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.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : G.V.Rajya Lakshmi
Course Name & Code : DataBase Management Systems Lab (20CS56)
L-T-P Structure : 0-0-3 Credits: 1.5
Program/Sem/Sec : B.Tech., CSE., III-Sem., Sec-A A.Y : 2023-24

PRE-REQUISITE : Programming language, Discrete Mathematical Structures and Data Structures.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to provide a strong formal foundation in database concepts, technology, and practice to the participants to groom them into well-informed database application developers.

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

CO 1	Create & manipulate the relational database using SQL**.(Apply- L3)**
CO 2	Implement Views, procedures, triggers, and cursors on relational database. **(Apply- L3)**
CO 3	Create Unstructured Databases using MongoDB**.(Apply- L3)**
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction to SQL, syntax	3	11.08.23		TLM4	
2	Experiment – 1	3	18.08.23		TLM4	
3	Experiment – 2	3	25.08.23		TLM4	
4	Experiment – 3	3	01.09.23		TLM4	
5	Experiment – 4	3	08.09.23		TLM4	
6	Experiment – 5,6	3	15.09.23		TLM4	
7	Experiment – 7,8	3	22.09.23		TLM4	
8	Experiment – 9,10,11	3	29.09.23		TLM4	
9	Experiment – 11,12	3	13.10.23		TLM4	
10	Experiment – 13	3	27.10.23		TLM4	
11	Experiment – 14	3	03.11.23		TLM4	
12	Experiment – 15	3	10.11.23		TLM4	
13	Design database for Case study	3	17.11.23		TLM4	
14	Internal Exam	3	24.11.23		TLM4	

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

PART-C

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**G.V.Rajya Lakshmi**	**G.V.Rajya Lakshmi**	**Dr.Y.Vijay Bhaskar Reddy**	**Dr.D.Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. T.N.V.S Praveen
Course Name & Code : Discrete Mathematical Structures, 20CS04
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-CSE / III SEM / A
A.Y. : 2023-24

PRE-REQUISITE: Basic mathematical knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to perform the operations associated with relations and functions. Relate practical examples to the functions and relations and interpret the associated operations and terminology used in the context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior of software or to solve problems such as puzzles.

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

CO1	Construct mathematical arguments using logical connectives and quantifiers and verify them.**(Apply -L3)**
CO2	Demonstrate the basic terminology of functions, relations, lattices and their operations. **(Understand - L2)**
CO3	Apply the properties of graphs to solve the graph theory problems in Computer science. **(Apply- L3)**
CO4	Illustrate the basic principles/techniques to solve different algebraic structures & combinatorial problems. **(Understand- L2)**
CO5	Solve linear recurrence relations by recognizing homogeneity using constant coefficients, characteristic roots and Generating functions. **(Apply – L3)**

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

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	1													
CO2	3	2	1												
CO3	3	3	1												
CO4	3	3	1												
CO5	3	3	1												

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

TEXTBOOKS:

1. Tremblay, Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH Publications, 2008

REFERENCE BOOKS:

1. Chandrasekaran, Umaparvathi, DiscreteMathematics,PHI, 2010.
2. Ralph. P.Grimaldi, Ramana, Discrete and Combinational Mathematics,Pearson,5th edition.
3. https://nptel.ac.in/courses/106/106/106106183/

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical Logic

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Mathematical Logic: Propositional Calculus	1	08/08/2023		**TLM1**	CO1	
2.	Statement and Notations, Connectives, Truth Tables	1	09/08/2023		**TLM1**	CO1	
3.	Tautologies	1	11/08/2023		**TLM1**	CO1	
4.	Equivalence of Formulas	1	15/08/2023		**TLM1**	CO1	
5.	Duality Law, Tautological Implications	1	16/08/2023		**TLM1**	CO1	
6.	Normal Forms, DNF	1	18/08/2023		**TLM2**	CO1	
7.	CNF	1	19/08/2023		**TLM2**	CO1	
8.	PCNF, PDNF	1	22/08/2023		**TLM2**	CO1	
9.	Theory of inference for statement Calculus	1	23/08/2023		**TLM2**	CO1	
10.	RULE CP	1	25/08/2023		**TLM2**	CO1	
11.	Consistency of Premises Indirect Method of Proof	1	26/08/2023		**TLM1**	CO1	
12.	Predicative Logic	1	29/08/2023		**TLM1**	CO1	
13.	Statement Functions, Variables, Free & Bound Variables, QUANTIFIERS	1	30/08/2023		**TLM1**	CO1	
No. of classes required to complete UNIT-I		13	No. of classes taken:				

UNIT-II: Sets, Relations & Functions

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Set Theory: Introduction,	1	01/09/2023		**TLM1**	CO2	
2.	Representation of Sets	1	02/09/2023		**TLM1**	CO2	
3.	Operations on Binary Sets	1	05/09/2023		**TLM2**	CO2	

4.	Relations: Properties of Binary Relations	1	06/09/2023		**TLM1**	CO2	
5.	Relation Matrix and Digraph Operations on Relations	1	08/09/2023		**TLM1**	CO2	
6.	Partition and Covering, Transitive Closure	1	09/09/2023		**TLM1**	CO2	
7.	Equivalence Relation	1	12/09/2023		**TLM2**	CO2	
8.	Compatible Relation, Partial Ordering Relation	1	13/09/2023		**TLM1**	CO2	
9.	Hasse Diagrams, Lattices	1	15/09/2023		**TLM1**	CO2	
10.	Functions: Bijective Functions	1	16/09/2023		**TLM1**	CO2	
11.	Composition of Functions, Inverse Functions	1	19/09/2023		**TLM1**	CO2	
No. of classes required to complete UNIT-2		11	No. of classes taken:				

UNIT – III: Graph Theory I & II

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Basic Concepts of Graphs	1	20/09/2023		**TLM1**	CO3	
2.	Matrix Representation of Graphs	1	26/09/2023		**TLM1**	CO3	
3.	Adjacency Matrices, Incidence Matrices	1	27/09/2023		**TLM1**	CO3	
4.	Isomorphic Graphs, Paths and circuits	1	30/09/2023		**TLM1**	CO3	
5.	Eulerian Graphs, Hamiltonian Graphs	1	03/10/2023		**TLM2**	CO3	
6.	Multigraphs, Planar Graphs, Euler‟s Formula	1	04/10/2023		**TLM1**	CO3	
7.	Graph Colouring and Covering, Chromatic Number	1	08/10/2023		**TLM1**	CO3	
8.	Trees Introduction	1	10/10/2023		**TLM1**	CO3	
9.	BFS, DFS	1	11/10/2023		**TLM2**	CO3	
10.	Spanning Trees: Properties	1	14/10/2023		**TLM2**	CO3	
11.	Algorithms for Minimum Spanning Trees	2	17/10/2023 18/10/2023		**TLM2**	CO3	
No. of classes required to complete UNIT-3		12	No. of classes taken:				

UNIT-IV: Algebraic Structures & Combinatorics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Algebraic Systems with one Binary Operation	1	20/10/2023		**TLM1**	CO4	
2.	Properties of Binary operations, Semi groups and Monoids	1	21/10/2023		**TLM1**	CO4	
3.	Homomorphism of Semi groups and Monoids, Groups	1	27/10/2023		**TLM1**	CO4	
4.	Abelian Group, Cosets, Subgroups	1	28/10/2023		**TLM1**	CO4	
5.	Langrage's Theorem	1	31/10/2023		**TLM1**	CO4	
6.	Basic of Counting, Permutations	1	01/11/2023		**TLM1**	CO4	
7.	Combinations	1	07/11/2023		**TLM1**	CO4	
8.	Circular Permutations, Restricted Permutations	1	08/11/2023		**TLM1**	CO4	
9.	Combinations with repetition Pigeonhole Principle and its Applications	2	10/11/2023 to 11/11/2023		**TLM1**	CO4	
10.	Principle of inclusion-exclusion	2	14/11/2023 to 15/11/2023		**TLM1**	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Recurrence Relation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Generating Functions of Permutations and Combinations	2	17-11-2023 18-11-2023		**TLM1**	CO5	
2.	Calculating Coefficient of Generating Functions	2	21-11-2023 24-11-2023		**TLM1**	CO5	
3.	Recurrence Relations	2	28-11-2023 29-11-2023		**TLM1**	CO5	
4.	solving linear homogeneous recurrence Relations by substitution	2	01-12-2023 02-12-2023		**TLM1**	CO5	
5.	generating functions	2	05-12-2023 06-12-2023		**TLM1**	CO5	
6.	The Method of Characteristic Roots	2	08-12-2023 09-12-2023		**TLM1**	CO5	
No. of classes required to complete UNIT-5		10	No. of classes taken:				

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

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. T.N.V.S.Praveen	Mr. T.N.V.S.Praveen	Dr.S.Jaya Pradha	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. S. Nagarjuna Reddy
Course Name & Code : Web Application Development using Full Stack Module-I
L-T-P Structure : 1-0-2 **Credits:** 2
Program/Sem/Sec : B.Tech. - CSE/III/A **A.Y.:** 20223-24

PREREQUISITE: IT WORKSHOP

Course Educational Objective: The objective of the course is to understand the design of HTML web pages, Styling of HTML pages using CSS, web forms validation using JavaScript and developing responsive web page using JQuery.

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

CO1	Apply the basic tags to design static web pages. **(Apply – L3)**
CO2	Validate the web pages at client side using java script. **(Apply – L3)**
CO3	Design the responsive web pages using JQuery. **(Apply – L3)**
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

Text Books &REFERENCE BOOKS:

T1	Thomas Powell, "HTML & CSS: The Complete Reference", McGrawHill,5thEdition2017.
T2	Jon Duckett , "Beginning HTML, XHTML, CSS, and JavaScript", Wiley India, 2010.
T3	Cody Lindley , "jQuery Cookbook", O'Reilly Media, 2009
R1	Steven M. Schafer, "HTML, XHTML, and CSS Bible", Wiley India,5th Edition, 2011
R2	Richard York , "Web Development with jQuery", Wiley India, 2015.

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.	HTML TAGS	4	07-08-2023	--	**DM5**	
2.	Lists and Table	4	14-08-2023		**DM5**	
3.	Forms	4	21-08-2023		**DM5**	
4.	Frames	4	28-08-2023		**DM5**	
5.	HTML5	4	04-09-2023		**DM5**	
6.	CSS	4	11-09-2023		**DM5**	
7.	CSS	4	18-09-2023		**DM5**	
8.	CSS	4	25-09-2023		**DM5**	
9.	JAVA SCRIPT	4	09-10-2023		**DM5**	
10.	JAVA SCRIPT	4	16-10-2023		**DM5**	
11.	JAVA SCRIPT	4	23-10-2023		**DM5**	
12.	**JAVA SCRIPT**	4	30-10-2023		**DM5**	
13.	XML	4	06-11-2023		**DM5**	
14.	XML	4	13-11-2023		**DM5**	
15.	JQUERY	4	20-11-2023		**DM5**	
16.	JQUERY	4	27-11-2023		**DM5**	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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. S.Nagarjuna Reddy)	(Dr. S.Nagarjuna Reddy	Dr. Y.V.B. Reddy	(Dr. D. Veeraiah)
Signature				

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs.G.V.Rajya Lakshmi
Course Name & Code : DATABASE MANAGEMENT SYSTEMS & 20CS07
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech III Sem CSE – A Section **A.Y.:** 2023-24
PREREQUISITE : Data Structures

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of this course is to know about basic concepts of DBMS, Database Languages, Database Design, Normalization Process, Transaction Processing, Indexing, and Interfacing with NOSQL using MongoDB.

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

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

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

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

TEXTBOOKS:

T1 Henry F. Korth, Abraham Silberschatz, S.Sudarshan, "Database System Concepts", McGrawHill, 6th edition, 2009.

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

REFERENCE BOOKS:

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

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

R3 RamezElmasri, ShamkanthB.Navathe, "Fundamentals of Database Systems", Addison Wesley, 6th edition, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DBMS Introduction & Data Modelling using the Entity Relationship Model

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	CEOs and COs discussion, Introduction: An overview of Database Management System	1	08-08-23		1 & 2	
2.	Database System Vs File System, Database System Concepts	1	09-08-23		1 & 2	
3.	Three Schema Architecture, Data Models	1	10-08-23		1 & 2	
4.	Database Schema and Instances, Data Independence	1	12-08-23		1 & 2	
5.	Database Languages, Database Structure	1	16-08-23		1 & 2	
6.	ER model concepts, Notation for ER Diagram	1	17-08-23		1 & 2	
7.	Mapping Constraints, Keys	1	19-08-23		1 & 2	
8.	Concepts of Super Key, Candidate Key, Primary Key	1	22-08-23		1 & 2	
9.	Generalization, Aggregation	1	23-08-23		1 & 2	
10.	Reduction of an ER Diagrams to Tables, Relationships of Higher Degree.	1	24-08-23		1 & 2	
11.	Unit-1 Revision	1	26-08-23		1 & 2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Relational Data Model and Language & Introduction to SQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Relational Data Model Concepts, Integrity Constraints	1	29-08-23		1 & 2	
13.	Entity Integrity, Referential Integrity	1	30-08-23		1 & 2	
14.	Key Constraints	1	31-08-23		1 & 2	
15.	Domain Constraints	1	02-09-23			
16.	Relational Algebra	1	05-09-23		1 & 2	
17.	Characteristics of SQL, Advantage of SQL	1	07-09-23		1 & 2	
18.	SQL Data types and Literals, Insert, Update and Delete Operations	1	12-09-23		1 & 2	
19.	Tables, Views and Indexes	1	13-09-23		1 & 2	
20.	Nested Queries, Aggregate Functions	1	14-09-23		1 & 2	
21.	Joins, Unions, Intersection, Minus	1	16-09-23		1 & 2	
22.	Cursors in SQL, Triggers in SQL	1	19-09-23		1 & 2	
23.	Unit-II revision	1	20-09-23		1 & 2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Normalization

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Functional Dependencies	1	21-09-23		1 & 2	
25.	Normal Forms - First, Second	1	23-09-23		1 & 2	
26.	Third Normal Forms, BCNF	1	26-09-23		1 & 2	
27.	Inclusion Dependences	1	27-09-23		1 & 2	
28.	Loss Less Join Decompositions	1	30-09-23		1 & 2	
29.	Multi Valued Dependencies	1	10-10-23		1 & 2	
30.	Fourth Normal Form	1	11-10-23		1 & 2	
31.	Join Dependencies and Fifth Normal Form	1	12-10-23		1 & 2	
32.	Unit-III Revision	1	17-10-23		1 & 2	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: Transaction Processing Concepts, Concurrency Control Techniques & Crash Recovery

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Transaction System, Testing of Serializability	1	18-10-23		1 & 2	
34.	Serializability of Schedules	1	19-10-23		1 & 2	
35.	Conflict Serializability	1	25-10-23		1 & 2	
36.	View Serializability	1	26-10-23		1 & 2	
37.	Recoverability, Deadlock Handling	1	28-10-23		1 & 2	
38.	Concurrency Control	1	31-10-23		1 & 2	
39.	Locking Techniques for Concurrency Control	1	01-11-23		1 & 2	
40.	Time Stamping Protocols for Concurrency Control	1	02-11-23		1 & 2	
41.	Validation Based Protocol	1	04-11-23		1 & 2	
42.	Multiple Granularity	1	07-11-23		1 & 2	
43.	Recovery with Concurrent Transactions	1	08-11-23		1 & 2	
44.	Log Based Recovery, Checkpoints	1	09-11-23		1 & 2	
45.	ARIES Algorithm	1	14-11-23			
46.	Unit-IV revision	1	15-11-23			
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: Physical Database Design & Interfacing and Interacting with NoSQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Storage and file structure	1	16-11-23		1 & 2	
48.	indexed files, hashed files	1	18-11-23		1 & 2	
49.	B+ trees	1	21-11-23		1 & 2	
50.	Files with dense index	1	22-11-23		1 & 2	
51.	files with variable length records	1	23-11-23		1 & 2	
52.	Introduction to NoSQL, Storing and Accessing Data	1	25-11-23		1 & 2	
53.	Storing Data In and Accessing Data from MongoDB	1	28-11-23		1 & 2	
54.	Querying MongoDB & Revision	1	29-11-23		1 & 2	
55.	Unit-5 revision	1	30-11-23		1 & 2	
56.	Discussion on External Exam	1	02-12-23		1 & 2	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Mrs.G.V.RajyaLakshmi**	**Mrs.G.V.RajyaLakshmi**	**Dr. Y.Vijay Bhaskar Reddy**	**Dr. D. Veeraiah**
Signature				

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

DEPARTMENT OF COMPUTER SCINCE AND ENGINEERING

COURSE HANDOUT

PART-A

PROGRAM : II B. Tech., I-Sem., CSE - A
ACADEMIC YEAR : 2023-24
COURSE NAME & CODE : PROBABILITY AND STATISTICS
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Dr. Y. P. C. S. Anil Kumar
COURSE COORDINATOR : M. Rami Reddy
PRE-REQUISITES : None

COURSE EDUCATIONAL OBJECTIVES (CEO): The objective of this course is to provide students with the foundations and applications of probabilistic and statistical methods mainly used in varied applications in engineering and science.

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

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

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

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

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 Jay L.Devore "Probability and Statistics for engineering and the sciences." , 8th edition, Cengage Learning india, 2012
T2 S.C.Gupta, V.K.Kapoor, "Fundamentals of Mathematical Statistics", 11thEdition, Sultan Chand and sons, New Delhi,2014.

BOS APPROVED REFERENCE BOOKS:

R1 Miller & Freund's "Probability and Statistics for Engineers",8th edition. PHI, New Delhi,2011.
R2 B.V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I :Probability and Random Variables

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction class, course outcomes	1	7-8-23		TLM1	
2.	Basic concepts of probability	1	8-8-23		TLM1	
3.	problems on basic probability	1	9-8-23		TLM1	
4.	problems on addition theorem	1	12-8-23		TLM1	
5.	Conditional probability	1	14-8-23		TLM1	
6.	Multiplication theorem, examples	1	16-8-23		TLM1	
7.	Independent events, theorems	1	19-8-23		TLM1	
8.	Problems on multiplication theorem, independent events	1	21-8-23		TLM1	
9.	Baye's theorem, problems	1	22-8-23		TLM1	
10.	Random variables, Expections	1	23-8-23		TLM1	
11.	Problems on PMF	1	26-8-23		TLM1	
12.	Problems on PDF	1	28-8-23		TLM1	
13.	Tutorial-1	1	29-8-23		TLM3	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: Probability Distributions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Binomial Distribution- mean & variance	1	30-8-23		TLM1	
2.	Problems on Binomial distribution	1	2-9-23		TLM1	
3.	Fitting of binomial distribution	2	4-9-23 5-9-23		TLM1	
4.	Poisson distribution, mean and variance	1	9-9-23		TLM1	
5.	Problems on Poisson distribution and fitting of Poisson distribution	1	11-9-23		TLM1	
6.	Normal distribution: mean &variance	1	12-9-23		TLM1	
7.	Problems on Normal Distribution	2	13-9-23		TLM1	
8.	Exponential distribution:	1	16-9-23		TLM1	
9.	Tutorial -2	1	19-9-23		TLM3	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Sampling distribution and Estimation

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

1.	Sampling distribution ,definitions	1	20-9-23		TLM1	
2.	Sampling distribution of mean, variance	1	23-9-23		TLM1	
3.	Problems	1	25-9-23		TLM1	
4.	Problems	1	26-9-23		TLM1	
5.	Problems on central limit theorem	1	27-9-23		TLM1	
6.	Problems on Central limit theorem	1	30-9-23		TLM1	
7.	I MID		3-10-23			
8.	I MID		4-10-23			
9.	I MID		7-10-23			
10.	I MID		9-10-23			
11.	Estimation	1	10-10-23		TLM1	
12.	Point and interval estimation	1	11-10-23		TLM1	
13.	Interval estimation of mean and proportions in large samples	1	14-10-23		TLM1	
14.	Interval estimation of mean in small samples	1	16-10-23		TLM1	
15.	Problems	1	17-10-23		TLM1	
16.	Tutorial-3	1	21-10-23		TLM3	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV :Tests of Hypothesis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Testing of Hypothesis , definitions	1	25-10-23		TLM1	
2.	Z-test for means	2	28-10-23 30-10-23		TLM1	
3.	Z-test for proportions	2	31-10-23 01-11-23		TLM1	
4.	t-test for means	2	04-11-23 06-11-23		TLM1	
5.	paired t-test	1	07-11-23		TLM1	
6.	F-test for variances	1	08-11-23		TLM1	
7.	χ^2-test for goodness of fit	1	11-11-23		TLM1	
8.	χ^2-test for independence of attributes	1	13-11-23		TLM1	
9.	Tutorial-8	1	14-11-23		TLM3	
No. of classes required to complete UNIT-IV: 12				No. of classes taken:		

UNIT-V :Correlation and Regression

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

1.	Simple Bi-variate Correlation	1	15-11-23		TLM1	
2.	Problems on Pearson's Correlation	1	18-11-23		TLM1	
3.	Regression lines	1	20-11-23		TLM1	
4.	Problems on Regression lines	1	21-11-23		TLM1	
5.	Properties of Regression coefficients	1	22-11-23		TLM1	
6.	Tutorial-9	1	25-11-23		TLM3	
7.	Problems on rank Correlation	1	27-11-23		TLM1	
8.	Problems on repeated rank Revision	1	28-11-23		TLM1	
9.	Revision	1	29-11-23		TLM1	
10.	Revision	1	2-12-23		TLM1	
11.	II MID		4-12-23			
12.	II MID		5-12-23			
13.	II MID		6-12-23			
14.	II MID		9-12-23			
No. of classes required to complete UNIT-V: 10				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/SwayamPrabha/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

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr.Y.P.C.S.Anil Kumar)	(M.Rami Reddy)	(Dr.A.Rami Reddy)	(Dr.A.Rami Reddy)

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

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : R Programming Lab (20IT53)

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

COURSE CREDITS : 1

COURSE INSTRUCTOR : **Mr. GOPI SURESH A**

COURSE COORDINATOR : **Dr. Y Vijaya Bhaskar Reddy**

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): In this course student will learn about the fundamentals of R programming, standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming language, get acquaintances with Arrays, files, strings, packages and distributions using R

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

CO1: : Implement basic concepts of R programming and its different module that includes conditional, looping, lists, strings, functions, frames, arrays and file programming

CO2: Implement the concepts of R Script to extract the data from data frames and file operations.

CO3: Implement the various statistical techniques using R

C04: Extend the functionality of R by using the addon packages

CO5: Use R Graphics and Tables to visualize results of various statistical operations on data

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Cycle1: Installing R and basic functionality of R	3	08/08/23		TLM4/TLM5	CO1	
2	Cycle 2: R Script on operators, if and else programs	3	15/08/23		TLM4/TLM5	CO1	
3	Cycle 3: R Script on list	3	22/08/23		TLM4/TLM5	CO1	
4	Cycle 4: Implement R Script on vectors	3	29/08//23		TLM4/TLM5	CO1	
5	Cycle 5: Implement R Script on matrices and data frames	3	05/09/23		TLM4/TLM5	CO1	
6	Cycle 6: Implement R Script on Descriptive statistics	3	12/09/23		TLM4/TLM5	CO4	
7	Cycle7: Reading different types of data sets into files	3	19/09/23		TLM4/TLM5	CO2	
8	Cycle8: implement different charting methods	3	26/09/23		TLM4/TLM5	CO2	
9	Cycle9: implement the different distributions	3	03/10/23		TLM4/TLM5	CO3	
10	Cycle 10 : implement the Non tabular data types and data transformations	3	17/10/23		TLM4/TLM5	CO4	
11	Cycle 11: Introduction to dirty data problems	3	24/10/23		TLM4/TLM5	CO5	
12	Cycle 12 : implement different data sources	3	31/10/23		TLM4/TLM5	CO5	
13	**LAB INTERNAL**	3					

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

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

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

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.
PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

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

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

PROGRAM SPECIFIC OUTCOMES

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

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

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

Course Instructor	Course Coordinator	Module Coordinator	HOD

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hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222 933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Dr.Y.V.Bhaskar Reddy
Course Name & Code : Object Oriented Programming, 20CS09
L-T-P Structure : **4-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-CSE / III SEM / A SEC
A.Y. : 2023-24

PREREQUISITE : **Programming for Problem-solving using C**

COURSE OBJECTIVE The objective of the course is to learn the constructs of the Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. In the process of learning the language, they will be applying knowledge of object-oriented programming; they will get the fundamental knowledge reason collection framework.

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

CO 1	Demonstrate the fundamentals of object-oriented programming and basic building blocks of Java. **(Understand- L2)**
CO 2	Apply object-oriented programming principles for the development of reusable applications. **(Apply - L3)**
CO 3	Understand the importance of abstraction, user defined package creation and handling different exceptions. **(Understand- L2)**
CO 4	Develop multitasking applications using JAVA multithreaded programming and perform different operations upon various data structures by using collection framework. **(Apply – L3)**
CO 5	Develop GUI applications using AWT (Abstract Window Toolkit). **(Apply- L3)**

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

CO	Program Outcomes(POs)												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3												1		
CO2		3												2	
CO3	3												1		
CO4		2												2	
CO5		2	1											2	

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

TEXTBOOKS:

1. Herbert Schildt, "Java: The complete reference", TMH Publications, 7th edition, 2006.
2. Cay S. Horstmann, "Core Java Volume I – Fundamentals", Pearson, Eleventh edition, 2018.

REFERENCE BOOKS:

1. Dr.R.NageswaraRao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition2008.
2. E. Balaguruswamy, "Programming with JAVA", TMH Publications, 2ndEdition, 2000.
3. Patrick Niemeyer & Jonathan Knudsen, "Learning Java", O'REILLY Publications, 3rd Edition, 2005.
4. Benjamin J Evans & David Flanagan, "Java–in a Nutshell – A desktop quick reference", O'REILLY Publications, 6th Edition, 2014.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Introduction to OOP, Introduction to JAVA, and Introduction to Classes and Object

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction to OOP	1	07-08-2023		TLM2	CO1	
2.	Programming Paradigms: Procedure vs OOP	1	08-08-2023		TLM2	CO1	
3.	Principles of OOP	1	10-08-2023		TLM2	CO1	
4.	Introduction to JAVA Data types	1	11-08-2023,		TLM2	CO1	
5.	Variables, keywords,operators	2	17-08-2023 18-08-2023		TLM2	CO1	
6.	Control statements	1	19-08-2023		TLM2	CO1	
7.	Class definition: Variables and Methods	1	21-08-2023		TLM2	CO1	
8.	Object creation – sample programs	1	22-08-2023		TLM2	CO1	
9.	Constructors and this keyword	1	24-08-2023		TLM2	CO1	
No. of classes required to complete UNIT-I		11					

UNIT-II: Classes and objects, Inheritance and polymorphism and String handling classes

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
10.	Overloading methods and constructors	1	25-08-2023		TLM2	CO2	
11.	Parameter passing and returning objects and recursion	1	26-08-2023		TLM2	CO2	
12.	Access specifiers	1	28-08-2023		TLM2	CO2	
13.	Nested and inner classes	1	29-08-2023		TLM2	CO2	
14.	Final and static keyword	1	31-08-2023		TLM2	CO2	
15.	Variable and command line arguments	1	01-09-2023		TLM2	CO2	
16.	Inheritance and types of inheritance.	1	02-09-2023,		TLM2	CO2	
17.	Polymorphism – compile-time and run-time	1	04-09-2023		TLM2	CO2	
18.	Abstract class	1	07-09-2023		TLM2	CO2	
19.	String , StringBuffer, and StringTokenizer	2	08-09-2023, 11-09-2023		TLM2	CO2	
No. of classes required to complete UNIT-II		11					

UNIT-III: Interfaces and Packages, Exception Handling.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
20.	Interface methods	1	12-09-2023		TLM2	CO3	
21.	Inheritance in interfaces	1	14-09-2023		TLM2	CO3	
22.	Packages: Built-in Java Packages and user-defined Packages Importance of CLASS PATH	1	15-09-2023		TLM2	CO3	
23.	Exception Handling – Exception class hierarchy	1	16-09-2023		TLM2	CO3	
24.	Importance of try, catch, throw, throws, and finally blocks	2	19-09-2023 21-09-2023		TLM2	CO3	
25.	Creation of user-defined exceptions	1	22-09-2023		TLM2	CO3	
26.	Assertions	2	23-09-2023 25-09-2023		TLM2	CO3	
No. of classes required to complete UNIT-III		09					

UNIT-IV: Multithreading & Collection Framework

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
27.	Multithreading – Introduction and thread life-cycle	1	26-09-2023		TLM2	CO4	
28.	Creation of threads, naming and joining a thread	1	29-09-2023		TLM2	CO4	
29.	Daemon thread and thread pool	1	30-09-2023		TLM2	CO4	
30.	Thread synchronization	2	09-10-2023 10-10-2023		TLM2	CO4	
31.	Inter-thread communication	1	12-10-2023		TLM2	CO4	
32.	Collection Framework Introduction: Generics	1	13-10-2023		TLM2	CO4	
33.	List interface	1	16-10-2023		TLM2	CO4	
34.	Set interface	2	17-10-2023 19-10-2023		TLM2	CO4	
35.	Queue and Map Interface	2	20-10-2023 21-10-2023		TLM2	CO4	
No. of classes required to complete UNIT-IV		12					

UNIT-V: AWT,EVENT HANDLING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
36.	AWT hierarchy – components and containers- Button, Label, text field, checkbox	2	03-11-2023, 04-11-2023		TLM2	CO5	
37.	Choice,list, canvas, scrollbar, menu Item & Menu	2	06-11-2023, 07-11-2023		TLM2	CO5	
38.	Layout Managers	2	09-11-2023 10-11-2023		TLM2	CO5	
39.	Event Delegation model & Event classes	2	13-11-2023 14-11-2023		TLM2	CO5	
40.	Key Events and Mouse Events	2	16-11-2023 17-11-2023		TLM2	CO5	
41.	Window Events and Action listener interface	2	18-11-2023 20-11-2023		TLM2	CO5	
42.	Key, Mouse, and Mouse Motion Listener.	2	21-11-2023 23-11-2023		TLM2	CO5	
43.	Window Listener and adapter classes.	2	24-11-2023 25-11-2023		TLM2	CO5	

No. of classes required to complete UNIT-V	16					

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	HOD Sign Weekly
44.	Introduction to Swings	2	27-11-2023 28-11-2023		TLM2	CO5	

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

EVALUATION PROCESS :

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.Y.V.Bhaskar Reddy
Course Name & Code : Object Oriented Programming lab, 20CS57
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech-CSE / III SEM / A SEC
A.Y. : 2023-24
PREREQUISITE : **C Programming Language**

Course Educational Objectives:

The objective of the course is to apply the constructs of Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. They will be applying knowledge of object-oriented programming, collection framework to perform all operations on data.

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

- **CO1:** Solve Basic mathematical problems using fundamentals of Java and its object-oriented principles. **(Apply – L3)**
- **CO2:** Implement multithreading and exception handling mechanisms. **(Apply – L3)**
- **CO3:** Develop GUI applications and basic data structures using collection framework. **(Apply – L3)**
- **CO4:** Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Introduction to OOP using C++ - Sample programs	6	09-08-2023, 16-08-2023		TLM4	CO1	
2	JAVA Installation & Module-1: Understand the language constructs of JAVA	3	23-08-2023		TLM4	CO1	
3	Module-2: Parameter passing, static and non-static methods	3	30-08-2023		TLM4	CO1	
4	Module-3: String class & Inheritance	3	13-09-2023		TLM4	CO1	
5	Module-4: Poly morphism, Packages & Interfaces	6	20-09-2023		TLM4	CO1	
6	Module-5: Abstract classes and interfaces	3	27-09-2023		TLM4	CO1	
7	Module-6: Multithreaded programming	6	04-10-2023		TLM4	CO2	
8	Module-7 : Exception–handling	3	11-10-2023		TLM4	CO2	
9	Module-8: Applet Programming & Develop simple applications using AWT	6	18-10-2023, 01-11-2023		TLM4	CO3	
10	Module-9: Collections framework	3	08-11-2023		TLM4	CO3	
11	Module-10: Collections framework	6	15-11-2023 22-11-2023		TLM4	CO3	
12	**Lab Internal Examination**		29-11-2023				

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 Regulation):

Evaluation Task	**Marks**
Day-to-Day Work	A1 = 5
Record & Observation	B1 = 5
Internal Exam	C1 = 5
Cumulative Internal Examination (CIE): (A1+B1+C1)	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**A**n ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	**An** 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. CH V NARAYANA
Course Name & Code : CO & 20CS08
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : II B.Tech., III-Sem, A-Sec **A.Y.: 2023-24**

PREREQUISITE: Fundamentals of Computer Science.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to learn about the functional blocks and data representation in computer system and understands the design principles of processor, organization and management of memory and peripheral devices.

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

CO1	Evaluate digital Number systems and use Boolean Algebra theorems, properties and canonical forms for digital logic circuit design **(Undestand-L2)**
CO2	Design Combinational Logic circuits and sequential logic circuits **(Apply-L3)**
CO3	Understand Computer Architecture and data representation to perform computer arithmetic operations **(Understan-L2)**
CO4	Illustrate the design principles of control unit and pipelining **(Understand-L2)**
CO5	Analyze the memory hierarchy in a computer system **(Understan-L2)**

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

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

TEXTBOOKS:

T1 Morris Mano Michel D Ciletti, "Digital Design",4/e,2008,PEA

T2 Carl Hamacher, Zvonks Vransenic ,SafeaZaky, "Computer Oraganization", TMH publications

REFERENCE BOOKS:

R1 M.Morris Mano, "Computer System Architecture",Pearson Education Publishers[Unit-1,2]

R2 Leach, Malvino, saha,"Digital Logic design", TMH,2006

R3 R.P.jain,"Modern Digital Electronics", TMH,2011

R4 A.Anand Kumar,"Switching Theory and logic Design", Prentice-hall Of India pvt..Limited,2010

R5 Kohavi,Jha,Cambridge,"Switching and Finite Automata Theory",3/e

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Number systems, Logic gates and Boolean algebra

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 Digital Logic and Number systems	1	9-8-2023		TLM1	
2.	Conversions of Number systems from one radix to another	1	10-8-2023		TLM1	
3.	r' and (r-1)'complements	1	11-8-2023		TLM1	
4.	Binary codes	2	12,16-8-2023		TLM1	
5.	Logic gates	1	17-8-2023		TLM1	
6.	Logic gates	1	18-8-2023		TLM1	
7.	Introduction to Boolean Algebra with fundamental postulates, theorems and properties	2	23,24-8-2023		TLM1	
8.	Complement and dual of logical expressions, SOP, POS	2	25,26-8-2023		TLM1	
9.	Minimization of Boolean functions using Boolean theorems	1	31-8-22		TLM1	
10.	Karnaugh Map(K-map)	2	1,2-9-2023		TLM1	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Combinational Logic Circuits and Sequential Logic Circuits

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 combinational circuits, Adders	1	6-9-2023		TLM1	
12.	Half/Full Subtractors, Ripple carry adder	1	7-9-2023		TLM1	
13.	Design of Decoders and Encoders	1	8-9-2023		TLM1	
14.	Multiplexer and De-multiplexer	1	9-9-2023		TLM1	
15.	Priority encoder	1	13-9-2023		TLM1	
16.	Introduction to sequential circuits, Latch & flip-flops	1	14-9-2023		TLM1	
17.	Flip-flops(RS,J,T,D),	2	15,16-9-2023		TLM1	
18.	Master slave flip-flop	2	20,21-9-2023		TLM1	
19.	Conversion of flip-flops, Truth & excitation tables	1	22-9-2023		TLM1	
20.	Registers and counters	1	23-9-2023		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Functional Blocks of a Computer & Data Representation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Basic functional blocks of a computer	1	27-9-2023		TLM2	
22.	Set Architecture of CPU-registers	1	29-9-2023		TLM2	
23.	Instruction execution cycle	1	30-9-2023		TLM2	
24.	RTL Interpretation of instructions	1	11-10-22		TLM2	

25.	Addressing Modes	1	12-10-22		TLM2	
26.	Instruction set	1	13-10-2023		TLM2	
27.	Signed Number representation	1	14-10-2023		TLM2	
28.	Fixed & Floating point representation,	1	18-10-2023		TLM2	
29.	Character representation	1	19-10-2023		TLM2	
30.	Computer arithmetic-Int. addition & subtraction	1	20-10-2023		TLM2	
31.	Multiplication shift-AND Add, Booth multiplier	1	21-10-2023		TLM2	
32.	Division restoring & non-restoring techniques	1	25-10-2023		TLM2	
33.	Floating Point arithmetic	1	26-10-2023		TLM2	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: CPU Control design & Parallel Processors

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Introduction to CPU control unit design	1	27-10-23		TLM2	
35.	Hardwired design	1	28-10-23		TLM2	
36.	Microprogrammed design approach	1	1-11-23		TLM2	
37.	Basic concepts of pipelining	1	2-11-23		TLM2	
38.	Throughput and speed	1	3-11-23		TLM2	
39.	Pipeline hazards	1	4-11-23		TLM2	
40.	Parallel processors	3	8,9,10-11-2023		TLM2	
No. of classes required to complete UNIT-IV: 9				**No. of classes taken:**		

UNIT-V: Memory system design & Peripheral devices and their characteristics

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Memory organization	1	11-11-2023		TLM2	
42.	Memory interleaving	1	15-11-2023		TLM2	
43.	Concept of memory hierarchical organization	1	16-11-2023		TLM2	
44.	Cache memory	1	17-11-2023		TLM2	
45.	Peripheral devices –I/O sub-systems	2	18-11-2023		TLM2	
46.	I/O device interface	1	22-11-2023		TLM2	
47.	I/O transfers-program controlled	1	23-11-2023		TLM2	
48.	Interrupt driven	2	24,25-11-2023		TLM2	
49.	DMA	1	29-11-2023		TLM2	
50.	Revision	1	30-11-2023		TLM2	
No. of classes required to complete UNIT-V: 13				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.Venkata Narayana Chejarla**	**Dr.Venkata Narayana Chejarla**	**Dr .D.Venkata Subbaiah**	**Dr.V.Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Ms. B. Usha Rani
Course Name & Code : Object Oriented Programming , 20CS09
L-T-P Structure : **4-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-CSE / III SEM / B SEC
A.Y. : 2023-24

PREREQUISITE : **Programming for Problem solving using C**

COURSE OBJECTIVE The objective of the course is to learn the constructs of the Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. In the process of learning the language, they will be applying knowledge of object-oriented programming; they will get the fundamental knowledge reason collection framework.

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

CO 1	Demonstrate the fundamentals of object-oriented programming and basic building blocks of Java. **(Understand- L2)**
CO 2	Apply object-oriented programming principles for the development of reusable applications. **(Apply - L3)**
CO 3	Understand the importance of abstraction, user defined package creation and handling different exceptions. **(Understand- L2)**
CO 4	Develop multitasking applications using JAVA multithreaded programming and perform different operations upon various data structures by using collection framework. **(Apply – L3)**
CO 5	Develop GUI applications using AWT (Abstract Window Toolkit). **(Apply- L3)**

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

CO	Program Outcomes(POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3												1		
CO2		3												2	
CO3	3												1		
CO4		2												2	
CO5		2	1											2	

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

TEXTBOOKS:

1. Herbert Schildt, “Java: The complete reference”, TMH Publications, 7th edition, 2006.
2. Cay S. Horstmann, “Core Java Volume I – Fundamentals”, Pearson, Eleventh edition, 2018.

REFERENCE BOOKS:

1. Dr.R.NageswaraRao, “Core JAVA: An Integrated Approach”, Dreamtech Press, 1st Edition2008.
2. E. Balaguruswamy, “Programming with JAVA”, TMH Publications, 2ndEdition, 2000.
3. Patrick Niemeyer & Jonathan Knudsen, “Learning Java”, O‘REILLY Publications, 3rd Edition, 2005.
4. Benjamin J Evans & David Flanagan, “Java–in a Nutshell – A desktop quick reference”, O‘REILLY Publications, 6th Edition, 2014.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Introduction : Need of Object oriented Paradigm and it’s history	1	07-08-2023		TLM2	CO1	
2.	Programming Paradigms : Procedure vs OOP	1	08-08-2023		TLM2	CO1	
3.	Principles of OOP	1	11-08-2023		TLM2	CO1	
4.	Introduction to JAVA : JAVA - installation & set up of program execution Environment	1	12-08-2023, 14-08-2023		TLM2	CO1	
5.	Data types, variables and Keywords	1	18-08-2023, 19-08-2023		TLM2	CO1	
6.	Operators and expression Evaluation	2	21-08-2023		TLM2	CO1	
7.	Control statements	1	22-08-2023		TLM2	CO1	
8.	Class definition: Variables and Methods	1	25-08-2023		TLM2	CO1	
9.	Object creation – sample programs	1	26-08-2023		TLM2	CO1	
10.	Constructors and this keyword	1	28-08-2023		TLM2	CO1	
No. of classes required to complete UNIT-I		11					

UNIT-II:

S.No.	Topics to be covered	No. of	Tentative	Actual	Teaching	Learning	HOD

		Classes Required	Date of Completion	Date of Completion	Learning Methods	Outcome COs	Sign Weekly
11.	Overloading methods and constructors	1	29-08-2023		TLM2	CO2	
12.	Parameter passing and returning objects and recursion	1	01-09-2023		TLM2	CO2	
13.	Access specifiers	1	02-09-2023		TLM2	CO2	
14.	Nested and inner classes	1	04-09-2023		TLM2	CO2	
15.	Final and static keyword	1	05-09-2023		TLM2	CO2	
16.	Variable and command line arguments	1	08-09-2023		TLM2	CO2	
17.	Inheritance and types of inheritance.	1	09-09-2023, 11-09-2023		TLM2	CO2	
18.	Polymorphism – compile-time and run-time	1	12-09-2023, 15-09-2023		TLM2	CO2	
19.	Abstract class	1	16-09-2023, 19-09-2023		TLM2	CO2	
20.	String ,StringBuffer, and StringTokenizer	2	22-09-2023, 23-09-2023		TLM2	CO2	
No. of classes required to complete UNIT-II		11					

UNIT-III:

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.	Interfaces -definition and creation	1	25-09-2023		TLM2	CO3	
22.	Inheritance in interfaces	1	26-09-2023		TLM2	CO3	
23.	Packages : Built-in and user-defined	1	29-09-2023		TLM2	CO3	
24.	Exception Handling – Exception class hierarchy	1	30-09-2023		TLM2	CO3	
25.	Use of try, catch, throw, throws, and finally	2	10-10-2023		TLM2	CO3	
26.	Creation of user-defined exceptions	1	13-10-2023		TLM2	CO3	
27.	Assertions	1	14-10-2023		TLM2	CO3	
No. of classes required to complete UNIT-III		09					

UNIT-IV: Trees, Traversals, Search Trees

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
28.	Multithreading – Introduction and thread life-cycle	1	16-10-2023		TLM2	CO4	

29.	Creation of threads, naming and joining a thread	1	17-10-2023		TLM2	CO4	
30.	Daemon thread and thread pool	1	20-10-2023		TLM2	CO4	
31.	Thread synchronization	2	21-10-2023, 24-10-2023		TLM2	CO4	
32.	Inter-thread communication	1	27-10-2023		TLM2	CO4	
33.	Collection framework – Introduction	1	28-10-2023		TLM2	CO4	
34.	List interface	1	30-10-2023		TLM2	CO4	
35.	Set interface	1	31-10-2023		TLM2	CO4	
36.	Queue and Map Interface	1	03-11-2023		TLM2	CO4	
No. of classes required to complete UNIT-IV		10					

UNIT-V:

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
37.	AWT hierarchy – components and containers- Button, Label, text field, checkbox	2	04-11-2023, 06-11-2023		TLM2	CO5	
38.	Choice,list, canvas, scrollbar, menu Item & Menu	2	07-11-2023, 10-11-2023		TLM2	CO5	
39.	Layout Managers	1	11-11-2023		TLM2	CO5	
40.	Event Delegation model & Action Event class	1	13-11-2023		TLM2	CO5	
41.	Key Events and Mouse Events	1	14-11-2023		TLM2	CO5	
42.	Window Events and Action listener interface	1	17-11-2023		TLM2	CO5	
43.	Key, Mouse, and Mouse Motion Listener.	1	18-11-2023		TLM2	CO5	
44.	Window Listener and adapter classes.	1	20-11-2023		TLM2	CO5	
No. of classes required to complete UNIT-V		10					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of	Tentative	Actual	Teaching	Learning	HOD

		Classes Required	Date of Completion	Date of Completion	Learning Methods	Outcome COs	Sign Weekly
45.	Introduction to Swings	1	21-11-2023		TLM2	CO5	

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

EVALUATION PROCESS :

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Ms. B. Usha Rani	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. B. Usha Rani
Course Name & Code : Object Oriented Programming lab , 20CS57
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech-CSE / III SEM / B SEC
A.Y. : 2023-24
PREREQUISITE : **C Programming Language**

Course Educational Objectives:

The objective of the course is to apply the constructs of Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. They will be applying knowledge of object-oriented programming, collection framework to perform all operations on data.

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

- **CO1:** Solve Basic mathematical problems using fundamentals of Java and its object-oriented principles. **(Apply – L3)**
- **CO2:** Implement multithreading and exception handling mechanisms. **(Apply – L3)**
- **CO3:** Develop GUI applications and basic data structures using collection framework. **(Apply – L3)**
- **CO4:** Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Introduction to OOP using C++ - Sample programs	3	11-08-2023, 18-08-2023		TLM4	CO1	
2	JAVA Installation & Module-1: Understand the language constructs of JAVA	3	25-08-2023		TLM4	CO1	
3	Module-2 : Parameter passing, static and non-static methods	3	01-09-2023		TLM4	CO1	
4	Module-3: String class & Inheritence	3	08-09-2023		TLM4	CO1	
5	Module-4 : Poly morphism , Packages & Interfaces	6	15-09-2023, 22-09-2023		TLM4	CO1	
6	Module-5 : Abstract classes and interfaces	3	29-09-2023		TLM4	CO1	
7	Module-6: Multithreaded programming	6	13-10-2023		TLM4	CO2	
8	Module-7 : Exception – handling	3	20-10-2023		TLM4	CO2	
9	Module-8 : Applet Programming & Develop simple applications using AWT	3	27-10-2023, 03-11-2023		TLM4	CO3	
10	Module-9 : Collections framework	3	10-11-2023		TLM4	CO3	
11	Module-10: Collections framework	3	17-11-2023		TLM4	CO3	
12	**Lab Internal Examination**		24-11-2023				

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 Regulation):

Evaluation Task	**Marks**
Day-to-Day Work	A1 = 5
Record & Observation	B1 = 5
Internal Exam	C1 = 5
Cumulative Internal Examination (CIE): (A1+B1+C1)	15
Semester End Examination (SEE)	35
Total Marks = CIE + SEE	50

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 12	**Life-long learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**A**n ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	**An** 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Ms. B. Usha Rani	Dr. Y. Vijay Bhaskar Reddy	Dr. Y. Vijay Bhaskar Reddy	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. CH V NARAYANA
Course Name & Code : CO & 20CS08
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : II B.Tech., III-Sem, B-Sec **A.Y.: 2023-23**

PREREQUISITE: Fundamentals of Computer Science.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to learn about the functional blocks and data representation in computer system and understands the design principles of processor, organization and management of memory and peripheral devices.

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

CO1	Evaluate digital Number systems and use Boolean Algebra theorems ,properties and canonical forms for digital logic circuit design **(Undestand-L2)**
CO2	Design Combinational Logic circuits and sequential logic circuits **(Apply-L3)**
CO3	Understand Computer Architecture and data representation to perform computer arithmetic operations **(Understan-L2)**
CO4	Illustrate the design principles of control unit and pipelining **(Understand-L2)**
CO5	Analyze the memory hierarchy in a computer system **(Understan-L2)**

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

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

TEXTBOOKS:

T1 Morris Mano Michel D Ciletti, "Digital Design",4/e,2008,PEA

T2 Carl Hamacher, Zvonks Vransenic ,SafeaZaky, "Computer Oraganization", TMH publications

REFERENCE BOOKS:

R1 M.Morris Mano, "Computer System Architecture",Pearson Education Publishers[Unit-1,2]

R2 Leach, Malvino, saha,"Digital Logic design", TMH,2006

R3 R.P.jain,"Modern Digital Electronics", TMH,2011

R4 A.Anand Kumar,"Switching Theory and logic Design", Prentice-hall Of India pvt..Limited,2010

R5 Kohavi,Jha,Cambridge,"Switching and Finite Automata Theory",3/e

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Number systems, Logic gates and Boolean algebra

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 Digital Logic and Number systems	1	7-8-2023		TLM1	
2.	Conversions of Number systems from one radix to another	1	10-8-2023		TLM1	
3.	r' and (r-1)'complements	1	11-8-2023		TLM1	
4.	Binary codes	1	12-8-2023		TLM1	
5.	Logic gates	1	14-8-2023		TLM1	
6.	Logic gates	1	17-8-2023		TLM1	
7.	Introduction to Boolean Algebra with fundamental postulates, theorems and properties	2	17,18-8-2023		TLM1	
8.	Complement and dual of logical expressions, SOP, POS	2	19,21-9-2023		TLM1	
9.	Minimization of Boolean functions using Boolean theorems	3	24,25,26-8-2023		TLM1	
10.	Karnaugh Map(K-map)	1	28-8-2023		TLM1	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Combinational Logic Circuits and Sequential Logic Circuits

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 combinational circuits, Adders	1	31-8-2023		TLM1	
12.	Half/Full Subtractors, Ripple carry adder	1	1-9-2023		TLM1	
13.	Design of Decoders and Encoders	1	2-9-2023		TLM1	
14.	Multiplexer and De-multiplexer	1	4-9-2023		TLM1	
15.	Priority encoder	1	7-9-2023		TLM1	
16.	Introduction to sequential circuits, Latch & flip-flops	1	8-9-2023		TLM1	
17.	Flip-flops(RS,J,T,D),	2	9,11-9-2023		TLM1	
18.	Master slave flip-flop	2	14,15-10-2023		TLM1	
19.	Conversion of flip-flops, Truth & excitation tables	1	16-9-2023		TLM1	
20.	Registers and counters	1	18-9-2023		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Functional Blocks of a Computer & Data Representation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Basic functional blocks of a computer	1	21-9-2023		TLM2	
22.	Set Architecture of CPU-registers	1	22-9-2023		TLM2	
23.	Instruction execution cycle	1	23-9-2023		TLM2	
24.	RTL Interpretation of instructions	1	25-9-2023		TLM2	
25.	Addressing Modes	1	29-9-2023		TLM2	
26.	Instruction set	1	30-9-2023		TLM2	

27.	Signed Number representation	1	9-10-2023		TLM2	
28.	Fixed & Floating point representation,	1	12-10-2023		TLM2	
29.	Character representation	1	13-10-2023		TLM2	
30.	Computer arithmetic-Int. addition & subtraction	1	14-10-2023		TLM2	
31.	Multiplication shift-AND Add, Booth multiplier	1	16-10-2023		TLM2	
32.	Division restoring & non-restoring techniques	1	19-10-2023		TLM2	
33.	Floating Point arithmetic	1	20-10-2023		TLM2	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: CPU Control design & Parallel Processors

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Introduction to CPU control unit design	1	21-10-023		TLM2	
35.	Hardwired design	1	26-10-023		TLM2	
36.	Microprogrammed design approach	1	27-10-023		TLM2	
37.	Basic concepts of pipelining	1	28,-10-023		TLM2	
38.	Throughput and speed	1	30-10-023		TLM2	
39.	Pipeline hazards	1	02-11-023		TLM2	
40.	Parallel processors	3	3-11-2023		TLM2	
No. of classes required to complete UNIT-IV: 9				**No. of classes taken:**		

UNIT-V: Memory system design & Peripheral devices and their characteristics

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Memory organization	1	4-11-2023		TLM2	
42.	Memory interleaving	1	6-11-2023		TLM2	
43.	Concept of memory hierarchical organization	2	9,11-12-2023		TLM2	
44.	Cache memory	2	13,16-11-2023		TLM2	
45.	Peripheral devices –I/O sub-systems	2	17,18-11-2023		TLM2	
46.	I/O device interface	1	20-11-2023		TLM2	
47.	I/O transfers-program controlled	2	23,24-12-2023		TLM2	
48.	Interrupt driven	1	25-11-2023		TLM2	
49.	DMA	2	27,30-11-2023		TLM2	
50.	Revision	1	1-12-2023		TLM2	
51.	Revision	1	2-12-2023		TLM2	
No. of classes required to complete UNIT-V: 14				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.Venkata Narayana Chejarla**	**Dr.Venkata Narayana Chejarla**	**Dr .D.Venkata Subbaiah**	**Dr.V.Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : G.V.Rajya Lakshmi
Course Name & Code : DataBase Management Systems Lab (20CS56)
L-T-P Structure : 0-0-3 Credits: 1.5
Program/Sem/Sec : B.Tech., CSE., III-Sem., Sec-A A.Y : 2023-24

PRE-REQUISITE : Programming language, Discrete Mathematical Structures and Data Structures.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to provide a strong formal foundation in database concepts, technology, and practice to the participants to groom them into well-informed database application developers.

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

CO 1	Create & manipulate the relational database using SQL**.(Apply- L3)**
CO 2	Implement Views, procedures, triggers, and cursors on relational database. **(Apply- L3)**
CO 3	Create Unstructured Databases using MongoDB**.(Apply- L3)**
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction to SQL, syntax	3	10.08.23		TLM4	
2	Experiment – 1	3	17.08.23		TLM4	
3	Experiment – 2	3	24.08.23		TLM4	
4	Experiment – 3	3	31.08.23		TLM4	
5	Experiment – 4	3	07.09.23		TLM4	
6	Experiment – 5,6	3	14.09.23		TLM4	
7	Experiment – 7,8	3	21.09.23		TLM4	
8	Experiment – 9,10,11	3	12.10.23		TLM4	
9	Experiment – 11,12	3	19.10.23		TLM4	
10	Experiment – 13	3	26.10.23		TLM4	
11	Experiment – 14	3	02.11.23		TLM4	
12	Experiment – 15	3	09.11.23		TLM4	
13	Design database for Case study	3	16.11.23		TLM4	
14	Internal Exam	3	23.11.23		TLM4	

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

PART-C

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Mr.N.Srikanth**	**G.V.Rajya Lakshmi**	**Dr.Y.Vijay Bhaskar Reddy**	**Dr.D.Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. T.N.V.S Praveen
Course Name & Code : Discrete Mathematical Structures, 20CS04
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-CSE / III SEM / B
A.Y. : 2023-24

PRE-REQUISITE: Basic mathematical knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to perform the operations associated with relations and functions. Relate practical examples to the functions and relations and interpret the associated operations and terminology used in the context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior of software or to solve problems such as puzzles.

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

CO1	Construct mathematical arguments using logical connectives and quantifiers and verify them.**(Apply -L3)**
CO2	Demonstrate the basic terminology of functions, relations, lattices and their operations. **(Understand - L2)**
CO3	Apply the properties of graphs to solve the graph theory problems in Computer science. **(Apply- L3)**
CO4	Illustrate the basic principles/techniques to solve different algebraic structures & combinatorial problems. **(Understand- L2)**
CO5	Solve linear recurrence relations by recognizing homogeneity using constant coefficients, characteristic roots and Generating functions. **(Apply – L3)**

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

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	1													
CO2	3	2	1												
CO3	3	3	1												
CO4	3	3	1												
CO5	3	3	1												

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

TEXTBOOKS:

1. Tremblay, Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH Publications, 2008

REFERENCE BOOKS:

1. Chandrasekaran, Umaparvathi, DiscreteMathematics,PHI, 2010.
2. Ralph. P.Grimaldi, Ramana, Discrete and Combinational Mathematics,Pearson,5th edition.
3. https://nptel.ac.in/courses/106/106/106106183/

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical Logic

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Mathematical Logic: Propositional Calculus	1	07/08/2023		**TLM1**	CO1	
2.	Statement and Notations, Connectives, Truth Tables	1	08/08/2023		**TLM1**	CO1	
3.	Tautologies	1	09/08/2023		**TLM1**	CO1	
4.	Equivalence of Formulas	1	11/08/2023		**TLM1**	CO1	
5.	Duality Law, Tautological Implications	1	14/08/2023		**TLM1**	CO1	
6.	Normal Forms, DNF	1	16/08/2023		**TLM2**	CO1	
7.	CNF	1	17/08/2023		**TLM2**	CO1	
8.	PCNF, PDNF	1	21/08/2023		**TLM2**	CO1	
9.	Theory of inference for statement Calculus	1	22/08/2023		**TLM2**	CO1	
10.	RULE CP	1	23/08/2023		**TLM2**	CO1	
11.	Consistency of Premises Indirect Method of Proof	1	24/08/2023		**TLM1**	CO1	
12.	Predicative Logic	1	28/08/2023		**TLM1**	CO1	
13.	Statement Functions, Variables, Free & Bound Variables, QUANTIFIERS	1	29/08/2023		**TLM1**	CO1	
No. of classes required to complete UNIT-I		13	No. of classes taken:				

UNIT-II: Sets, Relations & Functions

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Set Theory: Introduction,	1	31/08/2023		**TLM1**	CO2	
2.	Representation of Sets	1	04/09/2023		**TLM1**	CO2	
3.	Operations on Binary Sets	1	05/09/2023		**TLM2**	CO2	

4.	Relations: Properties of Binary Relations	1	06/09/2023		**TLM1**	CO2	
5.	Relation Matrix and Digraph Operations on Relations	1	07/09/2023		**TLM1**	CO2	
6.	Partition and Covering, Transitive Closure	1	11/09/2023		**TLM1**	CO2	
7.	Equivalence Relation	1	12/09/2023		**TLM2**	CO2	
8.	Compatible Relation, Partial Ordering Relation	1	13/09/2023		**TLM1**	CO2	
9.	Hasse Diagrams, Lattices	1	14/09/2023		**TLM1**	CO2	
10.	Functions: Bijective Functions	1	18/09/2023		**TLM1**	CO2	
11.	Composition of Functions, Inverse Functions	1	19/09/2023		**TLM1**	CO2	
No. of classes required to complete UNIT-2		11	No. of classes taken:				

UNIT – III: Graph Theory I & II

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Basic Concepts of Graphs	1	20/09/2023		**TLM1**	CO3	
2.	Matrix Representation of Graphs	1	25/09/2023		**TLM1**	CO3	
3.	Adjacency Matrices, Incidence Matrices	1	26/09/2023		**TLM1**	CO3	
4.	Isomorphic Graphs, Paths and circuits	1	27/09/2023		**TLM1**	CO3	
5.	Eulerian Graphs, Hamiltonian Graphs	1	28/09/2023		**TLM2**	CO3	
6.	Multigraphs, Planar Graphs, Euler‟s Formula	1	02/10/2023		**TLM1**	CO3	
7.	Graph Colouring and Covering, Chromatic Number	1	03/10/2023		**TLM1**	CO3	
8.	Trees Introduction	1	04/10/2023		**TLM1**	CO3	
9.	BFS, DFS	1	05/10/2023		**TLM2**	CO3	
10.	Spanning Trees: Properties	1	10/10/2023		**TLM2**	CO3	
11.	Algorithms for Minimum Spanning Trees	2	11/10/2023 12/10/2023		**TLM2**	CO3	
No. of classes required to complete UNIT-3		12	No. of classes taken:				

UNIT-IV: Algebraic Structures & Combinatorics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Algebraic Systems with one Binary Operation	1	16/10/2023		**TLM1**	CO4	
2.	Properties of Binary operations, Semi groups and Monoids	1	18/10/2023		**TLM1**	CO4	
3.	Homomorphism of Semi groups and Monoids, Groups	1	19/10/2023		**TLM1**	CO4	
4.	Abelian Group, Cosets, Subgroups	1	26/10/2023		**TLM1**	CO4	
5.	Langrage's Theorem	1	30/10/2023		**TLM1**	CO4	
6.	Basic of Counting, Permutations	1	31/10/2023		**TLM1**	CO4	
7.	Combinations	1	06/11/2023		**TLM1**	CO4	
8.	Circular Permutations, Restricted Permutations	1	07/11/2023		**TLM1**	CO4	
9.	Combinations with repetition Pigeonhole Principle and its Applications	2	08/11/2023 to 09/11/2023		**TLM1**	CO4	
10.	Principle of inclusion-exclusion	2	14/11/2023 to 15/11/2023		**TLM1**	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Recurrence Relation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Generating Functions of Permutations and Combinations	2	16-11-2023 20-11-2023		**TLM1**	CO5	
2.	Calculating Coefficient of Generating Functions	2	21-11-2023 23-11-2023		**TLM1**	CO5	
3.	Recurrence Relations	2	27-11-2023 28-11-2023		**TLM1**	CO5	
4.	solving linear homogeneous recurrence Relations by substitution	2	29-11-2023 30-11-2023		**TLM1**	CO5	
5.	generating functions	2	04-12-2023 05-12-2023		**TLM1**	CO5	
6.	The Method of Characteristic Roots	2	06-12-2023 07-12-2023		**TLM1**	CO5	
No. of classes required to complete UNIT-5		10	No. of classes taken:				

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

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	An 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. T.N.V.S.Praveen	Mr. T.N.V.S.Praveen	Dr.S.Jaya Pradha	Dr. D Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. A. Sudhakar
Course Name & Code **:** Web Application Development using Full Stack Module-I
L-T-P Structure **:** 1-0-2 **Credits:** 2
Program/Sem/Sec : B.Tech. - CSE/III/B **A.Y.:** 20223-24

PREREQUISITE: IT WORKSHOP

Course Educational Objective: The objective of the course is to understand the design of HTML web pages, Styling of HTML pages using CSS, web forms validation using JavaScript and developing responsive web page using JQuery.

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

CO1	Apply the basic tags to design static web pages. **(Apply – L3)**
CO2	Validate the web pages at client side using java script. **(Apply – L3)**
CO3	Design the responsive web pages using JQuery. **(Apply – L3)**
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

Text Books &REFERENCE BOOKS:

T1	Thomas Powell, "HTML & CSS: The Complete Reference", McGrawHill,5thEdition2017.
T2	Jon Duckett , "Beginning HTML, XHTML, CSS, and JavaScript", Wiley India, 2010.
T3	Cody Lindley , "jQuery Cookbook", O'Reilly Media, 2009
R1	Steven M. Schafer, "HTML, XHTML, and CSS Bible", Wiley India,5th Edition, 2011
R2	Richard York , "Web Development with jQuery", Wiley India, 2015.

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.	HTML TAGS	3	08-08-2023		**DM5**	
2.	HTML TAGS	1	10-08-2023		**DM2**	
3.	Lists and Table	1	17-08-2023		**DM2**	
4.	Forms	3	22-08-2023		**DM5**	
5.	Forms	1	24-08-2023		**DM2**	
6.	Frames	3	29-08-2023		**DM5**	
7.	Frames	1	31-08-2023		**DM2**	
8.	HTML5	3	05-09-2023		**DM5**	
9.	HTML5	3	12-09-2023		**DM5**	
10.	CSS	1	14-11-2023		**DM2**	
11.	CSS	1	21-09-2023		**DM2**	
12.	CSS	3	26-09-2023		**DM5**	
13.	CSS	1	28-09-2023		**DM2**	
14.	CSS	3	03-10-2023		**DM5**	
15.	JAVA SCRIPT	1	05-10-2023		**DM2**	
16.	JAVA SCRIPT	3	10-10-2023		**DM5**	
17.	JAVA SCRIPT	1	12-10-2023		**DM2**	
18.	JAVA SCRIPT	3	17-10-2023		**DM5**	
19.	JAVA SCRIPT	1	19-10-2023		**DM2**	
20.	JAVA SCRIPT	1	26-10-2023		**DM2**	
21.	JAVA SCRIPT	3	31-10-2023		**DM5**	
22.	XML	1	02-11-2023		**DM2**	
23.	XML	3	07-11-2023		**DM5**	
24.	XML	1	09-11-2023		**DM2**	
25.	XML	3	14-11-2023		**DM5**	
26.	JQUERY	1	16-11-2023		**DM2**	
27.	JQUERY	3	21-11-2023		**DM5**	
28.	JQUERY	1	23-11-2023		**DM2**	
29.	JQUERY	3	28-11-2023		**DM5**	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	50

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	Mr. A. Sudhakar	Dr. S.Nagarjuna Reddy	Dr. Y.V.B. Reddy	Dr. D. Veeraiah
Signature				

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.N.Srikanth
Course Name & Code : DATABASE MANAGEMENT SYSTEMS & 20CS07
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech III Sem CSE – A Section **A.Y.:** 2023-24
PREREQUISITE : Data Structures

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of this course is to know about basic concepts of DBMS, Database Languages, Database Design, Normalization Process, Transaction Processing, Indexing, and Interfacing with NOSQL using MongoDB.

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

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

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

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

TEXTBOOKS:

T1 Henry F. Korth, Abraham Silberschatz, S.Sudarshan, "Database System Concepts", McGrawHill, 6th edition, 2009.

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

REFERENCE BOOKS:

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

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

R3 RamezElmasri, ShamkanthB.Navathe, "Fundamentals of Database Systems", Addison Wesley, 6th edition, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DBMS Introduction & Data Modelling using the Entity Relationship Model

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	CEOs and COs discussion, Introduction: An overview of Database Management System	1	08-08-23		1 & 2	
2.	Database System Vs File System, Database System Concepts	1	09-08-23		1 & 2	
3.	Three Schema Architecture, Data Models	1	11-08-23		1 & 2	
4.	Database Schema and Instances, Data Independence	2	12-08-23		1 & 2	
5.	Database Languages, Database Structure	1	16-08-23		1 & 2	
6.	ER model concepts, Notation for ER Diagram	1	18-08-23		1 & 2	
7.	Mapping Constraints, Keys	1	19-08-23		1 & 2	
8.	Concepts of Super Key, Candidate Key, Primary Key	1	22-08-23		1 & 2	
9.	Generalization, Aggregation	1	23-08-23		1 & 2	
10.	Reduction of an ER Diagrams to Tables, Relationships of Higher Degree.	1	25-08-23		1 & 2	
11.	Unit-1 Revision	1	26-08-23		1 & 2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Relational Data Model and Language & Introduction to SQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Relational Data Model Concepts, Integrity Constraints	1	29-08-23		1 & 2	
13.	Entity Integrity, Referential Integrity	1	30-08-23		1 & 2	
14.	Key Constraints	1	01-09-23		1 & 2	
15.	Domain Constraints	1	02-09-23			
16.	Relational Algebra	1	05-09-23		1 & 2	
17.	Characteristics of SQL, Advantage of SQL	1	08-09-23		1 & 2	
18.	SQL Data types and Literals, Insert, Update and Delete Operations	1	12-09-23		1 & 2	
19.	Tables, Views and Indexes	1	13-09-23		1 & 2	
20.	Nested Queries, Aggregate Functions	1	15-09-23		1 & 2	
21.	Joins, Unions, Intersection, Minus	1	16-09-23		1 & 2	
22.	Cursors in SQL, Triggers in SQL	1	19-09-23		1 & 2	
23.	Unit-II revision	1	20-09-23		1 & 2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Normalization

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Functional Dependencies	1	22-09-23		1 & 2	
25.	Normal Forms - First, Second	1	23-09-23		1 & 2	
26.	Third Normal Forms, BCNF	1	26-09-23		1 & 2	
27.	Inclusion Dependences	2	27-09-23		1 & 2	
28.	Loss Less Join Decompositions	1	30-09-23		1 & 2	
29.	Multi Valued Dependencies	1	10-10-23		1 & 2	
30.	Fourth Normal Form	1	11-10-23		1 & 2	
31.	Join Dependencies and Fifth Normal Form	1	13-10-23		1 & 2	
32.	Unit-III Revision	1	17-10-23		1 & 2	
No. of classes required to complete UNIT-III: 10				**No. of classes taken:**		

UNIT-IV: Transaction Processing Concepts, Concurrency Control Techniques & Crash Recovery

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Transaction System, Testing of Serializability	1	18-10-23		1 & 2	
34.	Serializability of Schedules	1	20-10-23		1 & 2	
35.	Conflict Serializability	1	25-10-23		1 & 2	
36.	View Serializability	1	27-10-23		1 & 2	
37.	Recoverability, Deadlock Handling	1	28-10-23		1 & 2	
38.	Concurrency Control	1	31-10-23		1 & 2	
39.	Locking Techniques for Concurrency Control	1	01-11-23		1 & 2	
40.	Time Stamping Protocols for Concurrency Control	1	03-11-23		1 & 2	
41.	Validation Based Protocol	1	04-11-23		1 & 2	
42.	Multiple Granularity	1	07-11-23		1 & 2	
43.	Recovery with Concurrent Transactions	1	08-11-23		1 & 2	
44.	Log Based Recovery, Checkpoints	1	10-11-23		1 & 2	
45.	ARIES Algorithm	1	14-11-23			
46.	Unit-IV revision	1	15-11-23			
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: Physical Database Design & Interfacing and Interacting with NoSQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Storage and file structure	1	17-11-23		1 & 2	
48.	indexed files, hashed files	1	18-11-23		1 & 2	
49.	B+ trees	1	21-11-23		1 & 2	
50.	Files with dense index	1	22-11-23		1 & 2	
51.	files with variable length records	1	24-11-23		1 & 2	
52.	Introduction to NoSQL, Storing and Accessing Data	1	25-11-23		1 & 2	
53.	Storing Data In and Accessing Data from MongoDB	1	28-11-23		1 & 2	
54.	Querying MongoDB & Revision	1	29-11-23		1 & 2	
55.	Unit-5 revision	1	01-12-23		1 & 2	
56.	Discussion on External Exam	1	02-12-23		1 & 2	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 12	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Mr.N.Srikanth**	**Mrs.G.V.RajyaLakshmi**	**Dr. Y.Vijay Bhaskar Reddy**	**Dr. D. Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

PROGRAM	**:** II B. Tech., I-Sem., CSE - B
ACADEMIC YEAR	**:** 2023-24
COURSE NAME & CODE	**:** PROBABILITY AND STATISTICS
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**:** K. N. V. Lakshmi
COURSE COORDINATOR	**:** M. Rami Reddy
PRE-REQUISITES	**:** None

COURSE EDUCATIONAL OBJECTIVES (CEO): The objective of this course is to provide students with the foundations and applications of probabilistic and statistical methods mainly used in varied applications in engineering and science.

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

CO1: Understand various probabilistic situations using the laws of probability and Random variables. (Understand - L2)

CO2: Apply probability distributions like Binomial, Poisson, Normal and Exponential distributions in solving engineering problems. (Apply - L3)

CO3: Calculate the standard error of sampling distribution and confidence intervals for parameters like mean and proportion based on sample data. (Apply - L3)

CO4: Analyze the data scientifically with the appropriate statistical methodologies to apply the suitable test of hypothesis. (Analyze - L4)

CO5: Construct the regression lines to predict the dependent variables and calculate the Correlation Coefficient for a bivariate statistical data. (Apply - L4)

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

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

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

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

BOS APPROVED REFERENCE BOOKS:

R1 Miller & Freund's "Probability and Statistics for Engineers",8th edition. PHI, New Delhi,2011.

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Probability and Random Variables

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction class, course outcomes	1	7/8/23		TLM1	
2.	Basic concepts of probability	1	8/8/23		TLM1	
3.	problems on basic probability	1	9/8/23		TLM1	
4.	problems on addition theorem	1	14/8/23		TLM1	
5.	Conditional probability	1	16/8/23		TLM1	
6.	Multiplication theorem, examples	1	19/8/23		TLM1	
7.	Independent events, theorems	1	21/8/23		TLM1	
8.	Problems on multiplication theorem, independent events	1	22/8/23		TLM1	
9.	Baye's theorem, problems	1	23/8/23		TLM1	
10.	Random variables, Expections	1	26/8/23		TLM1	
11.	Problems on PMF	1	28/8/23		TLM1	
12.	Problems on PDF	1	29/8/23		TLM1	
13.	Tutorial-1	1	30/8/23		TLM3	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: Probability Distributions

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Binomial Distribution- mean & variance	1	2/9/23		TLM1	
2.	Problems on Binomial distribution	1	4/9/23		TLM1	
3.	Fitting of binomial distribution	1	5/9/23		TLM1	
4.	Poisson distribution, mean and variance	1	11/9/23		TLM1	
5.	Problems on Poisson distribution and fitting of Poisson distribution	1	12/9/23		TLM1	
6.	Normal distribution: mean &variance	1	13/9/23		TLM1	
7.	Problems on Normal Distribution	1	16/9/23		TLM1	
8.	Exponential distribution:	1	19/9/23		TLM1	
9.	Tutorial -2	1	20/9/23		TLM3	
No. of classes required to complete UNIT-II: 9				No. of classes taken:		

UNIT-III: Sampling distribution and Estimation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Sampling distribution,definitions	1	23/9/23		TLM1	
2.	Sampling distribution of mean, variance	1	25/9/23		TLM1	
3.	Problems	1	26/9/23		TLM1	
4.	Problems on central limit theorem	1	27/9/23		TLM1	
5.	Problems on Central limit theorem	1	30/9/23		TLM1	
6.	I MID		3/10/23			
7.	I MID		4/10/23			
8.	I MID		7/10/23			
9.	Estimation	1	9/10/23			
10.	Estimation	1	10/10/23		TLM1	
11.	Point and interval estimation	1	11/10/23		TLM1	
12.	Interval estimation of mean and proportions in large samples	1	16/10/23		TLM1	
13.	Interval estimation of mean in small samples	1	17/10/23		TLM1	
14.	Problems	1	18/10/23		TLM1	
15.	Tutorial-3	1	25/10/23		TLM3	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV :Tests of Hypothesis

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Testing of Hypothesis , definitions	1	28/10/23		TLM1	
2.	Z-test for means	1	30/10/23		TLM1	
3.	Z-test for means	1	31/10/23		TLM1	
4.	Z-test for proportions	1	1/11/23		TLM1	
5.	Z-test for proportions	1	4/11/23		TLM1	
6.	t-test for means	1	6/11/23		TLM1	
7.	t-test for means	1	7/11/23		TLM1	
8.	paired t-test	1	8/11/23		TLM1	
9.	F-test for variances	1	13/11/23		TLM1	
10.	χ^2-test for goodness of fit	1	14/11/23		TLM1	
11.	χ^2-test for independence of attributes	1	15/11/23		TLM1	

12.	χ^2-test for independence of attributes	1	18/11/23		TLM1	
13.	Tutorial-4	1	20/11/23		TLM3	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V :Correlation and Regression

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Simple Bi-variate Correlation	1	21/11/23		TLM1	
2.	Problems on Pearson's Correlation	1	22/11/23		TLM1	
3.	Regression lines	1	25/11/23		TLM1	
4.	Problems on Regression lines	1	27/11/23		TLM1	
5.	Properties of Regression coefficients	1	28/11/23		TLM1	
6.	Rank correlation coefficient and problems	1	29/11/23		TLM1	
7.	Tutorial-5	1	2/12/23		TLM3	
8.	II MID		4/12/23			
9.	II MID		5/12/23			
10.	II MID		6/12/23			
No. of classes required to complete UNIT-V: 7				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/SwayamPrabha/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

Course Instructor	Course Coordinator	Module Coordinator	HOD
(K. N. V. Lakshmi)	(M. Rami Reddy)	(Dr. A. Rami Reddy)	(Dr. A. Rami Reddy)

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

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : R Programming Lab (20IT53)

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

COURSE CREDITS : 1

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

COURSE COORDINATOR : **Y Vijaya Bhaskar Reddy**

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): In this course student will learn about the fundamentals of R programming, standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming language, get acquaintances with Arrays, files, strings, packages and distributions using R

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

CO1: : Implement basic concepts of R programming and its different module that includes conditional, looping, lists, strings, functions, frames, arrays and file programming

CO2: Implement the concepts of R Script to extract the data from data frames and file operations.

CO3: Implement the various statistical techniques using R

C04: Extend the functionality of R by using the addon packages

CO5: Use R Graphics and Tables to visualize results of various statistical operations on data

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Cycle1: Installing R and basic functionality of R	3	09-08-23		TLM4/TLM5	CO1	
2	Cycle 2: R Script on operators, if and else programs	3	16-08-23 23-08-23		TLM4/TLM5	CO1	
3	Cycle 3: R Script on list	3	30-08-23 06-09-23		TLM4/TLM5	CO1	
4	Cycle 4: Implement R Script on vectors	3	13-09-23		TLM4/TLM5	CO1	
5	Cycle 5: Implement R Script on matrices and data frames	3	20-09-23 27-09-23		TLM4/TLM5	CO1	
6	Cycle 6: Implement R Script on Descriptive statistics	3	11-10-23		TLM4/TLM5	CO4	
7	Cycle7: Reading different types of data sets into files	3	18-10-23		TLM4/TLM5	CO2	
8	Cycle8: implement different charting methods	3	01-11-23		TLM4/TLM5	CO2	
9	Cycle9: implement the different distributions	3	08-11-23		TLM4/TLM5	CO3	
10	Cycle 10 : implement the Non tabular data types and data transformations	3	15-11-23		TLM4/TLM5	CO4	
11	Cycle 11: Introduction to dirty data problems	3	22-11-23		TLM4/TLM5	CO5	
12	Cycle 12 : implement different data sources	3	29-11-23		TLM4/TLM5	CO5	
13	**LAB INTERNAL**	3	12-12-23				

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

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

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

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

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

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

responsibilities and norms of the engineering practice.

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

PROGRAM SPECIFIC OUTCOMES

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

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

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

G V Suresh			
Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF COMPUTER SCINCE AND ENGINEERING

COURSE HANDOUT

PART-A

PROGRAM : II B. Tech., I-Sem., CSE - C
ACADEMIC YEAR : 2023-24
COURSE NAME & CODE : PROBABILITY AND STATISTICS
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Dr. Y. P. C. S. Anil Kumar
COURSE COORDINATOR : M. Rami Reddy
PRE-REQUISITES : None

COURSE EDUCATIONAL OBJECTIVES (CEO): The objective of this course is to provide students with the foundations and applications of probabilistic and statistical methods mainly used in varied applications in engineering and science.

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

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

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

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

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 Jay L.Devore "Probability and Statistics for engineering and the sciences." , 8th edition, Cengage Learning india, 2012
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R2 B.V. Ramana, "Higher Engineering Mathematics", 1st Edition, TMH, New Delhi, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I :Probability and Random Variables

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction class, course outcomes	1	7-8-23		TLM1	
2.	Basic concepts of probability	1	8-8-23		TLM1	
3.	problems on basic probability	1	9-8-23		TLM1	
4.	problems on addition theorem	1	10-8-23		TLM1	
5.	Conditional probability	1	14-8-23		TLM1	
6.	Multiplication theorem, examples	1	17-8-23		TLM1	
7.	Independent events, theorems	1	19-8-23		TLM1	
8.	Problems on multiplication theorem, independent events	1	21-8-23		TLM1	
9.	Baye's theorem, problems	1	22-8-23		TLM1	
10.	Random variables, Expections	1	24-8-23		TLM1	
11.	Problems on PMF	1	26-8-23		TLM1	
12.	Problems on PDF	1	28-8-23		TLM1	
13.	Tutorial-1	1	29-8-23		TLM3	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: Probability Distributions

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Binomial Distribution- mean & variance	1	31-8-23		TLM2	
2.	Problems on Binomial distribution	1	2-9-23		TLM2	
3.	Fitting of binomial distribution	2	4-9-23 5-9-23		TLM2	
4.	Poisson distribution, mean and variance	1	7-9-23		TLM2	
5.	Problems on Poisson distribution and fitting of Poisson distribution	1	11-9-23		TLM2	
6.	Normal distribution: mean &variance	1	12-9-23		TLM2	
7.	Problems on Normal Distribution	2	14-9-23		TLM3	
8.	Exponential distribution:	1	16-9-23		TLM2	
9.	Tutorial -2	1	19-9-23		TLM3	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Sampling distribution and Estimation

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

1.	Sampling distribution ,definitions	1	21-9-23		TLM2	
2.	Sampling distribution of mean, variance	1	23-9-23		TLM2	
3.	Problems	1	25-9-23		TLM2	
4.	Problems	1	26-9-23			
5.	Problems on central limit theorem	1	30-9-23		TLM2	
6.	I MID		3-10-23			
7.	I MID		5-10-23			
8.	I MID		7-10-23			
9.	Estimation	1	9-10-23			
10.	Estimation and types	1	10-10-23		TLM2	
11.	Point and interval estimation	1	12-10-23		TLM3	
12.	Interval estimation of mean and proportions in large samples	1	14-10-23		TLM2	
13.	Interval estimation of mean in small samples	1	16-10-23		TLM2	
14.	Problems	1	17-10-23		TLM2	
15.	Tutorial-3	1	19-10-23		TLM3	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV :Tests of Hypothesis

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Testing of Hypothesis , definitions	1	21-10-23		TLM2	
2.	Z-test for means	2	26-10-23 28-10-23		TLM2	
3.	Z-test for proportions	2	30-10-23 31-10-23		TLM2	
4.	t-test for means	2	02-11-23 04-11-23		TLM3	
5.	paired t-test	1	06-11-23		TLM2	
6.	F-test for variances	1	07-11-23		TLM2	
7.	χ^2-test for goodness of fit	1	09-11-23		TLM2	
8.	χ^2-test for independence of attributes	1	11-11-23		TLM2	
9.	Tutorial-8	1	13-11-23		TLM3	
No. of classes required to complete UNIT-IV: 12				No. of classes taken:		

UNIT-V :Correlation and Regression

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Simple Bi-variate Correlation	1	14-11-23		TLM2	
2.	Problems on Pearson's Correlation	1	16-11-23		TLM2	

3.	Regression lines	1	18-11-23		TLM2	
4.	Problems on Regression lines	1	20-11-23		TLM2	
5.	Properties of Regression coefficients	1	21-11-23		TLM2	
6.	Tutorial-9	1	23-11-23		TLM3	
7.	Problems on rank Correlation	1	25-11-23		TLM2	
8.	Problems on repeated rank Revision	1	27-11-23		TLM3	
9.	Revision	1	28-11-23			
10.	Revision	1	2-12-23			
11.	II MID		4-12-23			
12.	II MID		5-12-23			
13.	II MID		6-12-23			
14.	II MID		9-12-23			
No. of classes required to complete UNIT-V: 10				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/SwayamPrabha/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

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr Y.P.C.S.Anil Kumar)	(M.Rami Reddy)	(Dr.A.Rami Reddy)	(Dr.A.Rami Reddy)

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. GOPI SURESH A
Course Name & Code :Discrete Mathematical Structures, 20CS04
L-T-P Structure : **3-0-0** **Credits:**03
Program/Sem/Sec : B.Tech-CSE / III SEM / C
A.Y. :2023-24

PRE-REQUISITE: Basic mathematical knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of the course is to perform the operations associated with relations and functions. Relate practical examples to the functions and relationsand interpret the associated operations and terminology used in the context. Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior ofsoftware or to solve problems such as puzzles.

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

CO1	Construct mathematical arguments using logical connectives and quantifiers and verify them.**(Apply -L3)**
CO2	Demonstrate the basic terminology of functions, relations, lattices and their operations. **(Understand - L2)**
CO3	Apply the properties of graphs to solve the graph theory problems in Computer science. **(Apply- L3)**
CO4	Illustrate the basic principles/techniques to solve different algebraic structures & combinatorial problems. **(Understand- L2)**
CO5	Solve linear recurrence relations by recognizing homogeneity using constant coefficients, characteristic roots and Generating functions. **(Apply – L3)**

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

CO	Program Outcomes (POs)												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	1													
CO2	3	2	1												
CO3	3	3	1												
CO4	3	3	1												
CO5	3	3	1												

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

TEXTBOOKS:

1. Tremblay, Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH Publications, 2008

REFERENCE BOOKS:

1. Chandrasekaran, Umaparvathi, DiscreteMathematics,PHI, 2010.
2. Ralph. P.Grimaldi, Ramana, Discrete and Combinational Mathematics,Pearson,5th edition.
3. https://nptel.ac.in/courses/106/106/106106183/

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Mathematical Logic

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Mathematical Logic: Propositional Calculus	1	07/08/2023		**TLM1**	CO1	
2.	Statement and Notations, Connectives, Truth Tables	1	10/08/2023		**TLM1**	CO1	
3.	Tautologies	1	11/08/2023		**TLM1**	CO1	
4.	Equivalence of Formulas	1	12/08/2023		**TLM1**	CO1	
5.	Duality Law, Tautological Implications	1	14/08/2023		**TLM1**	CO1	
6.	Normal Forms, DNF	1	17/08/2023		**TLM2**	CO1	
7.	CNF	1	18/08/2023		**TLM2**	CO1	
8.	PCNF, PDNF	1	19/08/2023		**TLM2**	CO1	
9.	Theory of inference for statement Calculus	1	21/08/2023		**TLM2**	CO1	
10.	RULE CP	1	24/08/2023		**TLM2**	CO1	
11.	Consistency of Premises Indirect Method of Proof	1	25/08/2023		**TLM1**	CO1	
12.	Predicative Logic	1	26/08/2023		**TLM1**	CO1	
13.	Statement Functions, Variables, Free & Bound Variables, QUANTIFIERS	1	28/08/2023		**TLM1**	CO1	
No. of classes required to complete UNIT-I		13	No. of classes taken:				

UNIT-II: Sets, Relations & Functions

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Set Theory: Introduction,	1	30/08/2023		**TLM1**	CO2	
2.	Representation of Sets	1	03/09/2023		**TLM1**	CO2	
3.	Operations on Binary Sets	1	04/09/2023		**TLM2**	CO2	

4.	Relations: Properties of Binary Relations	1	05/09/2023		**TLM1**	CO2	
5.	Relation Matrix and Digraph Operations on Relations	1	07/09/2023		**TLM1**	CO2	
6.	Partition and Covering, Transitive Closure	1	10/09/2023		**TLM1**	CO2	
7.	Equivalence Relation	1	11/09/2023		**TLM2**	CO2	
8.	Compatible Relation, Partial Ordering Relation	1	12/09/2023		**TLM1**	CO2	
9.	Hasse Diagrams, Lattices	1	14/09/2023		**TLM1**	CO2	
10.	Functions: Bijective Functions	1	16/09/2023		**TLM1**	CO2	
11.	Composition of Functions, Inverse Functions	1	19/09/2023		**TLM1**	CO2	
No. of classes required to complete UNIT-2		11	No. of classes taken:				

UNIT – III: Graph Theory I & II

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Basic Concepts of Graphs	1	20/09/2023		**TLM1**	CO3	
2.	Matrix Representation of Graphs	1	26/09/2023		**TLM1**	CO3	
3.	Adjacency Matrices, Incidence Matrices	1	27/09/2023		**TLM1**	CO3	
4.	Isomorphic Graphs, Paths and circuits	1	30/09/2023		**TLM1**	CO3	
5.	Eulerian Graphs, Hamiltonian Graphs	1	03/10/2023		**TLM2**	CO3	
6.	Multigraphs, Planar Graphs, Euler‟s Formula	1	04/10/2023		**TLM1**	CO3	
7.	Graph Colouring and Covering, Chromatic Number	1	08/10/2023		**TLM1**	CO3	
8.	Trees Introduction	1	10/10/2023		**TLM1**	CO3	
9.	BFS, DFS	1	11/10/2023		**TLM2**	CO3	
10.	Spanning Trees: Properties	1	14/10/2023		**TLM2**	CO3	
11.	Algorithms for Minimum Spanning Trees	2	17/10/2023 18/10/2023		**TLM2**	CO3	
No. of classes required to complete UNIT-3		12	No. of classes taken:				

UNIT-IV: Algebraic Structures & Combinatorics

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Algebraic Systems with one Binary Operation	1	20/10/2023		**TLM1**	CO4	
2.	Properties of Binary operations, Semi groups and Monoids	1	21/10/2023		**TLM1**	CO4	
3.	Homomorphism of Semi groups and Monoids, Groups	1	27/10/2023		**TLM1**	CO4	
4.	Abelian Group, Cosets, Subgroups	1	28/10/2023		**TLM1**	CO4	
5.	Langrage's Theorem	1	31/10/2023		**TLM1**	CO4	
6.	Basic of Counting, Permutations	1	01/11/2023		**TLM1**	CO4	
7.	Combinations	1	07/11/2023		**TLM1**	CO4	
8.	Circular Permutations, Restricted Permutations	1	08/11/2023		**TLM1**	CO4	
9.	Combinations with repetition Pigeonhole Principle and its Applications	2	10/11/2023 to 11/11/2023		**TLM1**	CO4	
10.	Principle of inclusion-exclusion	2	14/11/2023 to 15/11/2023		**TLM1**	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Recurrence Relation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1.	Generating Functions of Permutations and Combinations	2	17-11-2023 18-11-2023		**TLM1**	CO5	
2.	Calculating Coefficient of Generating Functions	2	21-11-2023 24-11-2023		**TLM1**	CO5	
3.	Recurrence Relations	2	28-11-2023 29-11-2023		**TLM1**	CO5	
4.	solving linear homogeneous recurrence Relations by substitution	2	01-12-2023 02-12-2023		**TLM1**	CO5	
5.	generating functions	2	05-12-2023 06-12-2023		**TLM1**	CO5	
6.	The Method of Characteristic Roots	2	08-12-2023 09-12-2023		**TLM1**	CO5	
No. of classes required to complete UNIT-5		10	No. of classes taken:				

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

EVALUATION PROCESS:

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	An ability to apply software engineering practices and strategies in software project development using open-source programming environment for the success of organization
PSO 2	AnAbility 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.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. GOPI SURESH A	Mr.GOPI SURESH A	Dr.S.Jaya Pradha	Dr. D Veeraiah
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
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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: Ms. P. SARALA
Course Name & Code : DATABASE MANAGEMENT SYSTEMS & 20CS07
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech III Sem CSE – C Section **A.Y.:** 2023-24

PREREQUISITE:

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Objective of this course is to know about basic concepts of DBMS, Database Languages, Database Design, Normalization Process, Transaction Processing, Indexing, and Interfacing with NOSQL using MongoDB.

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

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

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

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

TEXTBOOKS:

T1 Henry F. Korth, Abraham Silberschatz, S.Sudarshan, "Database System Concepts", McGrawHill, 6th edition, 2009.
T2 Shashank Tiwari, " ProfessionalNoSql", John Wiely& Sons, 2011.

REFERENCE BOOKS:

R1 Raghu Ramakrishnan, JohanneseGehrke, —Database Management System‖, McGrawHill, 3rd edition, 2000.
R2 Date C J, —An Introduction to Database System, Pearson Education, 8th edition, 2003.
R3 RamezElmasri, ShamkanthB.Navathe, "Fundamentals of Database Systems", Addison Wesley, 6th edition, 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DBMS Introduction & Data Modelling using the Entity Relationship Model

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	CEOs and COs discussion, Introduction: An overview of Database Management System	1	07-08-23		1 & 2	
2.	Database System Vs File System, Database System Concepts	1	08-08-23		1 & 2	
3.	Three Schema Architecture, Data Models	1	09-08-23		1 & 2	
4.	Database Schema and Instances, Data Independence	1	14-08-23		1 & 2	
5.	Database Languages, Database Structure	1	16-08-23		1 & 2	
6.	ER model concepts, Notation for ER Diagram	1	19-08-23		1 & 2	
7.	Mapping Constraints, Keys	1	21-08-23		1 & 2	
8.	Concepts of Super Key, Candidate Key, Primary Key	1	22-08-23		1 & 2	
9.	Generalization, Aggregation	1	23-08-23		1 & 2	
10.	Reduction of an ER Diagrams to Tables, Relationships of Higher Degree.	1	26-08-23		1 & 2	
11.	Unit-1 Revision	1	28-08-23		1 & 2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Relational Data Model and Language & Introduction to SQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Relational Data Model Concepts, Integrity Constraints	1	29-08-23		1 & 2	
13.	Entity Integrity, Referential Integrity	1	30-08-23		1 & 2	
14.	Key Constraints	1	31-08-23		1 & 2	
15.	Domain Constraints	1	02-09-23			
16.	Relational Algebra	1	04-09-23		1 & 2	
17.	Characteristics of SQL, Advantage of SQL	1	05-09-23		1 & 2	
18.	SQL Data types and Literals, Insert, Update and Delete Operations	1	11-09-23		1 & 2	
19.	Tables, Views and Indexes	1	12-09-23		1 & 2	
20.	Nested Queries, Aggregate Functions	1	13-09-23		1 & 2	
21.	Joins, Unions, Intersection, Minus	1	16-09-23		1 & 2	
22.	Cursors in SQL, Triggers in SQL	1	19-09-23		1 & 2	
23.	Unit-II revision	1	20-09-23		1 & 2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Normalization

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Functional Dependencies	1	23-09-23		1 & 2	
25.	Normal Forms - First, Second	1	25-09-23		1 & 2	
26.	Third Normal Forms, BCNF	1	26-09-23		1 & 2	
27.	Inclusion Dependences	1	27-09-23		1 & 2	
28.	Loss Less Join Decompositions	1	30-09-23		1 & 2	
29.	Multi Valued Dependencies	1	09-10-23		1 & 2	
30.	Fourth Normal Form	1	10-10-23		1 & 2	
31.	Join Dependencies and Fifth Normal Form	1	11-10-23		1 & 2	
32.	Unit-III Revision	1	16-10-23		1 & 2	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: Transaction Processing Concepts, Concurrency Control Techniques & Crash Recovery

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Transaction System, Testing of Serializability	1	17-10-23		1 & 2	
34.	Serializability of Schedules	1	18-10-23		1 & 2	
35.	Conflict Serializability	1	21-10-23		1 & 2	
36.	View Serializability	1	24-10-23		1 & 2	
37.	Recoverability, Deadlock Handling	1	25-10-23		1 & 2	
38.	Concurrency Control	1	28-10-23		1 & 2	
39.	Locking Techniques for Concurrency Control	1	30-10-23		1 & 2	
40.	Time Stamping Protocols for Concurrency Control	1	01-11-23		1 & 2	
41.	Validation Based Protocol	1	04-11-23		1 & 2	
42.	Multiple Granularity	1	06-11-23		1 & 2	
43.	Recovery with Concurrent Transactions	1	07-11-23		1 & 2	
44.	Log Based Recovery, Checkpoints	1	08-11-23		1 & 2	
45.	ARIES Algorithm	1	13-11-23		1 & 2	
46.	Unit-IV revision	1	14-11-23			
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: Physical Database Design & Interfacing and Interacting with NoSQL

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Storage and file structure	1	15-11-23		1 & 2	
48.	indexed files, hashed files	1	18-11-23		1 & 2	
49.	B+ trees	1	20-11-23		1 & 2	
50.	Files with dense index	1	21-11-23		1 & 2	
51.	files with variable length records	1	22-11-23		1 & 2	
52.	Introduction to NoSQL, Storing and Accessing Data	1	25-11-23		1 & 2	
53.	Storing Data In and Accessing Data from MongoDB	1	27-11-23		1 & 2	
54.	Querying MongoDB & Revision	1	28-11-23		1 & 2	
55.	Unit-5 revision	1	29-11-23		1 & 2	
56.	Discussion on External Exam	1	02-12-23		1 & 2	
No. of classes required to complete UNIT-V: 10				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Ms.P.Sarala**	**Mrs.G.V.Rajya Lakshmi**	**Dr. Y.V.B Reddy**	**Dr. D. Veeraiah**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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An ISO 21001:2018,14001:2015,50001:2018 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: Dr.D.Venkata Subbaiah
Course Name & Code : COMPUTER ORGANIZATION & 20CS08
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/III/CSE-C **A.Y.:** 2023-24

PREREQUISITE: Discrete Mathematical Structures, Fundamentals of Computer Hardware

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to learn about the functional blocks and data representation of computer system and understands the design principles of processor and organization and management of memory and peripheral devices.

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

CO1	Evaluate digital number systems and use Boolean algebra theorems, Properties and Canonical forms for digital logic circuit design. **(Understand- L2)**
CO2	Design Combinational logic circuits and Sequential logic circuits **(Apply - L3)**
CO3	Understand computer architecture and Data representation to perform computer arithmetic operations.**(Understand- L2)**
CO4	Illustrate the design principles of control unit and pipelining. .**(Understand- L2)**
CO5	Analyze the memory hierarchy in computer system. **(Understand- L2)**

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

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

TEXTBOOKS:

T1 Morries Mano, Michael D Ciletti, Digital Design, 4/e, 2008, PEA
T2 Carl Hamacher, Zvonks Vranesic, Safeazaky, "Computer Organization", TMH publications.

REFERENCE BOOKS:

R1 M. Morries Mano, "Computer Systems Architecture", Pearson Education Publishers.[Units-1,2].
R2 Leach, Malvino, Saha, "Digital Logic Design", TMH, 2006.
R3 A.Anand Kumar, "Switching Theory and Logic Design", PHI Pvt, 2010.
R4 Kohavi, Jha, Cambridge, "Switching and Finite Autometa Theory", 3/e.
R5 R.P.Jain, "Modern Digital Electronics",TMH, 2011

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Number Systems, Logic Gates and Boolean algebra

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.	Number Systems: Binary, Octal, Decimal, Hexadecimal Number Systems	1	08-08-2023		TLM1	
2.	Conversion of numbers from one radix to another radix	1	10-08-2023		TLM1	
3.	Conversion of numbers from one radix to another radix	1	11-08-2023		TLM1	
4.	R's complement and (R-1)'s complement	1	17-08-2023		TLM1	
5.	Subtraction using complements	1	18-08-2023		TLM1	
6.	Binary codes	1	19-08-2023		TLM1	
7.	Basic gates, Universal gates, Special gates	1	22-08-2023		TLM1	
8.	Fundamental postulates of Boolean algebra, basic theorems and properties	1	24-08-2023		TLM1	
9.	Complement, Dual of logical Expressions and SOP & POS	1	25-08-2023		TLM1	
10.	Minimization of logic functions using Boolean theorems	1	26-08-2023		TLM1	
11.	Karnaugh Maps for minimization of Boolean functions	1	29-08-2023		TLM1	
12.	Karnaugh Maps for minimization of Boolean functions using Don't cares	1	31-08-2023		TLM1	
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: Combinational & Sequential Logic Circuits

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Design of Half Adder, Full Adder	1	01-09-2023		TLM1	
14.	Design of Half Subtractor, Full Subtractor	1	02-09-2023		TLM1	
15.	Ripple carry adder	1	05-09-2023		TLM1	
16.	Design of Decoders and Encoders	1	07-09-2023		TLM1	
17.	Design of Multiplexers and Demultiplexers	1	08-09-2023		TLM1	

18.	Priority encoder	1	12-09-2023		TLM1	
19.	Latch and Flip-flop, RS-Latch using Universal gates	1	14-09-2023		TLM1	
20.	RS,JK,T and D flip-flops, Truth tables and excitation tables	1	15-09-2023		TLM1	
21.	Conversion of flip-flops	1	16-09-2023		TLM1	
22.	Master-Slave flip-flop	1	19-09-2023		TLM1	
23.	Registers and Counters	1	21-09-2023		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Functional blocks of a computer & Data representation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24.	Fundamental Blocks of a computer: CPU, Memory, Input-Output subsystems, Control unit	1	22-09-2023		TLM1	
25.	Instruction set architecture of a CPU-Registers	1	23-09-2023		TLM1	
26.	Instruction execution cycle	1	26-09-2023		TLM1	
27.	RTL interpretation of instructions	1	29-09-2023		TLM1	
28.	Addressing Modes	1	30-09-2023		TLM1	
29.	Instruction Set	1	10-10-2023		TLM1	
30.	Signed number representation, Fixed and floating point representation	1	12-10-2023		TLM1	
31.	Character representation- Integer addition and subtraction, multiplication, shift	1	13-10-2023		TLM1	
32.	Booth Multiplier	1	17-10-2023		TLM1	
33.	Division Restoring and Non-Restoring Techniques	1	19-10-2023		TLM1	
34.	Floating point Arithmetic	1	20-10-2023		TLM1	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: CPU control unit design, Parallel Processors

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.	Hardwired and Micro programmed design approaches	3	21-10-2023, 24-10-2023 &26-10-2023		TLM1	
36.	Basic concepts of pipelining	2	27-10-2023 &28-10-23		TLM1	
37.	Throughput, Speedup, Pipeline hazards	2	31-10-23 & 2-11-23		TLM1	

38.	Introduction to parallel processors	2	03-11-2023&04-11-2023		TLM1	
No. of classes required to complete UNIT-IV: 9				**No. of classes taken:**		

UNIT-V: Memory System Design, Peripheral Devices and their characteristics

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Memory organization and memory hierarchy	2	07-11-2023 & 09-11-2023		TLM1	
40.	Memory interleaving	1	10-11-2023		TLM1	
41.	Hierarchical memory and main memory	1	14-11-2023		TLM2	
42.	Cache memory	1	16-11-2023		TLM2	
43.	Input-output subsystems	2	17-11-2023 & 18-11-2023		TLM2	
44.	I/O device interface	1	21-11-2023		TLM2	
45.	I/O transfers: Program controlled	1	23-11-2023		TLM2	
46.	Interrupt driven	2	24-11-2023 & 25-11-2023		TLM2	
47.	DMA	2	28-11-2023 & 30-11-2023		TLM2	
No. of classes required to complete UNIT-V: 12				**No. of classes taken:**		

CONTENT BEYOND THE SYLLABUS:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	BCD Addition & Subtraction	1	01-12-2023		TLM1	
2.	Hamming code	1	02-12-2023		TLM1	

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

PEVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

	the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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.D.Venkata Subbaiah**	**Dr.Ch Venkata Narayana**	**Dr.D.Venkata Subbaiah**	**Dr.D.Veeraiah**
Signature				

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hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222 933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: N. SRINIVASARAO
Course Name & Code : OBJECT ORIENTED PROGRAMMING & 20CS09
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/III/C sec. **A.Y.:** 2023-24

PREREQUISITE: Programming for Problem Solving using C

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to learn the constructs of the Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. In the process of learning the language, they will be applying knowledge of object-oriented programming; they will get the fundamental knowledge reason collection framework.

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

CO1	Demonstrate the fundamentals of object-oriented programming and basic building blocks of Java. **(Understand- L2)**
CO2	Apply object-oriented programming principles for the development of reusable applications. **(Apply - L3)**
CO3	Understand the importance of abstraction, user defined package creation and handling different exceptions. **(Understand- L2)**
CO4	Develop multitasking applications using JAVA multithreaded programming and perform different operations upon various data structures by using collection framework. **(Apply– L3)**
CO5	Develop GUI applications using AWT (Abstract Window Toolkit). **(Apply- L3)**

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

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

TEXTBOOKS:

T1 Herbert Schildt, "Java: The complete reference", TMH Publications, 7th edition, 2006

T2 Cay S. Horstmann, "Core Java Volume I – Fundamentals", Pearson, Eleventh edition, 2018

REFERENCE BOOKS:

R1 Dr.R.NageswaraRao, "Core JAVA: An Integrated Approach", Dreamtech Press, 1st Edition2008.

R2 E. Balaguruswamy, "Programming with JAVA", TMH Publications, 2ndEdition, 2000.
R3 Patrick Niemeyer & Jonathan Knudsen, "Learning Java", O'REILLY Publications, 3rd Edition, 2005.
R4 Benjamin J Evans & David Flanagan, "Java–in a Nutshell – A desktop quick reference", O'REILLY Publications, 6th Edition, 2014.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
1.	Programming Paradigms	1	08/08/2023		TLM1&2	T1 & R1	
2.	Difference Between OOP vs POP	1	09/08/2023		TLM1&2	T1 & R1	
3.	Principles of OOP	1	11/08/2023		TLM1&2	T1 & R1	
4.	Java Introduction- History, Buzzwords	1	12/08/2023		TLM1&2	T1 & R1	
5.	Data Types	1	16/08/2023		TLM1&2	T1 & R1	
6.	Keywords, Variables	1	18/08/2023		TLM1&2	T1 & R1	
7.	Operators	1	19/08/2023		TLM1&2	T1 & R1	
8.	Control Statements	1	22/08/2023		TLM1&2	T1 & R1	
9.	Class Definition, Variables and Methods	1	23/08/2023		TLM1&2	T1 & R1	
10.	Declaring Objects, this Keyword	1	25/08/2023		TLM1&2	T1 & R1	
11.	Constructors	1	26/08/2023		TLM1&2	T1 & R1	
No. of classes required to complete UNIT-I: 11					**No. of classes taken:**		

UNIT-II:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
12.	Overloading Methods and Constructors	1	29/08/2023		TLM1&2	T1 & R1	
13.	Parameter Passing and Returning Objects	1	30/08/2023		TLM1&2	T1 & R1	
14.	Recursion and Access Control	1	01/09/2023		TLM1&2	T1 & R1	
15.	Nested and Inner Classes	1	02/09/2023		TLM1&2	T1 & R1	
16.	Final Keyword & Static	1	12/09/2023		TLM1&2	T1 & R1	
17.	Variable and Command Line Arguments	1	13/09/2023		TLM1&2	T1 & R1	
18.	Inheritance Introduction	1	I5/09/2023		TLM1&2	T1 & R1	
19.	Types of Inheritance	1	16/09/2023		TLM1&2	T1 & R1	
20.	Super Keyword	1	19/09/2023		TLM1&2	T1 & R1	
21.	Overriding and Dynamic Method Dispatch	1	20/09/2023		TLM1&2	T1 & R1	
22.	Abstract Class and Final with Inheritance	1	22/09/2023		TLM1&2	T1 & R1	
23.	String	1	23/09/2023		TLM1&2	T1 & R1	
24.	StringBuffer and StringTokenizer	1	26/09/2023		TLM1&2	T1 & R1	
No. of classes required to complete UNIT-II: 13					**No. of classes taken:**		

UNIT-III:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
25.	Interfaces, Inheritance in interfaces	1	27/09/2023		TLM1&2	T1 & R1	
26.	Packages -Introduction, Creation	1	29/09/2023		TLM1&2	T1 & R1	
27.	Java Built in Packages	1	30/09/2023		TLM1&2	T1 & R1	
28.	Exception Hierarchy	1	10/10/2023		TLM1&2	T1 & R1	
29.	Try,catch,throw	1	11/10/2023		TLM1&2	T1 & R1	
30.	Throws and finally	1	13/10/2023		TLM1&2	T1 & R1	
31.	User Defined Exception	1	14/10/2023		TLM1&2	T1 & R1	
32.	Assertions	1	17/10/2023		TLM1&2	T1 & R1	
No. of classes required to complete UNIT-III: 08					**No. of classes taken:**		

UNIT-IV:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
33.	Multi Threading -Introduction	1	18/10/2023		TLM1&2	T1 & R1	
34.	Thread Life Cycle	1	20/10/2023		TLM1&2	T1 & R1	
35.	Creation of Thread	1	21/10/2023		TLM1&2	T1 & R1	
36.	Naming a Thread, Joining a Thread	1	24/10/2023		TLM1&2	T1 & R1	
37.	Thread Priorities, Daemon Thread	1	25/10/2023		TLM1&2	T1 & R1	
38.	Thread Pool, Thread Group	1	27/10/2023		TLM1&2	T1 & R1	
39.	Thread Synchronization	1	28/10/2023		TLM1&2	T1 & R1	
40.	Inter Thread Communications	1	31/10/2023		TLM1&2	T1 & R1	
41.	Collections Framework	1	01/11/2023		TLM1&2	T1 & R1	
42.	Hierarchy, Generics	1	03/11/2023		TLM1&2	T1 & R1	
43.	List, Set	1	04/11/2023		TLM1&2	T1 & R1	
44.	Queue and Map	1	07/11/2023		TLM1&2	T1 & R1	
No. of classes required to complete UNIT-IV: 12					**No. of classes taken:**		

UNIT-V:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
45.	AWT Hierarchy	1	08/11/2023		TLM1&2	T1 & R1	
46.	Components & Containers	1	10/11/2023		TLM1&2	T1 & R1	
47.	Button, Label, Text Field	1	11/11/2023		TLM1&2	T1 & R1	
48.	Checkbox, Choice, List	1	14/11/2023		TLM1&2	T1 & R1	
49.	Canvas, Scrollbar, Menus	1	15/11/2023		TLM1&2	T1 & R1	
50.	Layout Managers	1	17/11/2023		TLM1&2	T1 & R1	
51.	Event Delegation Model, Event Classes	1	18/11/2023		TLM1&2	T1 & R1	
52.	Listener Interfaces	1	21/11/2023		TLM1&2	T1 & R1	
53.	Key Listener and Window Listener	1	22/11/2023		TLM1&2	T1 & R1	
54.	Adapter Classes, close AWS Window	1	24/11/2023		TLM1&2	T1 & R1	
No. of classes required to complete UNIT-V: 10					**No. of classes taken:**		

CONTENT BEYOND THE SYLLABUS:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Textbook Followed	HOD Sign Weekly
1	Java Arrays	1	25/11/2023		TLM1&5	T1 & R1	
2	Applets	1	28/11/2023		TLM1&5	T1 & R1	
3	Java HasA relationship	1	29/11/2023		TLM1&5	T1&R1	
4	Java 1.8 new features	1	01/11/2023		TLM1&5	T1&R1	
5	Lambda Expressions	1	02/11/2023		TLM1&5	T1&R1	

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 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Mr. N. SrinivasaRao**	**Dr. Y. V. B. Reddy**	**Dr. Y. V. B. Reddy**	**Dr. D.Veeraiah**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor: Ms. P. SARALA
Course Name & Code **:** Database Management Systems Lab (20CS56)
L-T-P Structure **:**0-0-3 **Credits:**1.5
Program/Sem/Sec : B. Tech III Sem CSE – C Section **A.Y.:** 2023-24

PRE-REQUISITE: Programming language, Discrete Mathematical Structures, and Data Structures.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this lab is to provide a strong formal foundation in database concepts, technology, and practice to the participants to groom them into well-informed database application developers.

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

CO 1	Create & manipulate the relational database using SQL**. (Apply- L3)**
CO 2	Implement Views, procedures, triggers, and cursors on relational database. **(Apply- L3)**
CO 3	Create Unstructured Databases using MongoDB**. (Apply- L3)**
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

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

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Introduction to SQL, syntax	3	10-08-23		TLM4	
2	Experiment - 1	3	17-08-23		TLM4	
3	Experiment - 2	3	24-08-23		TLM4	
4	Experiment - 3	3	31-08-23		TLM4	
5	Experiment - 4	3	07-09-23		TLM4	
6	Experiment – 5,6	3	14-09-23		TLM4	
7	Experiment – 7	3	21-09-23		TLM4	
8	Experiment – 8	3	12-10-23		TLM4	
9	Experiment – 9	3	19-10-23		TLM4	
10	Experiment – 10,11	3	26-10-23		TLM4	
11	Experiment – 12	3	02-11-23		TLM4	
12	Experiment – 13	3	09-11-23		TLM4	
13	Experiment – 14	3	16-11-23		TLM4	
14	Experiment – 15	3	23-11-23		TLM4	
15	Design database for Case study	3	30-11-23		TLM4	
16	Internal Exam	3	14-12-23		TLM4	

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

PART-C

EVALUATION PROCESS (R20 Regulations):

According to Academic Regulations of R20 Distribution and Weightage of Marksfor Laboratory Courses is as follows

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

Parameter	Marks
Day to Day work	05
Record	05
Internal Test	05
Total	15

(b) Semester End Examinations (SEE: The Semester End examinations (SEE) for laboratory courses shall be jointly conducted by internal and external examiners with 3 hours duration and evaluated for 35 marks. The performance of the student shall be evaluated as per the parameters indicated below:

Parameter	Marks
Procedure/Algorithm	05
Experimentation/Program execution	10
Observations/Calculations/Validation	10
Result/Inference	05
Viva voce	05
Total	35

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the fundamental engineering knowledge, computational principles, and methods for extracting knowledge from data to identify, formulate and solve real time problems.
PSO 2	To develop multidisciplinary projects with advanced technologies and tools to address social and environmental issues.
PSO 3	To provide a concrete foundation and enrich their abilities for employment and Higher studies in Artificial Intelligence and Data Science with ethical values.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ms. P. Sarala**	**Mrs. G. V. Rajya Lakshmi**	**Dr. Y.V.B Reddy**	**Dr. D. Veeraiah**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & 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: N. SRINIVASARAO

Course Name & Code **:** OBJECT ORIENTED PROGRAMMING LAB & 20CS57

L-T-P Structure **: 0-0-3** **Credits:** 1.5

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

PREREQUISITE: Programming for Problem Solving Using C and Data Structures

COURSE EDUCATIONAL OBJECTIVE(CE0):

The objective of the course is to apply the constructs of Java programming language along with built-in facilities to create different applications such as console & graphical user interfaces. They will be applying knowledge of object-oriented programming and collection framework to perform all operations on data.

COURSE OUTCOMES (CO):

CO1: Solve basic mathematical problems using fundamentals of Java and its object-oriented principles **(Apply - L3)**

CO2: Implement multithreading and exception handling mechanisms. (**Apply - L3**)

CO3: Develop GUI applications and basic data structures using collection framework. (**Apply - L3**)

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

COURSE ARTICULATION MATRIX (Correlation between Cos, Pos & PSOs):

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2										3		
CO2		3	2										3		
CO3		3	3										3		
CO4								2	2	2					

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

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
1.	Introduction Lab	3	08/08/2023		TLM4 & 5	
2.	Java Basic Programs	3	22/08/2023		TLM4 & 5	
3.	Classes and Objects	3	29/08/2023		TLM4 & 5	
4.	Constructors & Parameter Passing	3	05/09/2023		TLM4 & 5	
5.	Static Keyword Strings	3	12/09/2023		TLM4 & 5	
6.	Inheritance & Polymorphism	3	19/09/2023		TLM4 & 5	
7.	Dynamic Method Dispatch & Interfaces	3	26/09/2023		TLM4 & 5	
8.	Packages & Exception Handling	6	10/10/2023 17/10/2023		TLM4 & 5	
9.	Multithreading Programs	3	24/10/2023		TLM4 & 5	
10.	Collections Framework	3	31/10/2023		TLM4 & 5	
11.	AWT Controls	3	07/11/2023		TLM4 & 5	
12.	AWT Controls	3	14/11/2023		TLM4 & 5	
13.	Event Handling	3	21/11/2023		TLM4 & 5	
14.	Lab Internal Exam	3	28/11/2023		TLM4 & 5	

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

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	**Marks**
Day-to-day work	A1 = 05
Record	A2 = 05
Internal test	A3 = 05
CIE Total: (A1+A2+A3)	**M1 = 15**
Procedure/Algorithm	B1 = 5
Experimentation/Program execution	B2 = 10
Observations/Calculations/Validation	B3 = 10
Result/Inference	B4 = 5
Viva voce	B5 = 5
SEE Total: (B1+B2+B3+B4+B5)	**M2 = 35**
Total Marks = CIE + SEE = (M1+M2)	**50**

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	**Mr. N. SrinivasaRao**	**Dr. Y.V.B Reddy**	**Dr. Y.V.B Reddy**	**Dr. D. Veeraiah**
Signature				

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

COURSE HANDOUT

Part-A

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

ACADEMIC YEAR : 2023-24

COURSE NAME & CODE : R Programming Lab (20IT53)

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

COURSE CREDITS : 1

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

COURSE COORDINATOR : **Dr. Y Vijaya Bhaskar Reddy**

PRE-REQUISITES: Basics of Mathematics

COURSE EDUCATIONAL OBJECTIVES (CEOs): In this course student will learn about the fundamentals of R programming, standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming language, get acquaintances with Arrays, files, strings, packages and distributions using R

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

CO1: : Implement basic concepts of R programming and its different module that includes conditional, looping, lists, strings, functions, frames, arrays and file programming

CO2: Implement the concepts of R Script to extract the data from data frames and file operations.

CO3: Implement the various statistical techniques using R

C04: Extend the functionality of R by using the addon packages

CO5: Use R Graphics and Tables to visualize results of various statistical operations on data

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

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

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1	Cycle1: Installing R and basic functionality of R	3	07/08/23		TLM4/TLM5	CO1	
2	Cycle 2: R Script on operators, if and else programs	3	14/08/23		TLM4/TLM5	CO1	
3	Cycle 3: R Script on list	3	21/08/23		TLM4/TLM5	CO1	
4	Cycle 4: Implement R Script on vectors	3	28/08//23		TLM4/TLM5	CO1	
5	Cycle 5: Implement R Script on matrices and data frames	3	04/09/23		TLM4/TLM5	CO1	
6	Cycle 6: Implement R Script on Descriptive statistics	3	11/09/23		TLM4/TLM5	CO4	
7	Cycle7: Reading different types of data sets into files	3	25/09/23		TLM4/TLM5	CO2	
8	Cycle8: implement different charting methods	3	09/10/23		TLM4/TLM5	CO2	
9	Cycle9: implement the different distributions	3	16/10/23		TLM4/TLM5	CO3	
10	Cycle 10 : implement the Non tabular data types and data transformations	3	30/10/23		TLM4/TLM5	CO4	
11	Cycle 11: Introduction to dirty data problems	3	06/11/23		TLM4/TLM5	CO5	
12	Cycle 12 : implement different data sources	3	13/10/23		TLM4/TLM5	CO5	
13	**LAB INTERNAL**	3	20/10/23				

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

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

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

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.
PEO4: Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

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

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

PROGRAM SPECIFIC OUTCOMES

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

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

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

Course Instructor	Course Coordinator	Module Coordinator	HOD

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: M.Kiran Kumar
Course Name & Code : Web Application Development using Full Stack - Module-I (Frontend Development) & 20CSS1
L-T-P Structure : 1-0-2 **Credits:** 2
Program/Sem/Sec : B.Tech. - CSE/III/A **A.Y.:** 2023-24

PREREQUISITE: Knowledge of basic Computer hardware & software.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The objective of the course is to understand the design of HTML web pages, Styling of HTML pages using CSS, web forms validation using JavaScript and developing responsive web page using jQuery.

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

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

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

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

REFERENCE BOOKS:

R1	HTML & CSS: The Complete Reference, 5thEditionby Thomas Powell, McGrawHill, 2017.
R2	Beginning HTML, XHTML, CSS, and JavaScript by Jon Duckett, Wiley India, 2010.
R3	jQuery Cookbook by Cody Lindley, O'Reilly Media, 2009
R4	HTML, XHTML, and CSS Bible, 5th Edition by Steven M. Schafer, Wiley India, 2011.
R5	Web Development with jQuery by Richard York, Wiley India, 2015
R6	Headfirst HTML & CSS 2nd Edition by Elisabeth Robson, Eric Freeman, O'Reilly

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.	Lab Cycle-1	3	09-08-2023		**DM5**	
2.	Lab Cycle-1	3	16-08-2023		**DM5**	
3.	Lab Cycle-1	3	23-08-2023		**DM5**	
4.	Lab Cycle-2	3	30-08-2023		**DM5**	
5.	Lab Cycle-2	3	13-09-2023		**DM5**	
6.	Lab Cycle-3	3	20-09-2023		**DM5**	
7.	Lab Cycle-3	3	27-09-2023		**DM5**	
8.	Lab Cycle-4	3	11-10-2023		**DM5**	
9.	Lab Cycle-4	3	18-10-2023		**DM5**	
10.	Lab Cycle-5	3	25-10-2023		**DM5**	
11.	Lab Cycle-5	3	01-11-2023		**DM5**	
12.	Lab Cycle-6	3	08-11-2023		**DM5**	
13.	Lab Cycle-6	3	22-11-2023		**DM5**	
14.	Lab Cycle-6	3	29-11-2023		**DM5**	

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

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total	**50**

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	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	M.Kiran Kumar	Dr.S.Nagarjuna Reddy	Dr. K. Naga Prasanthi	Dr. D. Veeraiah
Signature				