
6.	Visually pleasing composition , amount of information	1	26-11-2021		TLM1	
7.	Distinctiveness, focus and emphasis	1	30-11-2021		TLM1	
8.	Tutorial	1	01-12-2021		TLM1	
No. of classes required to complete <b>UNIT-III</b>		08				



**UNIT –IV: Windows**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Windows</b> – New and Navigation schemes	1	03-12-2021		<b>TLM1</b>	
2.	Structure of Menus, Functions of Menus	1	07-12-2021		<b>TLM1 /TLM4</b>	
3.	Phrasing the Menu, Selecting Menu Choices	1	08-12-2021		<b>TLM1 /TLM4</b>	
4.	Navigating Menus, Kinds of Graphical Menus	1	10-12-2021		<b>TLM1 /TLM4</b>	
5.	selection of window, Components of Window	1	14-12-2021		<b>TLM1 /TLM4</b>	
6.	Window Presentation Styles, Types of Windows,	1	15-12-2021		<b>TLM1 /TLM4</b>	
7.	Selection of devices based controls		17-12-2021			
8.	Tutorial	1	21-12-2021		<b>TLM 3 /TLM 6</b>	
No. of classes required to complete <b>UNIT-IV</b>		08				

**UNIT-V: Components**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Components</b> – text and messages,	1	22-12-2021		<b>TLM1</b>	
2.	<b>Text for web pages</b>	1	24-12-2021		<b>TLM1 /TLM4</b>	
3.	Icons and increases , Kinds of Icons,	1	28-12-2021		<b>TLM1 /TLM4</b>	
4.	characteristics of Icons	1	29-12-2021		<b>TLM1 /TLM4</b>	
5.	Multimedia, Colors uses. problems with choosing colors	1	31-12-2021		<b>TLM1 /TLM4</b>	
6.	Keyboard and function keys, pointing devices,	1	04-01-2022		<b>TLM 3 /TLM 6</b>	
7.	Digitization and generation, Drivers.	1	05-01-2022			
8.	Tutorial	1	07-01-2022			
No. of classes required to		08				

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

## PART-C

### EVALUATION PROCESS (R17 Regulations):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

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

	methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
<b>PO 6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
<b>PO 7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO 8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO 9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO 10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO 11</b>	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
<b>A.RAJA GOPAL</b>	<b>J.NAGESWARA RAO</b>	<b>DR.CH.V.NARAYANA</b>	<b>DR. D.VEERAI AH</b>



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** SWATHI BURAGADDA

**Course Name & Code** : UML& DESIGN PATTERNS& 17CS03

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech.-CSE/V Sem/Sec-B

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

**PREREQUISITE:** Knowledge in basics of C++ and JAVA Programming

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The main objective of this course is that the students become familiar with all phases of OOAD and master the main features of the UML. The students know about the main concepts of Object Technologies and how to apply them at work and develop the ability to analyze and solve challenging problem in various domains. Student will use systematic approach that focus and describe abstract systems of interaction between classes and objects.

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

<b>CO1</b>	<b>Select</b> the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.
<b>CO2</b>	<b>Apply</b> basic and Advanced Structural Modeling Concepts for designing real time applications.
<b>CO3</b>	<b>Analyze</b> Dynamic Aspects of a Software System using Behavioral Diagrams and Runtime environment of Software Systems.
<b>CO4</b>	<b>Identify</b> the Design Patterns to solve Object Oriented Design Problems
<b>CO5</b>	<b>Implement</b> Creational Patterns, Structural Patterns and Behavioral Patterns for given applications

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	3
CO2	-	-	2	1	2	-	-	-	-	-	-	-	1	-	3
CO3	-	-	2	1	2	-	-	-	-	-	-	-	-	-	3
CO4	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	-	1	2	2	-	-	-	-	-	-	1	-	-	-	3
			1 - Low			2 -Medium			3 - High						

### SYLLABUS

#### **UNIT - I: Introduction to UML:**

**Why We Model:** History of UML, The Importance of Modeling, Principles of Modeling, and Object Oriented Modeling

**Introducing the UML:** An Overview of the UML, Conceptual Model of the UML, Architecture, and Software Development Life Cycle.

#### **UNIT - II: Structural Modeling:**

**Basic Structural Modeling:** Classes, Relationships, Common Mechanisms, Diagrams and Class Diagrams.

**Advanced Structural Modeling:** Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, and Object Diagrams.

**UNIT – III: Behavioral Modeling:**

**Basic Behavioral Modeling:** Interactions, Interaction Diagrams, Use Cases, Use Case Diagrams, Activity Diagrams.

**Advanced Behavioral Modeling:** Events and Signals, State Machines, Time and Space, State Diagrams.

**Architectural Modeling:** Component and Deployment Diagrams.

**UNIT – IV: Introduction to Design Patterns:**

What is Design pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to select a Design Pattern, How to use a Design Pattern.

**UNIT – V: Types of Patterns:**

**Creational Patterns:** Abstract Factory, Builder and Factory method

**Structural Patterns:** Adapter, Decorator, and Facade.

**Behavioral Patterns:** Chain of Responsibility, State, and Strategy.

**TEXTBOOKS:**

- T1** Grady Booch, James Rumbaugh, Ivar Jacobson “The Unified Modeling Language User Guide, Pearson Education, 2nd 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).

**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, 1st Edition, ISBN: 9789352132775, 9352132777, 2014.
- R3** <https://www.tutorialspoint.com/uml/>
- R4** [https://sourcemaking.com/design\\_patterns](https://sourcemaking.com/design_patterns)
- R1** Meilir Page-Jones, “Fundamentals of Object-Oriented Design in UML”, Pearson Education, 1st Edition, and ISBN: 9788177586770, 8177586777, and 2007.

**PART-B**

**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	HOD Sign Weekly
1.	<b>Why we model:</b> History of UML, The importance of Modeling	1	20/09/2021		TLM1, TLM2	CO1	
2.	Principles of Modeling and Object Oriented Modeling	1	24/09/2021		TLM1, TLM2	CO1	
3.	<b>Introducing the UML:</b> Overview of the UML	1	25/09/2021		TLM1, TLM2	CO1	
4.	Conceptual Model of the UML & Building Blocks: Things – Part 1	1	27/09/2021		TLM1, TLM2	CO1	
5.	Building Blocks: Things – Part 2	1	01/10/2021		TLM1, TLM2	CO1	
6.	Relationships and UML Diagrams	1	04/10/2021		TLM1, TLM2	CO1	
7.	Rules of the UML & Common Mechanisms in the UML	1	08/10/2021		TLM1, TLM2	CO1	
8.	Extensible Mechanisms	1	09/10/2021		TLM1,	CO1	

	and UML Architecture				TLM2		
9.	Software Development Life Cycle	1	11/10/2021		TLM1, TLM2	C01	
<b>No. of classes required to complete UNIT-I:</b>			<b>9</b>	<b>No. of classes taken:</b>			

### UNIT-II: 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	HOD Sign Weekly
10	<b>Basic Structural Modeling:</b> Classes	1	18/10/2021		TLM1, TLM2	C02	
11	Relationships	1	18/10/2021		TLM1, TLM2	C02	
12	Common Mechanisms	1	22/10/2021		TLM1, TLM2	C02	
13	Diagrams	1	23/10/2021		TLM1, TLM2, TLM8	C02	
14	Class Diagrams	1	25/10/2021		TLM1, TLM2, TLM8	C02	
15	Advanced Relationships	1	29/10/2021		TLM1, TLM2,	C02	
16	Interfaces, Types and Roles	1	30/10/2021		TLM1, TLM2	C02	
17	Packages	1	01/11/2021		TLM1, TLM2, TLM8	C02	
18	Class Diagrams	1	05/11/2021		TLM1, TLM2, TLM8	C02	
19	Object Diagrams	1	06/11/2021		TLM1, TLM2, TLM8	C02	
<b>No. of classes required to complete UNIT-II:</b>			<b>10</b>	<b>No. of classes taken:</b>			

### UNIT-III: 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	HOD Sign Weekly
11	<b>Basic Behavioral Modeling:</b> Interactions	1	15/11/2021		TLM1, TLM2	C03	
12	Interaction Diagrams	1	19/11/2021		TLM1, TLM2, TLM8	C03	
13	Use Cases	1	20/11/2021		TLM1, TLM2	C03	
14	Use Case Diagrams,	1	20/11/2021		TLM1, TLM2,	C03	

					TLM8		
15	Activity Diagrams	1	22/11/2021		TLM1, TLM2, TLM8	C03	
16	<b>Advanced Behavioral Modeling:</b> Events and Signals	1	26/11/2021		TLM1, TLM2	C03	
17	State Machines	1	27/11/2021		TLM1, TLM2	C03	
18	Time and Space	1	29/11/2021		TLM1, TLM2	C03	
19	State Diagrams.	1	03/12/2021		TLM1, TLM2, TLM8	C03	
20	<b>Architectural Modeling:</b> Component and Deployment Diagrams	1	04/12/2021		TLM1, TLM2, TLM8	C03	
<b>No. of classes required to complete UNIT-III:</b>			<b>9</b>	<b>No. of classes taken:</b>			

#### UNIT-IV: 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	HOD Sign Weekly
21	What is Design pattern?,	1	06/12/2021		TLM1, TLM2	C04	
22	Design Patterns in Smalltalk MVC	1	10/12/2021		TLM1, TLM2	C04	
23	Describing Design Patterns,	1	11/12/2021		TLM1, TLM2	C04	
24	The Catalog of Design Patterns, Organizing the Catalog	1	13/12/2021		TLM1, TLM2	C04	
25	How Design Patterns Solve Design Problems	1	17/12/2021		TLM1, TLM2	C04	
26	How to select a Design Pattern	1	18/12/2021		TLM1, TLM2	C04	
27	How to use a Design Pattern	1	20/12/2021		TLM1, TLM2	C04	
<b>No. of classes required to complete UNIT-IV:7</b>					<b>No. of classes taken:</b>		

#### UNIT-V: 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	HOD Sign Weekly
25	<b>Creational Patterns:</b> Abstract Factory	1	24/12/2021		TLM1, TLM2	C05	
26	Builder method	1	27/12/2021		TLM1,	C05	

					TLM2	
27	Factory method	1	31/12/2021		TLM1, TLM2	
28	<b>Structural Patterns:</b> Adapter	1	03/01/2022		TLM1, TLM2	CO5
29	Decorator	1	07/01/2022		TLM1, TLM2	CO5
30	Façade	1	08/01/2022		TLM1, TLM2	
31	<b>Behavioral Patterns:</b> Chain of Responsibility	1	10/01/2022		TLM1, TLM2	CO5
32	State and Strategy	1	14/01/2022		TLM1, TLM2	CO5
<b>No. of classes required to complete UNIT-V: 8</b>					<b>No. of classes taken:</b>	

<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-1	20-09-2021	06-11-2022	7W
<b>I Mid Examinations</b>	<b>08-11-2021</b>	<b>13-11-2022</b>	<b>1W</b>
II Phase of Instructions	15-11-2021	15-01-2022	9W
<b>II Mid Examinations</b>	<b>17-01-2022</b>	<b>22-01-2022</b>	<b>1W</b>
Preparation and Practical's	24-01-2022	29-01-2022	1W

### **PART-C**

#### **EVALUATION PROCESS (R17 Regulation):**

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



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

## PART-D

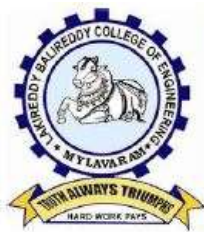
### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

<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>Ms.B. Swathi</b>	<b>Dr. D. Veeraiah</b>	<b>Dr. Ch. V.Narayana</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution

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

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

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : K DEVIPRIYA  
Course Name & Code : Web Technologies - 17CI14  
L-T-P Structure : 3-0-0 Credits : 3  
Program/Sem/Sec : B.Tech., CSE., V-Sem., B Sec. A.Y : 2021-22

**PRE-REQUISITE:**C, JAVA & DBMS

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

<b>CO 1</b>	Design web pages by using HTML and DHTML.
<b>CO 2</b>	Develop user defined tags and transfer data between components by using XML and Java Beans.
<b>CO 3</b>	Create data driven web applications by applying database connectivity techniques.
<b>CO 4</b>	Design and implement dynamic Webpages using server-side components like servlets.
<b>CO 5</b>	Understand concepts of JSP and struts framework and apply them in solving real world Problems.

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

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<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

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

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

**TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEYDreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.
- T3** Bill Siggelkow, "Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

- R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.
- R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****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	HOD Sign Weekly
1.	Introduction, COs.	1	20/09/2021		TLM1 TLM2 TLM5	
2.	Versions of HTML, Text formatting tags, images, lists, Links, marquee tag.	1	22/09/2021		TLM1 TLM2 TLM5	
3.	Tables, concept.	1	24/09/2021		TLM1 TLM2 TLM5	
4.	HTML Forms.	1	27/09/2021		TLM2 TLM5	
5.	HTML Frames.	1	29/09/2021		TLM2 TLM5	
6.	CSS Selectors	1	2/10/21		TLM2 TLM5	
7.	CSS Rule, selectors.	1	04/10/2021		TLM2 TLM5	
8.	Types of CSS.	1	06/10/2021		TLM2 TLM5	
9.	Properties in CSS.	1	08/10/2021		TLM2 TLM5	
10.	JavaScript, objects in JS. Assignment I	1	11/10/2021		TLM2 TLM5 TLM6	
11.	Dynamic HTML with JS, Form validation using JS.	1	18/10/2021		TLM2 TLM5	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

**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	HOD Sign Weekly
12.	Introduction to XML, XML Well formed-ness Rules	1	20/10/2021		TLM2 TLM5	
13.	XML DTD and its types.	1	22/10/2021		TLM2 TLM5	
14.	XML Schema.	1	25/10/2021		TLM2 TLM5	
15.	Presenting XML, XML.	1	27/10/2021		TLM2 TLM5	
16.	Processors: DOM & SAX.	1	29/10/2021		TLM2 TLM5	
17.	Introduction to JavaBeans,Persistence.	1	01/11/2021		TLM2 TLM5 TLM6	
18.	JavaBean API. Assignment II.	1	03/11/2021		TLM2 TLM5	
19.	EJB Introduction.	1	05/11/2021		TLM2 TLM5	
No. of classes required to complete UNIT-II :08				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	HOD Sign Weekly
20.	JDBC Introduction, Types of JDBC Drivers.	1	15/11/21		TLM2 TLM5	
21.	Java.sql.* package, Procedure to establish database connection	1	17/11/2021		TLM2 TLM5	
22.	JDBC steps,	1	19/11/2021		TLM2 TLM5	
23.	DB operations: Create, Insert.	1	22/11/2021		TLM2 TLM5	
24.	DB operations: Delete, Update.	1	24/11/2021		TLM2 TLM5	
25.	Types of Statements.	1	26/11/2021		TLM2 TLM5	
26.	ResultSet Types. Assignment III.	1	29/11/2021		TLM2 TLM5 TLM6	
27.	Example Programs using JDBC.	1	01/12/2021		TLM2 TLM5	

No. of classes required to complete UNIT-III :08	No. of classes taken:
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#### UNIT-IV: SERVLETS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Introduction to Servlets, Servlet Lifecycle.	1	03/12/2021		TLM2 TLM5	
29.	Servlet API: javax.servlet.*, javax.servlet.http.*.	1	06/12/2021		TLM2 TLM5	
30.	Servlet Request, Response.	1	08/12/2021		TLM2 TLM5	
31.	GenericServlet, ServletConfig.	1	10/12/2021		TLM2 TLM5	
32.	ServletContext, RequestDispatcher.	1	13/12/2021		TLM2 TLM5	
33.	HTTPServlet, Request, Response.	1	15/12/2021		TLM2 TLM5	
34.	HTTPSession, Cookie concept, Assignment IV.	1	17/12/2021		TLM2 TLM5 TLM6	
35.	Database access by using Servlets	1	20/12/2021		TLM2 TLM5	
No. of classes required to complete UNIT-IV: 08				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	HOD Sign Weekly
36.	Intro., Lifecycle of JSP.	1	22/12/2021		TLM2 TLM5	
37.	JSP Examples	1	24/12/2021		TLM2 TLM5	
38.	Scripting elements, Implicit objects.	1	27/12/2021		TLM2 TLM5	
39.	Directive elements,	1	29/12/2021		TLM2 TLM5	
40.	Action elements.	1	31/12/2021		TLM2 TLM5	
41.	Error handling, debugging.	1	03/01/2022		TLM2 TLM5	
42.	Access database from JSP pages.	1	05/01/2022		TLM2 TLM5	
43.	Strut Framework.	1	07/01/2022		TLM2 TLM5	
44.	MVC design pattern. Assignment V.	1	10/01/2022		TLM2 TLM5 TLM6	

45.	Strut main components, Controller components	1	12/01/2022		<b>TLM2</b> <b>TLM5</b>	
No. of classes required to complete UNIT-V:08				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

### **PART-C**

#### **EVALUATION PROCESS (R17 Regulations):**

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

## PART-D

### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

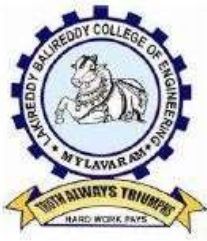


Course Instructor  
(Ms. K. Devi Priya)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y. V. B. Reddy)

HOD  
(Dr. D. Veeraiah)



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-B/S
<b>ACADEMIC YEAR</b>	: 2021-22
<b>COURSE NAME &amp; CODE</b>	: Automata Theory & Compiler Design – 17CI15
<b>L-T-P STRUCTURE</b>	: 3- -
<b>COURSE CREDITS</b>	3
<b>COURSE INSTRUCTOR</b>	: Dr. D. VENKATA SUBBAIAH
<b>COURSE COORDINATOR</b>	: Dr.D.VENKATA SUBBAIAH
<b>PRE-REQUISITE</b>	: 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:**

1. John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.
2. 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: Finite Automata and 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
1.	Basic Mathematical notations and techniques	1	21-09-2021		<b>TLM1</b>	CO1	T1,R1	
2.	classification of automata , definition and its applications	1	22-09-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
3.	Deterministic Finite Automata	1	25-09-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
4.	Nondeterministic Finite Automata	1	28-09-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
5.	Equivalence of NFA and DFA (Conversion of NFA to DFA)	1	29-09-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
6.	Minimization of DFA	1	05-10-2021		<b>TLM1 /TLM4</b>	CO1	T1,R2	
7.	Regular Expression(REs), Equivalence of RE and Finite Automata( Conversion of RE to FA)	1	06-10-2021		<b>TLM1 /TLM4</b>	CO1	T1,R2	
8.	Conversion of Finite automata to Regular expression	1	09-10-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
9.	Pumping lemma for Regular language and closure properties	1	20-10-2021		<b>TLM1 /TLM4</b>	CO1	T1,R1	
No. of classes required to complete UNIT-I		9			No. of classes taken:			

## UNIT - 2: Context-free grammars and pushdown automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion (DD-MM-YY)	Actual Date of Completion (DD-MM-YY)	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Classification of Grammars and introduction to Context-free grammar	1	23-10-2021		TLM1	CO2	T1,R1	
2.	Derivations and parse trees, and ambiguity	1	26-10-2021		TLM1 /TLM4	CO2	T1,R2	
3.	Simplification CFG: removing unit productions, null productions and useless productions	1	27-10-2021		TLM1 /TLM4	CO2	T1,R2	
4.	Convert CFG to CNF and CFG to GNF	1	30-10-2021		TLM1 /TLM4	CO2	T1,R2	
5.	Pushdown automata- Deterministic and Nondeterministic	1	02-11-2021		TLM1 /TLM4	CO2	T1,R1	
6.	Equivalence of PDA and CFG	1	03-11-2021		TLM1 /TLM4	CO2	T1,R2	
7.	Pumping lemma of context free language and properties of CFLs	1	06-11-2021		TLM1 /TLM4	CO2	T1,R2	
No. of classes required to complete <b>UNIT-2</b>		7			No. of classes taken:			

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

<b>S.No.</b>	<b>Topics to be covered</b>	<b>No. of Classes Required</b>	<b>Tentative Date of Completion</b>	<b>Actual Date of Completion</b>	<b>Teaching Learning Methods</b>	<b>Learning Outcome COs</b>	<b>Text Book followed</b>	<b>HOD Sign Weekly</b>
1.	Introduction to Language translator, Basic language Processing system	1	16-11-2021		<b>TLM1/ TLM2</b>	CO4	T2,R4	
2.	Phases of a compiler and example	1	17-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
3.	Lexical analyzer - definitions, Specification of tokens	1	20-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
4.	recognition of tokens ,and input buffering	1	23-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
5.	Design of Lexical analyzer using LEX tool	1	24-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
6.	Role of parser, top-down parser design methods- Recurive descent and predictive parser	1	27-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
7.	Bottom-up parsing- Handle pruning, shift-reduce parsing	1	30-11-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
8.	LR parsers- SLR,CLR and LALR parser design methods and YACC tool	1	01-12-2021		<b>TLM2 /TLM4</b>	CO4	T2,R4	
No. of classes required to complete <b>UNIT-3</b>		8			No. of classes taken:			

**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
10.	Attribute Grammar- Syntax directed definition	1	4-12-2021		TLM1/ TLM2	CO4	T2,R4	
11.	Translation schemes	1	07-12-2021		TLM2 /TLM4	CO4	T2,R4	
13.	Applications of SDTs – syntax tree; Intermediate code generation – syntax tree, 3-address code, and SSA	1	08-12-2021		TLM2  /TLM4	CO4	T2,R4	
14.	Translation of statements and expressions	1	11-10-2020		TLM2 /TLM4	CO4	T2,R4	
15.	Run-time storage organization and storage allocation strategies	1	14-12-2020		TLM2 /TLM4	CO4	T2,R4	
16.	Access to non-local data	1	15-12-2021		TLM2 /TLM4	CO4	T2,R4	
17.	parameter passing techniques	1	18-12-2021		TLM2 /TLM4	CO4	T2,R4	
No. of classes required to complete <b>UNIT-4</b>		7			No. of classes taken:			

**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
1.	Construction basic blocks and flow graphs	1	21-12-2021		TLM2 /TLM4	CO5	T2,R3	
2.	The principal sources of optimization	1	22-12-2021		TLM2 /TLM4	CO5	T2,R3	
3.	Optimization of Basic Blocks	1	28-12-2021		TLM2 /TLM4	CO5	T2,R4	
4.	Loops in flow graph	1	29-12-2021		TLM2 /TLM4	CO5	T2,R4	
5.	Issues in the design of a code generator and generic code generation algorithm	1	04-01-2022		TLM2 /TLM4	CO5	T2,R3	
6.	Register allocation and Assignment Peephole optimization	1	05-01-2022		TLM2 /TLM4	CO5	T2,R3	
7.	DAG representation of basic blocks and generating the code from DAG	1	08-01-2022		TLM2 /TLM4	CO5	T2,R3	
No. of classes required to complete UNIT-5		7			No. of classes taken:			

**Contents beyond the Syllabus:**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
1	Introduction to Turing machine	1	11-01-2022					
2	Decidability and Undecidability	1	12-01-2022					



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: $B=75\% \text{ of Max}(B1,B2)+25\% \text{ of Min}(B1,B2)$	1,2,3,4,5	B=20
<b>Cumulative Internal Examination : A+B</b>	<b>1,2,3,4,5</b>	<b>A+B=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:**

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

norms of the engineering practice.

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

**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>	Dr D Venkata Subbaiah	Dr D Venkata Subbaiah	Dr D Venkata Subbaiah	Dr. D VEERAI AH
<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

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

**ACADEMIC YEAR** : 2021 -22

**COURSE NAME & CODE** : OPERATING SYSTEMS -17CS04

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

**COURSE CREDITS** : 3

**COURSE INSTRUCTOR** : Dr. CH VENKATA NARAYANA

**COURSE COORDINATOR** : Dr. Ch. Venkata Narayana

**MODULE COORDINATOR**: Dr. Ch. Venkata Narayana

**PRE-REQUISITE**: Knowledge of Computer fundamentals, Data Structures & CO.

#### **COURSE OBJECTIVE:**

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

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

**CO1:** Identify the functional aspects and implementation methods (system call And System programs of different modules in a general-purpose operating System).

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

**CO3:** Analyse the process synchronization methods and deadlock handling Approaches employed in operating systems.

**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 & PSOs):**

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	-	-	-	-	-	-	-	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)

**TEXT BOOK/S:**

1. Silberschatz & Galvin, —Operating System Concepts, Wiley, 7th edition, 2007.

**REFERENCES:**

1. William Stallings, —Operating Systems, PHI, 5th Edition, 2004.
2. Charles Crowley, —Operating Systems: A Design-Oriented Approach, TMH Publications, 1998.
3. Andrew S. Tanenbaum, —Modern Operating Systems, PHI, 2nd edition, 1995.
4. <http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/index.html>
5. <https://www.youtube.com/watch?v=jciGIvn7UfM&list=PLTgavEZk0mZX7P2WVuE6hN9qVnkTgrAc9>

**COURSE DELIVERY PLAN (LESSON PLAN): Section-C****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
1.	Computer system organization and architecture	1	21/09/21		TLM2	CO1	T1	
2.	Operating system structure and operations	1	23/09/21		TLM2	CO1	T1	
3.	Process management and memory management	1	25/09/21		TLM2	CO1	T1	
4.	Storage management and protection and security	1	28/09/21		TLM2	CO1	T1, R1	
5.	Distributed systems and special purpose systems	1	30/09/21		TLM2	CO1	T1, R1	
6.	Operating system services and user operating system interfaces	1	05/10/21		TLM2	CO1	T1, R1	
7.	System calls and types of system calls	1	07/10/21		TLM2	CO1	T1	
8.	System programs, OS design and implementation	1	12/10/21		TLM2	CO1	T1	
9.	OS structure and Virtual Machine	1	16/10/21		TLM2	CO1	T1	
10.	OS generation and System Boot	1	19/10/21		TLM2	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>10</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
11.	Concepts and process scheduling	1	21/10/21		TLM2	CO2	T1	

12.	Operations on process	1	23/10/21		TLM2	CO2	T1	
13.	IPC and examples on IPC	1	26/10/21		TLM2	CO2	T1	
14.	Communication in client server systems	1	28/10/21		TLM2	CO2	T1	
15.	Multithreading Models, Thread libraries and Thread issues	1	30/10/21		TLM2	CO2	T1, R1	
16.	Scheduling Criteria	1	02/11/21		TLM2	CO2	T1, R1	
17.	Scheduling algorithms	1	06/11/21		TLM2	CO2	T1, R1	
18.	Multi-Processor Scheduling	1	16/11/21		TLM2	CO2	T1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
19.	The Critical section problem, Peterson's solutions	1	11/11/21		TLM1	CO3	T1	
20.	Synchronization hardware	1	18/11/21		TLM1	CO3	T1	
21.	Semaphores, Classic problems of Synchronization	1	20/11/21		TLM1	CO3	T1	
22.	Monitors, Synchronization examples and atomic transactions	1	23/11/21		TLM1	CO3	T1, R1	
23.	System model and deadlock characterization	1	25/11/21		TLM1	CO3	T1, R1	
24.	Methods for Handling deadlocks and deadlock prevention	1	27/11/21		TLM1	CO3	T1	
25.	Deadlock Avoidance	1	30/11/21		TLM1	CO3	T1	
26.	Deadlock detection	1	02/12/21		TLM1	CO3	T1	
27.	Recovery from deadlock	1	04/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
28.	Swapping	1	07/12/21		TLM1	CO4	T1	
29.	Contiguous Memory Allocation	1	09/12/21		TLM1	CO4	T1	
30.	Paging and structure of a page table	1	14/12/21		TLM1	CO4	T1	
31.	Segmentation	1	16/12/21		TLM1	CO4	T1	

32.	Demand paging	1	18/12/21		TLM1	CO4	T1	
33.	Page replacement and allocation of frames	1	21/12/21		TLM1	CO4	T1	
34.	Thrashing	1	23/12/21		TLM1	CO4	T1	
35.	Memory mapped files		28/12/21					
36.	Allocating kernel memory		30/12/21					
<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
37.	The Concept of a file and access methods	1	27/12/21		TLM2	CO5	T1	
38.	File System structure	1	29/12/21		TLM2	CO5	T1	
39.	File system implementation	1	30/12/21		TLM2	CO5	T1	
40.	Directory implementation	1	4/01/22		TLM2	CO5	T1	
41.	Allocation methods	1	6/01/22		TLM2	CO5	T1	
42.	Free space management	1	9/01/22		TLM2	CO5	T1	
43.	Efficiency of the file system	1	11/01/22		TLM2	CO5	T1	
44.	Performance and recovery	1	13/01/22		TLM2	CO5	T1	
<b>No. of classes required to complete UNIT-V</b>		<b>08</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
45.	Realtime systems	1						
46.	Network management	1						
47.	Kernel modules	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:**

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



5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

**PSO 1:**

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

**PSO 2:**

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

**PSO 3:**

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

<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>	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Ms. Swathi Buragadda

**Course Name & Code** : UML&DP LAB & 17CS622

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

**Credits:** 1

**Program/Sem/Sec** : B.Tech.-CSE/V Sem/Sec-B

**A.Y.:** 2020-21

**PRE-REQUISITE:** Knowledge in Basics of C++ or JAVA Programming

**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

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

<b>CO1</b>	<b>Analyze</b> Software Requirements for the given Software Application using Use Cases of UML.
<b>CO2</b>	<b>Develop</b> the UML Diagrams to view Software System in Static and Dynamic Aspect
<b>CO3</b>	Select a Design Pattern related to their problem and draw the Class and Object Diagrams using the UML notations.
<b>CO4</b>	<b>Improve</b> individual/team work skills, communication and report writing skills with ethical values..

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	<b>1</b>	-	<b>3</b>
<b>CO2</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	-	<b>1</b>	<b>3</b>
<b>CO3</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	<b>1</b>	-	<b>3</b>
<b>CO4</b>	-	-	-	-	-	-	-	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	-
			<b>1 - Low</b>			<b>2 - Medium</b>			<b>3 - High</b>						

## PART-B

### SCHEDULE:

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Basics of UML	2			DM5
2.	Basics of Tool used for Drawing Diagrams like Gliffy, Umbrello, Rational Rose etc.	2			DM5
3.	Use case Diagrams for CaseStudies	2			DM5
4.	Class Diagrams for 6 Case Studies	2			DM5
5.	Object Diagrams for 6 Case Studies	2			DM5
6.	Sequence Diagrams for 6CaseStudies	2			DM5
7.	Communication Diagrams For 6Case Studies	2			DM5
8.	Activity Diagrams for 6 Case Studies	2			DM5
9.	State Chart Diagrams for 6 CaseStudies	2			DM5
10.	Component Diagrams for 6 CaseStudies	2			DM5
11.	Deployment Diagrams for 6 CaseStudies	2			DM5
12.	Class Diagram/Object Diagram: i) Drawing Editor ii) Converter	2			DM5
13.	Class Diagram/Object Diagram: i) Media Player ii) Pizza Toppings Selection				DM5

### 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			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

## PART-C

### PROGRAMME OUTCOMES (POs):

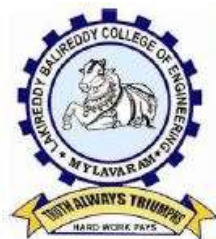
PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

**PSO 3** To inculcate an ability to analyze, design and implement database applications.

<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>Ms.B. Swathi</b>	<b>Dr. D. Veeraiah</b>	<b>Dr. Ch. V. Narayana</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I) ISO 9001:2015 Certified Institution

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

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

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : K DEVIPRIYA  
Course Name & Code : Web Technologies Lab- 17CI66  
L-T-P Structure : 0-0-2 Credits : 1  
Program/Sem/Sec : B.Tech., CSE., V-Sem., B Sec. A.Y : 2021-22

**PRE-REQUISITE:**C, JAVA & DBMS

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

<b>CO 1</b>	Design and implement static & dynamic websites.
<b>CO 2</b>	Create reusable components by using Java Beans.
<b>CO 3</b>	Design and implement data driven web applications.
<b>CO 4</b>	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO2</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO3</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

### **TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEYDreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.
- T3** Bill Siggelkow, "Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

- R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.
- R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

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

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Web Technologies Lab, COs.	1	23/09/2021		TLM5 TLM8	
2.	Lab Cycle-1	1	30/09/2021		TLM5 TLM8	
3.	Lab Cycle-2	1	07/10/2021		TLM5 TLM8	
4.	Lab Cycle-3	1	21/10/2021		TLM5 TLM8	
5.	Lab Cycle-4	1	28/10/2021		TLM5 TLM8	
6.	Lab Cycle-5,6	1	18/11/2021		TLM5 TLM8	
7.	Lab Cycle-7	1	25/11/2021		TLM5 TLM8	
8.	Lab Cycle-8	1	30/11/2021		TLM5 TLM8	
9.	Lab Cycle-9	1	09/12/2021		TLM5 TLM8	
10.	Lab Cycle-10	1	16/12/2021		TLM5 TLM8	
11.	Lab Cycle-11	1	23/12/2021		TLM5 TLM8	
12.	Lab Cycle-12	1	30/12/2021		TLM5 TLM8	
13.	Lab Cycle-13,14	1	06/01/2022		TLM5 TLM8	
14.	Internal Exam	1	22/01/2022		TLM5 TLM8	

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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

<b>Evaluation Task</b>	<b>Marks</b>
Day-Day Performance	I1=20
Viva	I2=5
Internal Test	I3=10
Attendance	I4=5
Internal Exam (A = I1+I2+I3+I4)	A=40
End Exam (B)	B=60
Total Marks = A+B	100

### PART-D

#### PROGRAMME OUTCOMES (POs):

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



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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

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

Course Instructor  
(Ms. K. Devi Priya)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y. V. B. Reddy)

HOD  
(Dr. D. Veeraiah)

# 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-B sec  
**ACADEMIC YEAR** : 2021 -22  
**COURSE NAME & CODE** : ADVANCED GRAPH ALOGRITHMS -17CS90  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : Dr. S Jayaprada  
**COURSE COORDINATOR** : Dr. S Jayaprada  
**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-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
1.	Introduction to Graphs & its Applications	1	21/09/21		TLM1	CO1	T1	
2.	Basics of Paths, Cycles, and Trails	1	22/09/21		TLM1	CO1	T1	
3.	Connection, Bipartite Graphs,	1	25/09/21		TLM1	CO1	T1	
4.	Eulerian Circuits,	1	28/09/21		TLM1	CO1	T1, R1	
5.	Vertex Degrees and Counting	1	29/09/21		TLM1	CO1	T1, R1	
6.	Degree-sum formula	1	05/10/21		TLM1	CO1	T1, R1	
7.	The Chinese Postman Problem	1	06/10/21		TLM1	CO1	T1	
8.	Graphic Sequences.	1	09/10/21		TLM1	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>08</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
9.	Trees and Distance	1	20/10/21		TLM1	CO2	T1	
10.	Properties of Trees	1	23/10/21		TLM1	CO2	T1	
11.	Spanning Trees and Enumeration	1	26/10/21		TLM1	CO2	T1	
12.	Optimization and Trees.	2	27/10/21, 30/10/21		TLM1	CO2	T1	
13.	Matrix-tree computation	1	02/11/21		TLM1	CO2	T1, R1	
14.	Cayley's Formula	1	03/11/21		TLM1	CO2	T1, R1	
15.	Prufer code	1	06/11/21		TLM1	CO2	T1, R1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
16.	Matchings and Covers	1	16/11/21		TLM1	CO3	T1	
17.	Hall's Condition, Min-Max Theorem	1	17/11/21		TLM1	CO3	T1	
18.	Independent Sets, Covers and Maximum Bipartite Matching	1	20/11/21		TLM1	CO3	T1	
19.	Augmenting Path Algorithm	1	23/11/21		TLM1	CO3	T1, R1	
20.	Weighted Bipartite Matching, Hungarian Algorithm	1	24/11/21		TLM1	CO3	T1, R1	
21.	Stable Matchings and Faster Bipartite Matching	1	27/11/21		TLM1	CO3	T1	
22.	Factors & Perfect Matching in General Graphs	1	30/11/21		TLM1	CO3	T1	
23.	Matching in General Graphs:	1	01/12/21		TLM1	CO3	T1	
24.	Edmonds' Blossom Algorithm	1	04/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
25.	Connectivity and Paths: Cuts and Connectivity	1	07/12/21		TLM1	CO4	T1	
26.	k-Connected Graphs	1	08/12/21		TLM1	CO4	T1	
27.	Network Flow Ford-Fulkerson Labeling Algorithm,	1	14/12/21		TLM1	CO4	T1	
28.	Max-Flow Min-cut Theorem, Menger's Proof using Max-Flow Min-Cut Theorem.	2	15/12/21, 18/12/21		TLM1	CO4	T1	
29.	Vertex Coloring and Upper Bounds	1	21/12/21		TLM1	CO4	T1	
30.	Brooks' Theorem and Color-Critical Graphs	2	22/12/21, 25/12/21		TLM1	CO4	T1	
31.	Counting Proper Colorings	1	28/12/21		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
32.	Planar Graphs, Characterization of Planar Graphs	2	29/12/21, 04/01/22		TLM1	CO5	T2, R4	
33.	Kuratowski's Theorem, Wagner's Theorem	2	05/01/22, 08/01/22		TLM1	CO5	T2, R4	
34.	Line Graphs and Edge-coloring	1	11/01/22		TLM1	CO5	T2, R4	
35.	Hamiltonian Graph, Traveling Salesman Problem	1	12/01/22		TLM1	CO5	T2, R4	
36.	NP-Completeness, Dominating Sets.	1	15/01/22		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
37.	Graph Monors	1						
38.	Decomposition Tree Algorithms	2						
39.	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:**

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

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

**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
Name of the Faculty	Dr. S Jayaprada	Dr. S Jayaprada	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
Signature				



# 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 AND SCIENCE ENGINEERING

### COURSE HANDOUT

#### Part-A

**PROGRAM** : B.Tech., V-Sem., SEC-C  
**ACADEMIC YEAR** : 2021-22  
**COURSE NAME & CODE** : **ENGINEERING ECONAMICS & ACCOUNTANCY- 17HS01**  
**L-T-P STRUCTURE** : 3-0-0  
**COURSE CREDITS** : 3  
**COURSE INSTRUCTOR** : **B.KALYAN KUMAR**  
**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 Guptha, 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	22.09.2021		<b>TLM1</b>	CO1	T1	
2.	Economics- definitions, nature & scope	01	23.09.2021		<b>TLM1</b>		T1	
3.	Branches of economics, engineering economics –	01	24.09.2021		<b>TLM1</b>	CO1	T1	
4.	features and scope.	01	28.09.2021		<b>TLM1</b>	CO1	T1	
5.	Demand- types, determinants, law of demand	01	29.09.2021		<b>TLM1</b>	CO1	T1	
6.	Elasticity of demand – significance-	01	30.09.2021		<b>TLM1</b>	CO3	T1	
7.	Types of elasticity of demand	01	06.10.2021		<b>TLM2</b>	CO1	T1	
8.	Demand forecasting types- factor governing-	01	05.10.2021		<b>TLM1</b>	CO1	T1	
9.	Methods of demand forecasting.	01	06.10.2021		<b>TLM2</b>	CO1	T1	
10.	TUTORIAL-1	01	11.10.2021		<b>TLM3</b>	CO1	T1	
11.	Assignment/Quiz – 1	01	20.10.2021		<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	21.10.2021		<b>TLM1</b>	CO1	T1	
2.	Production function- isoquant and isocost.	01	22.10.2021		<b>TLM1</b>	CO1	T1	
3.	MRTS, least cost combination of inputs , law of returns	01	27.10.2021		<b>TLM2</b>	CO1	T1	

4.	Internal and external economies of scale	01	28.10.2021		<b>TLM1</b>	CO1	T1	
5.	Cost analysis: cost concepts, cost & output relationship in short run & long run,	01	29.10.2021		<b>TLM2</b>	CO1	T1	
6.	Break even analysis, determination of BEP	01	03.11.2021		<b>TLM1</b>	CO1	T1	
7.	Significance & limitation of BEA.	01	04.11.2021		<b>TLM1</b>	CO1	T1	
8.	TUTORIAL-2	01	05.11.2021		<b>TLM3</b>	CO1	T1	
9.	Assignment/Quiz – 2	01	8.11.2021		<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	17.11.2021		<b>TLM1</b>	CO3	T1	
2.	Types of markets, features & price output determinations under perfect competitions.	01	18.11.2021		<b>TLM1</b>	CO3	T1	
3.	Monopoly, monopolistic competitions, oligopoly markets.	01	19.11.2021		<b>TLM2</b>	CO3	T1	
4.	Pricing policies-	01	24.11.2021		<b>TLM1</b>	CO3	T1	
5.	Pricing objectives-methodes		25.11.2021			CO3	T1	
6.	Applications in business	01	26.11.2021		<b>TLM3, TLM9</b>	CO3	T1	
7.	Assignment/Quiz – 3	01	29.12.2021		<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	03.12.2021		<b>TLM1</b>	CO2	T1	
2.	Capital & its significance-types of capital	01	08.12.2021		<b>TLM1</b>	CO2	T1	
3.	Estimation of fixed cost and working capital	01	09.12.2021		<b>TLM1</b>	CO2	T1	
4.	Components of working capital & factors determining the need of working capital	01	10.12.2021		<b>TLM1</b>	CO4	T1	
5.	Sources of raising working capital.	01	15.12.2021		<b>TLM9</b>	CO2	T1	
6.	Capital budgeting significance- process	01	16.12.2021		<b>TLM1</b>	CO4	T1	

7.	Techniques of capital budgeting	01	17.12.2021		<b>TLM2</b>	CO4	T1	
8.	Non discounted cash flow techniques		22.12.2021			CO4	T1	
9.	Discounted cash flow techniques.	01	23.12.2021		<b>TLM1</b>	CO2	T1	
10.	TUTORIAL-4	01	24.12.2021		<b>TLM3</b>	CO2	T1	
11.	Assignment/Quiz – 4	01	29.12.2021		<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	30.12.2021		<b>TLM1</b>	CO5	T1	
2.	Accounting significance- book keeping- double entry system	01	31.12.2022		<b>TLM1</b>	CO5	T1	
3.	Journal- ledger- trail balance	01	05.01.2022		<b>TLM2</b>	CO5	T1	
4.	Final accounts with simple adjustments.	01	06.01.2022		<b>TLM1</b>	CO5	T1	
5.	Financial statement analysis through ratios.	01	07.01.2022		<b>TLM1</b>	CO5	T1	
6.	TUTORIAL-5, Assignment/Quiz – 5	01	07.01.2022		<b>TLM3</b>	CO5	T1	
No. of classes required to complete UNIT-V		06			No. of classes taken:			

Teaching Learning Methods			
<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:

Description	From	To	Weeks
I Phase of Instructions	20.09.2021	06.11.2021	7W
I Mid Examinations	08.11.2021	13.11.2021	1W
II Phase of Instructions	15.11.2021	15.01.2022	9W
II Mid Examinations	17.01.2022	22.01.2022	1W
Preparation and Practicals	24.01.2022	29.01.2022	1 W
Semester End Examinations	31.01.2022	12.02.2022	2W

#### EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=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.

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

Graduate of the Information Technology will have the ability to

1. Organize, Analyze and Interpret the data to extract meaningful conclusions.
2. Design, Implement and evaluate a computer-based system to meet desired needs.
3. Develop IT application services with the help of different current engineering tools.

B.Kalyan Kumar	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>



# 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**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-C/S
<b>ACADEMIC YEAR</b>	: 2021-22
<b>COURSE NAME &amp; CODE</b>	: <b>HUMAN COMPUTER INTERACTION-17CI12</b>
<b>L-T-P STRUCTURE</b>	: 3
<b>COURSE CREDITS</b>	: 3
<b>COURSE INSTRUCTOR</b>	: Mr. A.RAJA GOPAL
<b>COURSE COORDINATOR</b>	: Mr. J NAGESWARA RAO
<b>PRE-REQUISITE</b>	: Knowledge of Computer and Its Architecture.

### **Course Educational Objective (CEO):**

To provide basic methodologies and processes for designing interfaces.

To improve the interaction between users and computers by making computers more usable and receptive to the user 's needs.

To provide relevant principles of behaviour, mostly derived from cognitive science and psychology and other sources that describe human ethologic in particular environment, especially technological ones.

To make the students familiar with developing new interfaces and interaction techniques.

**Course Outcomes (COs):** After the completion of this course, student will be able to:

CO1: Identify the elements of good user interface design through effective GUI.

CO2: Identify the importance of human characteristics and understanding business functions.

CO3: Analyze screen design principles for making good decisions based on technological considerations in interface design.

CO4: Select the window, device and screen based controls through navigation schemes.

CO5: Identify the basic components and interaction devices to interact with the computers.

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

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

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

**TEXT BOOK:**

Wilbert O Galitz, 『The Essential Guide to User Interface Design』, Wiley DreamaTech, Third Edition, 2007.

**REFERENCES:**

1. Ben Shneiderman, Catherine Plaisant, —Designing the User Interface, Fourth Edition, Pearson Education, 2008.
2. ALAN DIX, JANET FINLAY, GREGORY D. ABOWD, RUSSELL BEALE, —Human Computer Interaction, Third Edition, PEARSON, 2009.
3. <http://ps.fragne1.edu.in/~dipalis/prgdwnl/eguid.pdf>
4. <https://www.alljntuworld.in/download/human-computer-interaction-materials-notes/>
5. [http://www.crectirupati.com/sites/default/files/lecture\\_notes/HCI-notes.pdf](http://www.crectirupati.com/sites/default/files/lecture_notes/HCI-notes.pdf)

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN): Section-C****UNIT –I: Introduction to Graphical User Interface**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Introduction :</b> Importance of user Interface, Overview of user Interface	1	20-09-2021		<b>TLM1</b>	
2.	Importance of good design	1	23-09-2021		<b>TLM1 /TLM4</b>	
3.	Benefits of good design, A brief history of Screen design	1	25-09-2021		<b>TLM1 /TLM4</b>	
4.	<b>The graphical user interface</b> – popularity of graphics	1	30-09-2021		<b>TLM1 /TLM4</b>	
5.	the concept of direct manipulation	1	04-10-2021		<b>TLM1 /TLM4</b>	
6.	graphical system Characteristics	1	07-10-2021		<b>TLM1 /TLM4</b>	
7.	Web user – Interface popularity	1	09-10-2021		<b>TLM1 /TLM4</b>	
8.	Characteristics- Principles of user interface.	1	18-10-2021		<b>TLM1 /TLM4</b>	
9.	Tutorial	1	21-10-2021		<b>TLM1 /TLM4</b>	
<b>No. of classes required to complete UNIT-I</b>		09				

**UNIT –II: Design process**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Design process –</b> Human interaction with computers	1	23-10-2021		<b>TLM1</b>	
2.	Importance of human characteristics	1	25-10-2021		<b>TLM1</b>	
3.	Human consideration	1	28-10-2021		<b>TLM1 /TLM4</b>	
4.	Human interaction speeds	1	30-11-2021		<b>TLM1 /TLM4</b>	
5.	Understanding business junctions	1	01-11-2021		<b>TLM1 /TLM4</b>	
6.	Tutorial	1	06-11-2021		<b>TLM1 /TLM4</b>	
No. of classes required to complete <b>UNIT-II</b>		06				

**UNIT –III: Screen Designing**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Screen Designing :</b> Design goals	1	15-11-2021			
2.	Screen planning and purpose	1	18-11-2021		<b>TLM1</b>	
3.	organizing screen elements	1	20-11-2021		<b>TLM1 /TLM4</b>	
4.	ordering of screen data and content	1	22-11-2021		<b>TLM1 /TLM4</b>	
5.	screen navigation and flow	1	25-11-2021		<b>TLM1 /TLM4</b>	
6.	Visually pleasing composition	1	27-11-2021		<b>TLM1 /TLM4</b>	
7.	amount of information	1	29-11-2021		<b>TLM1</b>	
8.	Distinctiveness, focus and emphasis	1	02-12-2021		<b>TLM1</b>	
9.	Tutorial	1	04-12-2021		<b>TLM1</b>	
No. of classes required to complete <b>UNIT-III</b>		09				



**UNIT –IV: Windows**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Windows</b> – New and Navigation schemes	1	06-12-2021		<b>TLM1</b>	
2.	Structure of Menus, Functions of Menus	1	09-12-2021		<b>TLM1 /TLM4</b>	
3.	Phrasing the Menu, Selecting Menu Choices	1	11-12-2021		<b>TLM1 /TLM4</b>	
4.	Navigating Menus, Kinds of Graphical Menus	1	13-12-2021		<b>TLM1 /TLM4</b>	
5.	selection of window, Components of Window	1	16-12-2021		<b>TLM1 /TLM4</b>	
6.	Window Presentation Styles, Types of Windows,	1	18-12-2021		<b>TLM1 /TLM4</b>	
7.	Selection of devices based controls	1	20-12-2021			
8.	Tutorial	1	23-12-2021		<b>TLM 3 /TLM 6</b>	
No. of classes required to complete <b>UNIT-IV</b>		08				

**UNIT-V: Components**

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	<b>Components</b> – text and messages,	1	27-12-2021		<b>TLM1</b>	
2.	<b>Text for web pages,</b> Icons and increases , Kinds of Icons,	1	30-12-2021		<b>TLM1 /TLM4</b>	
3.	characteristics of Icons	1	01-01-2022		<b>TLM1 /TLM4</b>	
4.	Multimedia, Colors uses. problems with choosing colors	1	03-01-2022		<b>TLM1 /TLM4</b>	
5.	Keyboard and function keys, pointing devices,	1	06-01-2022		<b>TLM1 /TLM4</b>	
6.	Digitization and generation, Drivers.	1	08-01-2022		<b>TLM 3 /TLM 6</b>	
7.	Tutorial	1	10-01-2022			
No. of classes required to complete <b>UNIT-V</b>		07				

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

## PART-C

### EVALUATION PROCESS (R17 Regulations):

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

## PART-D

### PROGRAMME OUTCOMES (POs):

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

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

#### **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
<b>A.RAJA GOPAL</b>	<b>J.NAGESWARA RAO</b>	<b>DR.CH.V.NARAYANA</b>	<b>DR. D.VEERAI AH</b>



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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr.PAMULAPATI ASHOK REDDY

**Course Name & Code** : UML& DESIGN PATTERNS& 17CS03

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

**Credits:** 3

**Program/Sem/Sec** : B.Tech.–CSE/V Sem/Sec-C

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

**PREREQUISITE:** Knowledge in basics of C++ and JAVA Programming

**COURSE EDUCATIONAL OBJECTIVES (CEOs):** The main objective of this course is that the students become familiar with all phases of OOAD and master the main features of the UML. The students know about the main concepts of Object Technologies and how to apply them at work and develop the ability to analyze and solve challenging problem in various domains. Student will use systematic approach that focus and describe abstract systems of interaction between classes and objects.

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

<b>CO1</b>	<b>Select</b> the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.
<b>CO2</b>	<b>Apply</b> basic and Advanced Structural Modeling Concepts for designing real time applications.
<b>CO3</b>	<b>Analyze</b> Dynamic Aspects of a Software System using Behavioral Diagrams and Runtime environment of Software Systems.
<b>CO4</b>	<b>Identify</b> the Design Patterns to solve Object Oriented Design Problems
<b>CO5</b>	<b>Implement</b> Creational Patterns, Structural Patterns and Behavioral Patterns for given applications

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	3
CO2	-	-	2	1	2	-	-	-	-	-	-	-	1	-	3
CO3	-	-	2	1	2	-	-	-	-	-	-	-	-	-	3
CO4	2	1	3	-	-	-	-	-	-	-	-	-	-	-	3
CO5	-	1	2	2	-	-	-	-	-	-	1	-	-	-	3
			1 - Low			2 -Medium			3 - High						

### SYLLABUS

#### **UNIT - I: Introduction to UML:**

**Why We Model:** History of UML, The Importance of Modeling, Principles of Modeling, and Object Oriented Modeling

**Introducing the UML:** An Overview of the UML, Conceptual Model of the UML, Architecture, and Software Development Life Cycle.

#### **UNIT - II: Structural Modeling:**

**Basic Structural Modeling:** Classes, Relationships, Common Mechanisms, Diagrams and Class Diagrams.

**Advanced Structural Modeling:** Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages, and Object Diagrams.

**UNIT – III: Behavioral Modeling:**

**Basic Behavioral Modeling:** Interactions, Interaction Diagrams, Use Cases, Use Case Diagrams, Activity Diagrams.

**Advanced Behavioral Modeling:** Events and Signals, State Machines, Time and Space, State Diagrams.

**Architectural Modeling:** Component and Deployment Diagrams.

**UNIT – IV: Introduction to Design Patterns:**

What is Design pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to select a Design Pattern, How to use a Design Pattern.

**UNIT – V: Types of Patterns:**

**Creational Patterns:** Abstract Factory, Builder and Factory method

**Structural Patterns:** Adapter, Decorator, and Facade.

**Behavioral Patterns:** Chain of Responsibility, State, and Strategy.

**TEXTBOOKS:**

- T1** Grady Booch, James Rumbaugh, Ivar Jacobson “The Unified Modeling Language User Guide, Pearson Education, 2nd 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).

**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, 1st Edition, ISBN: 9789352132775, 9352132777, 2014.
- R3** <https://www.tutorialspoint.com/uml/>
- R4** [https://sourcemaking.com/design\\_patterns](https://sourcemaking.com/design_patterns)
- R1** Meilir Page-Jones, “Fundamentals of Object-Oriented Design in UML”, Pearson Education, 1st Edition, and ISBN: 9788177586770, 8177586777, and 2007.

**PART-B**

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

**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	HOD Sign Weekly
1.	<b>Why we model:</b> History of UML, The importance of Modeling	1	20-09-2021		TLM1, TLM2	CO1	
2.	Principles of Modeling and Object Oriented Modeling	1	23-09-2021		TLM1, TLM2	CO1	
3.	<b>Introduction the UML:</b> Overview of the UML	1	25-09-2021		TLM1, TLM2	CO1	
4.	Conceptual Model of the UML & Building Blocks: Things – Part 1	1	27-09-2021		TLM1, TLM2	CO1	
5.	Building Blocks: Things – Part 2	1	30-09-2021		TLM1, TLM2	CO1	
6.	Relationships and UML Diagrams	1	04-10-2021 07-10-2021		TLM1, TLM2	CO1	
7.	Rules of the UML & Common Mechanisms in the UML	1	09-10-2021 11-10-2021		TLM1, TLM2	CO1	

8.	Extensible Mechanisms and UML Architecture	1	18-10-2021		TLM1, TLM2	CO1	
9.	Software Development Life Cycle	1	21-10-2021		TLM1, TLM2	CO1	
<b>No. of classes required to complete UNIT-I:</b>				<b>No. of classes taken:</b>			

### UNIT-II: 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	HOD Sign Weekly
10	<b>Basic Structural Modeling:</b> Classes	1	23-10-2021		TLM1, TLM2	CO2	
11	Relationships , Common Mechanisms	1	25-10-2021		TLM1, TLM2	CO2	
12	Diagrams	1	28-10-2021		TLM1, TLM2	CO2	
13	Class Diagrams	1	30-10-2021		TLM1, TLM2, TLM8	CO2	
14	Advanced Relationships	1	30-10-2021		TLM1, TLM2, TLM8	CO2	
15	Interfaces, Types and Roles	1	01-11-2021		TLM1, TLM2,	CO2	
16	Packages	1	06-11-2021		TLM1, TLM2	CO2	
17	Object Diagrams	1	08-11-2021		TLM1, TLM2, TLM8	CO2	
<b>No. of classes required to complete UNIT-II:</b>				<b>No. of classes taken:</b>			

### UNIT-III: 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	HOD Sign Weekly
11	<b>Basic Behavioral Modeling:</b> Interactions	1	18-11-2021		TLM1, TLM2	CO3	
12	Interaction Diagrams	1	20-11-2021		TLM1, TLM2, TLM8	CO3	
13	Use Cases	1	22-11-2021		TLM1, TLM2	CO3	
14	Use Case Diagrams,	1	25-11-2021		TLM1, TLM2, TLM8	CO3	
15	Activity Diagrams	2	27-11-2021 29-11-2021		TLM1, TLM2, TLM8	CO3	
16	<b>Advanced Behavioral Modeling:</b> Events and Signals	1	02-12-2021		TLM1, TLM2	CO3	
17	State Machines	1	04-12-2021		TLM1, TLM2	CO3	
18	Time and Space	1	06-12-2021		TLM1, TLM2	CO3	

19	State Diagrams.	1	09-12-2021		TLM1, TLM2, TLM8	CO3	
20	<b>Architectural Modeling:</b> Component and Deployment Diagrams	2	11-12-2021 13-12-2021		TLM1, TLM2, TLM8	CO3	
<b>No. of classes required to complete UNIT-III:</b>				<b>No. of classes taken:</b>			

#### UNIT-IV: 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	HOD Sign Weekly
21	What is Design pattern?, Design Patterns in Smalltalk MVC	1	16-12-2021		TLM1, TLM2	CO4	
22	Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog	1	18-12-2021		TLM1, TLM2	CO4	
23	How Design Patterns Solve Design Problems	1	20-12-2021		TLM1, TLM2	CO4	
24	How to select a Design Pattern, How to use a Design Pattern	1	23-12-2021		TLM1, TLM2	CO4	
<b>No. of classes required to complete UNIT-IV:</b>				<b>No. of classes taken:</b>			

#### UNIT-V: 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	HOD Sign Weekly
25	<b>Creational Patterns:</b> Abstract Factory	1	27-12-2021		TLM1, TLM2	CO5	
26	Builder and Factory method	1	30-12-2021		TLM1, TLM2	CO5	
27	<b>Structural Patterns:</b> Adapter and Decorator	1	03-01-2022		TLM1, TLM2	CO5	
28	Facade	1	06-01-2022		TLM1, TLM2	CO5	
29	<b>Behavioral Patterns:</b> Chain of Responsibility	1	08-01-2022		TLM1, TLM2	CO5	
30	State and Strategy	1	10-01-2022		TLM1, TLM2	CO5	
<b>No. of classes required to complete UNIT-V:</b>				<b>No. of classes taken:</b>			

<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-1	20-09-2021	06-11-2022	7W
<b>I Mid Examinations</b>	<b>08-11-2021</b>	<b>13-11-2022</b>	<b>1W</b>
II Phase of Instructions	15-11-2021	15-01-2022	9W
<b>II Mid Examinations</b>	<b>17-01-2022</b>	<b>22-01-2022</b>	<b>1W</b>
Preparation and Practical's	24-01-2022	29-01-2022	1W

**PART-C**

**EVALUATION PROCESS (R17 Regulation):**

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



## PART-D

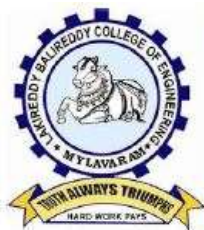
### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr.P.Ashok Reddy	Dr. D. Veeraiah	Dr. Ch. V.Narayana	Dr. D. Veeraiah
Signature				



# 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**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : P Vamsi Naidu  
 Course Name & Code : Web Technologies - 17CI14  
 L-T-P Structure : 3-0-0 Credits : 3  
 Program/Sem/Sec : B.Tech., CSE., V-Sem., C Sec. A.Y : 2021-22

**PRE-REQUISITE:** C, JAVA & DBMS

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

<b>CO 1</b>	Design web pages by using HTML and DHTML.
<b>CO 2</b>	Develop user defined tags and transfer data between components by using XML and Java Beans.
<b>CO 3</b>	Create data driven web applications by applying database connectivity techniques.
<b>CO 4</b>	Design and implement dynamic Webpages using server-side components like servlets.
<b>CO 5</b>	Understand concepts of JSP and struts framework and apply them in solving real world Problems.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<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

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

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

**TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEY Dreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.
- T3** Bill Siggelkow," Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

- R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.
- R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

**PART-B****COURSE DELIVERY PLAN (LESSON PLAN):****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	HOD Sign Weekly
1.	Introduction, COs.	1	20-09-2021		TLM2 TLM5	
2.	Versions of HTML, Text formatting tags, lists.	1	21-09-2021		TLM2 TLM5	
3.	Tables, images concept, Links, marquee tag.	1	23-09-2021		TLM2 TLM5	
4.	HTML Forms.	1	27-09-2021		TLM2 TLM5	
5.	HTML Frames.	1	28-09-2021		TLM2 TLM5	
6.	Types of CSS, CSS selectors. Assignment I.	1	30-09-2021		TLM2 TLM5	
7.	Properties in CSS.	1	04-10-2021		TLM2 TLM5	
8.	JavaScript Introduction, objects in JS.	1	05-10-2021		TLM2 TLM5	
9.	Dynamic HTML with JS.	1	07-10-2021		TLM2 TLM5	
10.	Form validation using JS.	1	11-10-2021		TLM2 TLM5	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

**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	HOD Sign Weekly
11.	Introduction to XML.	1	18-10-2021		TLM2 TLM5	
12.	XML DTD and its types.	1	19-10-2021		TLM2 TLM5	
13.	XML Schema, Presenting XML	1	21-10-2021		TLM2 TLM5	
14.	XML Processors: DOM & SAX.	1	25-10-2021		TLM2 TLM5	
15.	Introduction to JavaBeans, advantages.	1	26-10-2021		TLM2 TLM5	
16.	JavaBean Persistence.	1	28-10-2021		TLM2 TLM5	
17.	JavaBean API. Assignment II.	1	01-11-2021		TLM2 TLM5	
18.	EJB Introduction.	1	02-11-2021		TLM2 TLM5	
No. of classes required to complete UNIT-II : 08				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	HOD Sign Weekly
19.	JDBC Introduction, Types of JDBC Drivers.	1	15-11-2021			
20.	Java.sql package.	1	16-11-2021			
21.	Procedure to establish database connection	1	18-11-2021			
22.	JDBC steps.	1	22-11-2021			
23.	Database operations: Create, Insert.	1	23-11-2021			
24.	Database operations: Delete, Update, Types of Statements.	1	25-11-2021			
25.	ResultSet Types. Assignment III.	1	29-11-2021			
26.	Example Programs using JDBC.	1	30-11-2021		<b>TLM2</b> <b>TLM5</b>	
No. of classes required to complete UNIT-III : 08				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	HOD Sign Weekly
27.	Introduction to Servlets.	1	02-12-2021			
28.	Servlet Lifecycle.	1	06-12-2021			
29.	Servlet API: javax.servlet.*, .http.*.	1	07-12-2021			
30.	Servlet Request, Response.	1	09-12-2021			
31.	GenericServlet, ServletConfig.	1	13-12-2021			
32.	ServletContext, RequestDispatcher, HTTPServlet, Request, Response.	1	14-12-2021			
33.	HTTPSession, Assignment IV, Cookie Concepty	1	16-12-2021			
34.	Database access by using Servlets, Example Programs.	1	20-12-2021			
No. of classes required to complete UNIT-IV : 08				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	HOD Sign Weekly
35.	Intro., Lifecycle of JSP.	1	21-12-2021		TLM2 TLM5	
36.	Scripting elements.	1	23-12-2021		TLM2 TLM5	
37.	Implicit objects.	1	27-12-2021		TLM2 TLM5	
38.	Directive elements, Action elements.	1	28-12-2021		TLM2 TLM5	
39.	Error handling, debugging.	1	30-12-2021		TLM2 TLM5	
40.	Access database from JSP pages.	1	03-01-2022		TLM2 TLM5	
41.	Strut Framework.	1	04-01-2022		TLM2 TLM5	
42.	MVC design pattern.	1	06-01-2022		TLM2 TLM5	
43.	Strut main components.	1	10-01-2022		TLM2 TLM5	
44.	Controller components	1	11-01-2022		TLM2 TLM5	
No. of classes required to complete UNIT-V : 10				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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

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

### PART-D

#### PROGRAMME OUTCOMES (POs):

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

	of data, and synthesis of the information to provide valid conclusions.
<b>PO 5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
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<b>PO 11</b>	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO 12</b>	<b>Life-long learning:</b> Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### PROGRAMME SPECIFIC OUTCOMES (PSOs):

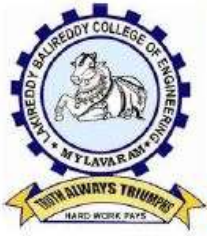
<b>PSO 1</b>	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
<b>PSO 2</b>	The ability to design and develop computer programs in networking, web applications and IoT as per the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

Course Instructor  
(Mr. P Vamsi Naidu)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y.V.B. Reddy)

HOD  
(Dr. D. Veeraiah)



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

<b>PROGRAM</b>	: B.Tech., V-Sem., CSE-C/S
<b>ACADEMIC YEAR</b>	: 2021-22
<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>	: Mr. K SUNDEEP SARADHI
<b>COURSE COORDINATOR</b>	: Dr. D VENKATA SUBBAIAH
<b>PRE-REQUISITE</b>	: 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:**

1. John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.
2. 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: Finite Automata and 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
1.	Basic Mathematical notations and techniques	1	22.09.2021		TLM1	CO1	T1,R1	
2.	classification of automata , definition and its applications	1	24.09.2021		TLM1 /TLM4	CO1	T1,R1	
3.	Deterministic Finite Automata	1	25.09.2021		TLM1 /TLM4	CO1	T1,R1	
4.	Nondeterministic Finite Automata	1	29.09.2021		TLM1 /TLM4	CO1	T1,R1	
5.	Equivalence of NFA and DFA (Conversion of NFA to DFA)	1	01.10.2021		TLM1 /TLM4	CO1	T1,R1	
6.	Minimization of DFA	1	06.10.2021		TLM1 /TLM4	CO1	T1,R2	
7.	Regular Expression	1	08.10.2021		TLM1 /TLM4	CO1	T1,R2	
8.	Equivalence of Regular expression and Finite Automata ( Conversion of RE to FA)	1	09.10.2021		TLM1 /TLM4	CO1	T1,R2	
9.	Conversion of Finite automata to Regular expression	1	20.10.2021		TLM1 /TLM4	CO1	T1,R1	
10.	Pumping lemma for Regular language and closure properties	1	22.10.2021		TLM1 /TLM4	CO1	T1,R1	
11.	Tutorial-1	1	22.10.2021		TLM 3	CO1	T1,R1,R2	
<b>No. of classes required to complete UNIT-I</b>		11			No. of classes taken:			

## UNIT - 2: Context-free grammars and pushdown automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion (DD-MM-YY)	Actual Date of Completion (DD-MM-YY)	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Classification of Grammars and introduction to Context-free grammar	1	23.10.2021		TLM1	CO2	T1,R1	
2.	Derivations and parse trees, and ambiguity	1	27.10.2021		TLM1 /TLM4	CO2	T1,R2	
3.	Simplification CFG: removing unit productions, null productions and useless productions	1	29.10.2021		TLM1 /TLM4	CO2	T1,R2	
4.	Convert CFG to CNF and CFG to GNF	1	30.10.2021		TLM1 /TLM4	CO2	T1,R2	
5.	Pushdown automata- Deterministic and Nondeterministic	1	03.10.2021		TLM1 /TLM4	CO2	T1,R1	
6.	Equivalence of PDA and CFG	1	05.11.2021		TLM1 /TLM4	CO2	T1,R2	
7.	Pumping lemma of context free language and properties of CFLs	1	06.11.2021		TLM1 /TLM4	CO2	T1,R2	
8.	Tutorial-2	1	06.11.2021		TLM 3 /TLM 6	CO2	T1,R1,R2	
<b>No. of classes required to complete UNIT-2</b>		08			No. of classes taken:			

### 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
1.	Introduction to Language translator, Basic language Processing system	1	17.11.2021		TLM1/ TLM2	CO4	T2,R4	
2.	Phases of a compiler and example	1	19.11.2021		TLM2 /TLM4	CO4	T2,R4	
3.	Lexical analyzer - definitions, Specification of tokens	1	20.11.2021		TLM2 /TLM4	CO4	T2,R4	
4.	recognition of tokens ,and input buffering	1	24.11.2021		TLM2 /TLM4	CO4	T2,R4	
5.	Design of Lexical analyzer using LEX tool	1	26.11.2021		TLM2 /TLM4	CO4	T2,R4	
6.	Role of parser, top-down parser design methods- Recursive descent and predictive parser	2	27.11.2021		TLM2 /TLM4	CO4	T2,R4	
7.	Bottom-up parsing- Handle pruning, shift-reduce parsing	1	01.12.2021		TLM2 /TLM4	CO4	T2,R4	
8.	LR parsers- SLR,CLR and LALR parser design methods and YACC tool	2	03.12.2021		TLM2 /TLM4	CO4	T2,R4	
9.	Tutorial-3/ Assignment-3	1	03.12.2021		TLM 3	CO4	T2,R3 ,R4	
<b>No. of classes required to complete UNIT-3</b>		09			No. of classes taken:			

**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
1	Attribute Grammar- Syntax directed definition	1	04.12.2021		TLM1/ TLM2	CO4	T2,R4	
2	Translation schemes , Applications of SDTs – syntax tree	1	08.12.2021		TLM2 /TLM4	CO4	T2,R4	
3	Intermediate code generation – syntax tree, 3-address code, and SSA	1	10.12.2021		TLM2 /TLM4	CO4	T2,R4	
4	Translation of statements and expressions	1	15.12.2021		TLM2 /TLM4	CO4	T2,R4	
5	Run-time storage organization and storage allocation strategies	1	17.12.2021		TLM2 /TLM4	CO4	T2,R4	
6	Access to non-local data , parameter passing techniques	2	18.12.2021		TLM2 /TLM4	CO4	T2,R4	
7	Tutorial-4	1	18.12.2021		TLM 3	CO4	T2,R3,R4	
<b>No. of classes required to complete UNIT-4</b>		07			No. of classes taken:			

### 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
1.	Construction basic blocks and flow graphs	1	22.12.2021		TLM2 /TLM4	CO5	T2,R3	
2.	The principal sources of optimization	1	24.12.2021		TLM2 /TLM4	CO5	T2,R3	
3.	Optimization of Basic Blocks , Loops in flow graph	1	29.12.2021		TLM2 /TLM4	CO5	T2,R4	
4.	Issues in the design of a code generator and generic code generation algorithm	1	31.12.2021		TLM2 /TLM4	CO5	T2,R4	
5.	Register allocation and Assignment ,	1	05.12.2022		TLM2 /TLM4	CO5	T2,R3	
6.	DAG representation of basic blocks and generating the code from DAG	1	07.01.2022		TLM2 /TLM4	CO5	T2,R3	
7.	Tutorial-5	1	07.01.2022		TLM 3	CO5	T2,R3,R4	
<b>No. of classes required to complete UNIT-5</b>		07			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

#### 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:**

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



norms of the engineering practice.

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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

**1. Programming Paradigms:**

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

**2. Data Engineering:**

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

**3. Software Engineering:**

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

<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 K.Sundeep Saradhi	Dr.D.V.Subbaiah	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
<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.

### COURSE HANDOUT

**PROGRAM** : B.Tech. V-Sem., CSE-C sec

**ACADEMIC YEAR** : 2021 -22

**COURSE NAME & CODE** : Operating system -17CS04

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

**COURSE CREDITS** : 3

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

**COURSE COORDINATOR** : Dr. Ch. Venkata Narayana

**MODULE COORDINATOR**: Dr. Ch. Venkata Narayana

**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:

**CO1:** Identify the functional aspects and implementation methods (system call And System programs of different modules in a general-purpose operating System).

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

**CO3:** Analyse the process synchronization methods and deadlock handling Approaches employed in operating systems.

**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 & PSOs):**

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	-	-	-	-	-	-	-	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)

**TEXT BOOK/S:**

1. Silberschatz & Galvin, —Operating System Concepts, Wiley, 7th edition, 2007.

**REFERENCES:**

1. William Stallings, —Operating Systems, PHI, 5th Edition, 2004.
2. Charles Crowley, —Operating Systems: A Design-Oriented Approach, TMH Publications, 1998.
3. Andrew S. Tanenbaum, —Modern Operating Systems, PHI, 2nd edition, 1995.
4. <http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/index.html>
5. <https://www.youtube.com/watch?v=jciGIvn7UfM&list=PLTgavEZk0mZX7P2WVuE6hN9qVnkTgrAc9>

**COURSE DELIVERY PLAN (LESSON PLAN): Section-C****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
1.	Computer system organization and architecture	1	20/09/21		TLM2	CO1	T1	
2.	Operating system structure and operations	1	21/09/21		TLM2	CO1	T1	
3.	Process management and memory management	1	24/09/21		TLM2	CO1	T1	
4.	Storage management and protection and security	1	27/09/21		TLM2	CO1	T1, R1	
5.	Distributed systems and special purpose systems	1	28/09/21		TLM2	CO1	T1, R1	
6.	Operating system services and user operating system interfaces	1	01/10/21		TLM2	CO1	T1, R1	
7.	System calls and types of system calls	1	04/10/21		TLM2	CO1	T1	
8.	System programs, OS design and implementation	1	05/10/21		TLM2	CO1	T1	
9.	OS structure and Virtual Machine	1	8/10/21		TLM2	CO1	T1	
10.	OS generation and System Boot	1	11/10/21		TLM2	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>10</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
11.	Concepts and process scheduling	1	18/10/21		TLM2	CO2	T1	

12.	Operations on process	1	22/10/21		TLM2	CO2	T1	
13.	IPC and examples on IPC	1	25/10/21		TLM2	CO2	T1	
14.	Communication in client server systems	1	26/10/21		TLM2	CO2	T1	
15.	Multithreading Models, Thread libraries and Thread issues	1	29/10/21		TLM2	CO2	T1, R1	
16.	Scheduling Criteria	1	01/11/21		TLM2	CO2	T1, R1	
17.	Scheduling algorithms	1	02/11/21		TLM2	CO2	T1, R1	
18.	Multi-Processor Scheduling	1	5/11/21		TLM2	CO2	T1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
19.	The Critical section problem, Peterson's solutions	1	15/11/21		TLM1	CO3	T1	
20.	Synchronization hardware	1	16/11/21		TLM1	CO3	T1	
21.	Semaphores, Classic problems of Synchronization	1	19/11/21		TLM1	CO3	T1	
22.	Monitors, Synchronization examples and atomic transactions	1	22/11/21		TLM1	CO3	T1, R1	
23.	System model and deadlock characterization	1	23/11/21		TLM1	CO3	T1, R1	
24.	Methods for Handling deadlocks and deadlock prevention	1	26/11/21		TLM1	CO3	T1	
25.	Deadlock Avoidance	1	29/11/21		TLM1	CO3	T1	
26.	Deadlock detection	1	30/11/21		TLM1	CO3	T1	
27.	Recovery from deadlock	1	03/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
28.	Swapping	1	06/12/21		TLM1	CO4	T1	
29.	Contiguous Memory Allocation	1	07/12/21		TLM1	CO4	T1	
30.	Paging and structure of a page table	1	10/12/21		TLM1	CO4	T1	
31.	Segmentation	1	13/12/21		TLM1	CO4	T1	

32.	Demand paging	1	14/12/21		TLM1	CO4	T1	
33.	Page replacement and allocation of frames	1	17/12/21		TLM1	CO4	T1	
34.	Thrashing	1	20/12/21		TLM1	CO4	T1	
35.	Memory mapped files		21/12/21					
36.	Allocating kernel memory		24/12/21					
<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
37.	The Concept of a file and access methods	1	27/12/21		TLM2	CO5	T1	
38.	File System structure	1	28/12/21		TLM2	CO5	T1	
39.	File system implementation	1	31/12/21		TLM2	CO5	T1	
40.	Directory implementation	1	3/01/22		TLM2	CO5	T1	
41.	Allocation methods	1	4/01/22		TLM2	CO5	T1	
42.	Free space management	1	7/01/22		TLM2	CO5	T1	
43.	Efficiency of the file system	1	10/01/22		TLM2	CO5	T1	
44.	Performance and recovery	1	11/01/22		TLM2	CO5	T1	
<b>No. of classes required to complete UNIT-V</b>		<b>08</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
45.	Realtime systems	1						
46.	Network management	1						
47.	Kernel modules	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:**

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

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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

**PSO 1:**

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

**PSO 2:**

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

**PSO 3:**

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

<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. N V NAIK	Dr. Ch. Venkata Narayana	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
<b>Signature</b>				



# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

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

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

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

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

### COURSE HANDOUT

#### PART-A

**Name of Course Instructor:** Dr.Pamulapati Ashok Reddy

**Course Name & Code** : UML&DP LAB & 17CS622

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

**Credits:** 1

**Program/Sem/Sec** : B.Tech.-CSE/V Sem/Sec-C

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

**PRE-REQUISITE:** Knowledge in Basics of C++ or JAVA Programming

**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

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

<b>CO1</b>	<b>Analyze</b> Software Requirements for the given Software Application using Use Cases of UML.
<b>CO2</b>	<b>Develop</b> the UML Diagrams to view Software System in Static and Dynamic Aspect
<b>CO3</b>	Select a Design Pattern related to their problem and draw the Class and Object Diagrams using the UML notations.
<b>CO4</b>	<b>Improve</b> individual/team work skills, communication and report writing skills with ethical values..

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	<b>1</b>	-	<b>3</b>
<b>CO2</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	-	<b>1</b>	<b>3</b>
<b>CO3</b>	-	-	-	<b>1</b>	<b>3</b>	-	-	-	<b>2</b>	<b>1</b>	-	<b>2</b>	<b>1</b>	-	<b>3</b>
<b>CO4</b>	-	-	-	-	-	-	-	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	-
			<b>1 - Low</b>			<b>2 - Medium</b>			<b>3 - High</b>						



## PART-B

### SCHEDULE:

S. No.	Programs to be covered	No. of Classes Required		Date of Completion	Delivery Method
		As per the Schedule	Taken		
1.	Basics of UML	2			DM5
2.	Basics of Tool used for Drawing Diagrams like Gliffy, Umbrello, Rational Rose etc.	2			DM5
3.	Use case Diagrams for 6 CaseStudies	2			DM5
4.	Class Diagrams for 6 Case Studies	2			DM5
5.	Object Diagrams for 6 Case Studies	2			DM5
6.	Sequence Diagrams for 6CaseStudies	2			DM5
7.	Communication Diagrams For 6Case Studies	2			DM5
8.	Activity Diagrams for 6 Case Studies	2			DM5
9.	State Chart Diagrams for 6 CaseStudies	2			DM5
10.	Component Diagrams for 6 CaseStudies	2			DM5
11.	Deployment Diagrams for 6 CaseStudies	2			DM5
12.	Class Diagram/Object Diagram: i) Drawing Editor ii) Converter	2			DM5
13.	Class Diagram/Object Diagram: i) Media Player ii) Pizza Toppings Selection	2			DM5

### 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			
DM1	Chalk and Talk	DM4	Assignment/Test/Quiz
DM2	ICT Tools	DM5	Laboratory/Field Visit
DM3	Tutorial	DM6	Web-based Learning

## PART-C

### PROGRAMME OUTCOMES (POs):

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

### PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

<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.P.Ashok Reddy</b>	<b>Dr. D. Veeraiah</b>	<b>Dr. Ch. V. Narayana</b>	<b>Dr. D. Veeraiah</b>
<b>Signature</b>				



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

## COURSE HANDOUT

### PART-A

Name of Course Instructor : P Vamsi Naidu  
 Course Name & Code : Web Technologies Lab - 17CI66  
 L-T-P Structure : 0-0-2 Credits : 1  
 Program/Sem/Sec : B.Tech., CSE., V-Sem., C Sec. A.Y : 2021-22

**PRE-REQUISITE:** C, JAVA & DBMS

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

<b>CO 1</b>	Design and implement static & dynamic websites.
<b>CO 2</b>	Create reusable components by using Java Beans.
<b>CO 3</b>	Design and implement data driven web applications.
<b>CO 4</b>	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>CO1</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO2</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO3</b>	3	2	3	-	3	-	-	-	-	-	-	2	3	3	-
<b>CO4</b>	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

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

### **TEXT BOOKS:**

- T1** Chris Bates, Web Programming, building internet applications, WILEY Dreamtech, 2nd edition.
- T2** MartyHall and Larry Brown, "Core Servlets and Java Server Pages Volume 1: Core Technologies", Pearson, 2<sup>nd</sup> Edition, 2004.

**T3** Bill Siggelkow, "Jakarta Struts Cookbook", O'Reilly Media, 2005.

**REFERENCE BOOKS:**

**R1** Robert W Sebesta, "Programming the World Wide Web", Pearson Education, 8<sup>th</sup> Edition, 2015.

**R2** A.A.Puntambekar, "Web Technologies", Technical Publications, 2009.

**PART-B**

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

<b>S.No.</b>	<b>Topics to be covered</b>	<b>No. of Classes Required</b>	<b>Tentative Date of Completion</b>	<b>Actual Date of Completion</b>	<b>Teaching Learning Methods</b>	<b>HOD Sign Weekly</b>
1.	Introduction to Web Technologies Lab, COs.	1	24-09-2021		<b>TLM5 TLM8</b>	
2.	Lab Cycle-1	1	01-10-2021		<b>TLM5 TLM8</b>	
3.	Lab Cycle-2	1	08-10-2021		<b>TLM5 TLM8</b>	
4.	Lab Cycle-3	1	22-10-2021		<b>TLM5 TLM8</b>	
5.	Lab Cycle-4	1	29-10-2021		<b>TLM5 TLM8</b>	
6.	Lab Cycle-5	1	05-11-2021		<b>TLM5 TLM8</b>	
7.	Lab Cycle-6	1	19-11-2021		<b>TLM5 TLM8</b>	
8.	Lab Cycle-7	1	26-11-2021		<b>TLM5 TLM8</b>	
9.	Lab Cycle-8	1	03-12-2021		<b>TLM5 TLM8</b>	
10.	Lab Cycle-9	1	10-12-2021		<b>TLM5 TLM8</b>	
11.	Lab Cycle-10	1	17-12-2021		<b>TLM5 TLM8</b>	
12.	Lab Cycle-11,12	1	24-12-2021		<b>TLM5 TLM8</b>	
13.	Lab Cycle-13		31-12-2021			
14.	Lab Cycle-14	1	07-01-2022		<b>TLM5 TLM8</b>	
15.	Internal Exam	1	28-01-2022		<b>TLM5 TLM8</b>	

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

### PART-C

#### EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Day-Day Performance	I1=20
Viva	I2=5
Internal Test	I3=10
Attendance	I4=5
Internal Exam (A = I1+I2+I3+I4)	A=40
End Exam (B)	B=60
Total Marks = A+B	100

### PART-D

#### PROGRAMME OUTCOMES (POs):

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

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

**PROGRAMME SPECIFIC OUTCOMES (PSOs):**

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

Course Instructor  
(Mr. P Vamsi Naidu)

Course Coordinator  
(Ms. K. Devi Priya)

Module Coordinator  
(Dr. Y.V.B. Reddy)

HOD  
(Dr. D. Veeraiah)

# 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-C sec
<b>ACADEMIC YEAR</b>	: 2021 -22
<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:**

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-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
1.	Introduction to Graphs & its Applications	1	21/09/21		TLM1	CO1	T1	
2.	Basics of Paths, Cycles, and Trails	1	22/09/21		TLM1	CO1	T1	
3.	Connection, Bipartite Graphs,	1	25/09/21		TLM1	CO1	T1	
4.	Eulerian Circuits,	1	28/09/21		TLM1	CO1	T1, R1	
5.	Vertex Degrees and Counting	1	29/09/21		TLM1	CO1	T1, R1	
6.	Degree-sum formula	1	05/10/21		TLM1	CO1	T1, R1	
7.	The Chinese Postman Problem	1	06/10/21		TLM1	CO1	T1	
8.	Graphic Sequences.	1	09/10/21		TLM1	CO1	T1	
<b>No. of classes required to complete UNIT-I:</b>		<b>08</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
9.	Trees and Distance	1	20/10/21		TLM1	CO2	T1	
10.	Properties of Trees	1	23/10/21		TLM1	CO2	T1	
11.	Spanning Trees and Enumeration	1	26/10/21		TLM1	CO2	T1	
12.	Optimization and Trees.	2	27/10/21, 30/10/21		TLM1	CO2	T1	
13.	Matrix-tree computation	1	02/11/21		TLM1	CO2	T1, R1	
14.	Cayley's Formula	1	03/11/21		TLM1	CO2	T1, R1	
15.	Prufer code	1	06/11/21		TLM1	CO2	T1, R1	
<b>No. of classes required to complete UNIT-II:</b>		<b>08</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
16.	Matchings and Covers	1	16/11/21		TLM1	CO3	T1	
17.	Hall's Condition, Min-Max Theorem	1	17/11/21		TLM1	CO3	T1	
18.	Independent Sets, Covers and Maximum Bipartite Matching	1	20/11/21		TLM1	CO3	T1	
19.	Augmenting Path Algorithm	1	23/11/21		TLM1	CO3	T1, R1	
20.	Weighted Bipartite Matching, Hungarian Algorithm	1	24/11/21		TLM1	CO3	T1, R1	
21.	Stable Matchings and Faster Bipartite Matching	1	27/11/21		TLM1	CO3	T1	
22.	Factors & Perfect Matching in General Graphs	1	30/11/21		TLM1	CO3	T1	
23.	Matching in General Graphs:	1	01/12/21		TLM1	CO3	T1	
24.	Edmonds' Blossom Algorithm	1	04/12/21		TLM1	CO3	T1, R1	
<b>No. of classes required to complete UNIT-III</b>		<b>09</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
25.	Connectivity and Paths: Cuts and Connectivity	1	07/12/21		TLM1	CO4	T1	
26.	k-Connected Graphs	1	08/12/21		TLM1	CO4	T1	
27.	Network Flow Ford-Fulkerson Labeling Algorithm,	1	14/12/21		TLM1	CO4	T1	
28.	Max-Flow Min-cut Theorem, Menger's Proof using Max-Flow Min-Cut Theorem.	2	15/12/21, 18/12/21		TLM1	CO4	T1	
29.	Vertex Coloring and Upper Bounds	1	21/12/21		TLM1	CO4	T1	
30.	Brooks' Theorem and Color-Critical Graphs	2	22/12/21, 25/12/21		TLM1	CO4	T1	
31.	Counting Proper Colorings	1	28/12/21		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
32.	Planar Graphs, Characterization of Planar Graphs	2	29/12/21, 04/01/22		TLM1	CO5	T2, R4	
33.	Kuratowski's Theorem, Wagner's Theorem	2	05/01/22, 08/01/22		TLM1	CO5	T2, R4	
34.	Line Graphs and Edge-coloring	1	11/01/22		TLM1	CO5	T2, R4	
35.	Hamiltonian Graph, Traveling Salesman Problem	1	12/01/22		TLM1	CO5	T2, R4	
36.	NP-Completeness, Dominating Sets.	1	15/01/22		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
37.	Graph Monors	1						
38.	Decomposition Tree Algorithms	2						
39.	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:**

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

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

**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
Name of the Faculty	Mr. G Balu NarasimhaRao	Mr. G Balu NarasimhaRao	Dr. Ch. Venkata Narayana	Dr. D Veeraiah
Signature				