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, NTR DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: T. KARUNA LATHA

Course Name : UHV- II: Understanding Harmony and Ethical Human Conduct
Course Code : 23HS01 **Credits:** 3 **L-T-P Structure:** 3-0-0
Program/Sem/Sec : B.Tech/III Semester – IT Section- A **A.Y.** : 2024-25

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): To become more aware of themselves and their surroundings (family, society, nature); they would become more responsible in life and in handling problems with sustainable solutions while keeping human relationships and human nature in mind.

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

- **CO1:** Describe the terms like Natural Acceptance, Happiness and Prosperity (L2)
- **CO2:** Identify one's self, and one's surroundings (family, society nature) (L2)
- **CO3:** Relate human values with human relationship and human society. (L2)
- **CO4:** Illustrate the need for universal human values and harmonious existence (L2)
- **CO5:** Develop as socially and ecologically responsible engineers (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	1		1			2	2	2	2			2			
CO2	1		1			2	2	2	2			2			
CO3	1		1			3	3	3	3			3			
CO4	1		1			3	3	3	3			3			
CO5	1		1			3	3	3	3			3			

TEXTBOOKS:

T1 R R Gaur, r singal, G P Bagaria, "Human values and Professional Ethics", Excel Books, New Delhi,2010

REFERENCE BOOKS:

R1 Jeevan vidya: Ek Parichaya, A.Nagaraj, Jeevan Vidya Prakashan, Amarkantak,1999
R2 Human values, A N Tripathi, New Age Publishers, New Delhi, 2004
R3 The story of my experiments with Truth, Mohandas Karamchand Gandhi

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Value Education

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, COs	1	16-7-24		TLM2	
2.	Process for self exploration: Natural Acceptance	1	18-7-24		TLM.2	
3.	Right Understanding, Relationship and Physical Facility	2	19-7-24 20-7-24		TLM2	
4.	Understanding Value Education	1	23-7-24		TLM2	
5.	self-exploration as the Process for Value Education	1	25-7-24		TLM2	
6.	Continuous Happiness and Prosperity	2	26-7-24 27-7-24		TLM2	
7.	Happiness and Prosperity	1	30-7-24		TLM2	
8.	Method to Fulfill the Basic Human Aspirations	1	30-7-24		TLM2	
9.	Tutorial	1	1-08-24		TLM2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Harmony in the Human Being

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Understanding Human being as the Co-existence of the self and the body	1	02-08-24	1-08-24	TLM2	
11.	Distinguishing between the Needs of the self and the body	2	03-8-24 6-08-24	02-08-24	TLM2	
12.	The body as an Instrument of the self	1	08-08-24	03-8-24	TLM2	
13.	Understanding Harmony in the self	2	09-8-24 13-8-24	6-08-24	TLM2	
14.	Harmony of the self with the body	1	16-8-24	08-08-24	TLM2	
15.	Programme to ensure self-regulation and Health	1	17-8-24	09-8-24	TLM2	
16.	Tutorial - 1	1	20-8-24	13-8-24	TLM2	
17.	Tutorial -2	1	22-8-24	16-8-24	TLM1	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT III: Harmony in the Family and Society

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Harmony in the Family	2	23-8-24 24-8-24		TLM2	
19.	'Trust' – the Foundational Value in Relationship	1	27-8-24		TLM2	
20.	Practice Session PS7 Exploring the Feeling of Trust	1	29-8-24		TLM2	
21.	'Respect' – as the Right Evaluation	1	30-8-24		TLM1	
22.	Practice Session PS8 Exploring the Feeling of Respect	2	31-8-24 10-9-24		TLM2	
23.	Other Feelings, Justice in Human-to-Human Relationship	1	12-9-24		TLM2	
24.	Understanding Harmony in the Society	2	13-9-24 17-9-24		TLM2	
25.	Vision for the Universal Human Order	1	19-9-24		TLM2	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Harmony in the Nature/Existence

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Understanding Harmony in the Nature	2	20-9-24 21-9-24		TLM2	
27.	Interconnectedness, self-regulation	1	24-9-24		TLM2	
28.	Mutual Fulfilment among the Four Orders of Nature	1	26-9-24		TLM2	
29.	Realizing Existence as Co-existence at All Levels	2	27-9-24 28-9-24		TLM2	
30.	The Holistic Perception of Harmony in Existence	2	1-10-24 3-10-24		TLM2	
31.	Tutorial -1	2	4-10-24 5-10-24		TLM2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Implications of the Holistic Understanding

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Natural acceptance of human values	1	8-10-24		TLM2	
33.	Definitiveness of ethical human conduct	1	10-10-24		TLM2	
34.	Basis for humanistic education	1	12-10-24		TLM2	

35.	A Basis for Humanistic Education, Humanistic Constitution and Universal Human	2	15-10-24 17-10-24		TLM2	
36.	Competence in professional ethics	1	1810-24		TLM2	
37.	Strategy for transition from the present state to universal human order	1	19-10-24		TLM2	
38.	Holistic Technologies, Production Systems and Management Models-Typical Case	1	22-10-24		TLM2	
No. of classes required to complete UNIT-V: 8				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III ,IV & V)	A2=5
II- Descriptive Examination (UNIT-III , IV & V)	M2=15
II-Quiz Examination (UNIT-III, 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	**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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

ACADEMIC CALENDAR: A.Y 2024-25

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

Signature				
Name of the Faculty	**T.KARUNA ATHA**	**Dr. B. SRINIVASA RAO**	**Dr. B. SRINIVASA RAO**	**Dr. B. SRINIVASA RAO**
Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.B. SRINIVASA RAO
Course Name : UHV- II: Understanding Harmony and Ethical Human Conduct
Course Code : 23HS01 **Credits:** 3 **L-T-P Structure:** 3-0-0
Program/Sem/Sec : B.Tech/III Semester – IT Section - B **A.Y.** : 2024-25

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs): To become more aware of themselves and their surroundings (family, society, nature); they would become more responsible in life and in handling problems with sustainable solutions while keeping human relationships and human nature in mind.

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

- **CO1:** Describe the terms like Natural Acceptance, Happiness and Prosperity (L2)
- **CO2:** Identify one's self, and one's surroundings (family, society nature) (L2)
- **CO3:** Relate human values with human relationship and human society. (L2)
- **CO4:** Illustrate the need for universal human values and harmonious existence (L2)
- **CO5:** Develop as socially and ecologically responsible engineers (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	1		1			2	2	2	2			2			
CO2	1		1			2	2	2	2			2			
CO3	1		1			3	3	3	3			3			
CO4	1		1			3	3	3	3			3			
CO5	1		1			3	3	3	3			3			

TEXTBOOKS:

T1 R R Gaur, r singal, G P Bagaria, "Human values and Professional Ethics", Excel Books, New Delhi,2010

REFERENCE BOOKS:

R1 Jeevan vidya: Ek Parichaya, A.Nagaraj, Jeevan Vidya Prakashan, Amarkantak,1999
R2 Human values, A N Tripathi, New Age Publishers, New Delhi, 2004
R3 The story of my experiments with Truth, Mohandas Karamchand Gandhi

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Value Education

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, COs	1	15-7-24		TLM2	
2.	Process for self exploration: Natural Acceptance	1	16-7-24		TLM.2	
3.	Right Understanding, Relationship and Physical Facility	2	20-7-24 22-7-24		TLM2	
4.	Understanding Value Education	1	23-7-24		TLM2	
5.	self-exploration as the Process for Value Education	1	24-7-24		TLM2	
6.	Continuous Happiness and Prosperity	2	27-7-24 29-7-24		TLM2	
7.	Happiness and Prosperity	1	30-7-24		TLM2	
8.	Method to Fulfill the Basic Human Aspirations	1	31-7-24		TLM2	
9.	Tutorial	1	3-08-24		TLM2	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Harmony in the Human Being

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Understanding Human being as the Co-existence of the self and the body	1	05-08-24	1-08-24	TLM2	
11.	Distinguishing between the Needs of the self and the body	2	06-08-24 07-08-24	02-08-24	TLM2	
12.	The body as an Instrument of the self	1	12-08-24	03-8-24	TLM2	
13.	Understanding Harmony in the self	2	13-08-24 14-08-24	6-08-24	TLM2	
14.	Harmony of the self with the body	1	17-08-24	08-08-24	TLM2	
15.	Programme to ensure self-regulation and Health	1	19-08-24	09-8-24	TLM2	
16.	Tutorial - 1	1	20-08-24	13-8-24	TLM2	
17.	Tutorial -2	1	21-08-24	16-8-24	TLM1	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT III: Harmony in the Family and Society

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Harmony in the Family	2	24-08-24 27-08-24		TLM2	
19.	'Trust' – the Foundational Value in Relationship	1	28-08-24		TLM2	
20.	Practice Session PS7 Exploring the Feeling of Trust	1	31-08-24		TLM2	
21.	'Respect' – as the Right Evaluation	1	09-09-24		TLM1	
22.	Practice Session PS8 Exploring the Feeling of Respect	2	10-09-24 11-09-24		TLM2	
23.	Other Feelings, Justice in Human-to-Human Relationship	1	17-09-24		TLM2	
24.	Understanding Harmony in the Society	2	18-09-24 21-09-24		TLM2	
25.	Vision for the Universal Human Order	1	23-09-24		TLM2	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Harmony in the Nature/Existence

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Understanding Harmony in the Nature	2	24-09-24 25-09-24		TLM2	
27.	Interconnectedness, self-regulation	1	28-09-24		TLM2	
28.	Mutual Fulfilment among the Four Orders of Nature	1	30-09-24		TLM2	
29.	Realizing Existence as Co-existence at All Levels	2	01-10-24 05-10-24		TLM2	
30.	The Holistic Perception of Harmony in Existence	2	07-10-24 08-10-24		TLM2	
31.	Tutorial -1	2	09-10-24 10-10-24		TLM2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Implications of the Holistic Understanding

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Natural acceptance of human values	1	14-10-24		TLM2	
33.	Definitiveness of ethical human conduct	1	15-10-24		TLM2	
34.	Basis for humanistic education	1	16-10-24		TLM2	

35.	A Basis for Humanistic Education, Humanistic Constitution and Universal Human	2	19-10-24 21-10-24		TLM2	
36.	Competence in professional ethics	1	22-10-24		TLM2	
37.	Strategy for transition from the present state to universal human order	1	23-10-24		TLM2	
38.	Holistic Technologies, Production Systems and Management Models-Typical Case	1	26-10-24		TLM2	
No. of classes required to complete UNIT-V: 8				**No. of classes taken:**		

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

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III ,IV & V)	A2=5
II- Descriptive Examination (UNIT-III , IV & V)	M2=15
II-Quiz Examination (UNIT-III, 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	**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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

ACADEMIC CALENDAR: A.Y 2024-25

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

Signature				
Name of the Faculty	**Dr. B. SRINIVASA RAO**	**Dr. B. SRINIVASA RAO**	**Dr. B. SRINIVASA RAO**	**Dr. B. SRINIVASA RAO**
Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: J.GeethaRenuka
Course Name & Code : 23FE11-DISCRETE MATHEMATICS AND GRAPH THEORY
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech/IT/III /A **A.Y.:** 2024-25

PREREQUISITE: Data Structures

COURSE EDUCATIONAL OBJECTIVES(CEO):

The main objectives of the course is to

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

COURSE OUTCOMES (COs): At the end of the course, student 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	Illustrate the basic principles/techniques to solve different combinatorial problems and linear recurrence relations**.(Apply- L3)**
CO4	Demonstrate the different types of graphs.**(Understand -L2)**
CO5	Apply the properties of graphs to solve the graph theory problems in computer science**.(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	-	-	-	-	-	-	-	-	-	-	1		
CO2	3	2	1	-	-	-	-	-	-	-	-	-			
CO3	3	3	1	1	-	-	-	-	-	-	-	-			
CO4	3	3	1	-	-	-	-	-	-	-	-	-			
CO5	3	3	1	1	-	-	-	-	-	-	-	-		1	1

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L.Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.

3. Theory and Problems of Discrete Mathematics, Schaum's Outline Series, Seymour Lipschutz and Marc Lars Lipson, 3rd Edition, McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L.Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby and Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborty and B.K. Sarkar, Oxford, 2011.
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

PART-B

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	HOD Sign Weekly
1.	Propositional Calculus: Statements and Notations, Connectives	1	15-07-2024		TLM1	
2.	Well Formed Formulas, Truth Tables	1	16-07-2024		TLM1	
3.	Tutorial on : Statements and Notations, Connectives,TruthTables	1	19-07-2024		TLM3	
4.	Tautologies, Equivalence of Formulas, Duality Law	1	20-07-2024		TLM1	
5.	Tautological Implications, Normal Forms,	1	22-07-2024		TLM1	
6.	Theory of Inference for Statement Calculus, Consistency of Premises,	1	23-07-2024		TLM1	
7.	Tutorial on : Theory of Inference for Statement Calculus, Consistency of Premises	1	26-07-2024		TLM3	
8.	Indirect Method of Proof, Predicate Calculus: Predicates	1	27-07-2024		TLM1	
9.	Predicative Logic, Statement Functions	1	29-07-2024		TLM1	
10.	Variables and Quantifiers	1	30-07-2024		TLM1	
11.	Tutorial on : Predicates, Predicative Logic, Statement Functions,	1	02-08-2024		TLM3	
12.	Free and Bound Variables	1	03-08-2024		TLM1	
13.	Inference Theory for Predicate Calculus	2	05-08-2024 06-08-2024		TLM1	
14.	Tutorial on Unit 1	1	09-08-2024		TLM3	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Set Theory:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Sets: Operations on Sets	1	10-08-2024		TLM1	
16.	Principle of Inclusion-Exclusion	1	12-08-2024		TLM1	
17.	Relations: Properties, Operations	1	13-08-2024		TLM1	
18.	Tutorial on Practice the sets and Relations Problems	1	16-08-2024		TLM3	
19.	Partition and Covering,	1	17-08-2024		TLM1	
20.	Transitive Closure, Equivalence,	1	19-08-2024		TLM1	
21.	Compatibility and Partial Ordering, Hasse Diagrams	1	20-08-2024		TLM1	

22.	Tutorial on Transitive Closure, Equivalence,Hasse Diagrams	1	23-08-2024		TLM3	
23.	Functions: Bijective, Composition, Inverse,	1	24-08-2024		TLM1	
24.	Permutation, and Recursive Functions,	1	27-08-2024		TLM1	
25.	Tutorial on Functions& Recursive Functions	1	30-08-2024		TLM3	
26.	Lattice and its Properties	1	31-08-2024		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Combinatorics and Recurrence Relations:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Basis of Counting, Permutations, Permutations with Repetitions	1	09-09-2024		TLM1	
28.	Circular and Restricted Permutations, Combinations,	1	10-09-2024		TLM1	
29.	Tutorial on Permutations, Combinations,	1	13-09-2024		TLM3	
30.	Restricted Combinations	1	14-09-2024		TLM1	
31.	Binomial and Multinomial Coefficients and Theorems.	1	17-09-2024		TLM1	
32.	Tutorial on Binomial and Multinomial Coefficients and Theorems.	1	20-09-2024		TLM3	
33.	Recurrence Relations: Generating Functions, Function of Sequences,	1	21-09-2024		TLM1	
34.	Partial Fractions, Calculating Coefficient of Generating Functions	1	23-09-2024		TLM1	
35.	Recurrence Relations, Formulation as Recurrence Relations	1	24-09-2024		TLM1	
36.	Tutorial on Partial Fractions, Recurrence Relations	1	27-09-2024		TLM3	
37.	Solving Recurrence Relations by Substitution and Generating Functions	1	28-09-2024		TLM1	
38.	Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations	2	30-10-2024 01-10-2024		TLM1	
39.	Tutorial on UNIT III	1	04-10-2024		TLM3	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: Graph Theory:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
40.	Basic Concepts, Graph Theory and its Applications	1	05-10-2024		TLM1	
41.	Subgraphs, Graph Representations: Adjacency and Incidence Matrices	2	07-10-2024 08-10-2024		TLM1	
42.	Isomorphic Graphs,	1	14-10-2024		TLM1	
43.	Paths and Circuits	1	15-10-2024		TLM1	
44.	Tutorial on Graphs	1	18-10-2024		TLM3	
45.	Eulerian and Hamiltonian Graphs,	1	19-10-2024		TLM1	
No. of classes required to complete UNIT-IV: 6				**No. of classes taken:**		

UNIT-V: Multi Graphs

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
46.	Multigraphs,	1	21-10-2024		TLM1	
47.	Bipartite and Planar Graphs	1	22-10-2024		TLM1	
48.	Tutorial on Bipartite and Planar Graphs	1	25-10-2024		TLM3	
49.	Euler's Theorem	1	26-10-2024		TLM1	
50.	Graph Colouring	1	28-10-2024		TLM1	
51.	Covering	1	29-10-2024		TLM1	
52.	Tutorial on Graph Colouring, Euler Theorem	1	01-11-2024		TLM3	
53.	Chromatic Number	1	02-11-2024		TLM1	
54.	Spanning Trees, Prim's and Kruskal's Algorithms	1	04-11-2024		TLM1	
55.	BFS Spanning Trees.	1	05-11-2024		TLM1	
56.	Tutorial on UNIT V	1	08-11-2024		TLM3	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Pigeon Hole Principle	1	27-08-2024		**TLM1**			
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

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 (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	**Mrs. J.GeethaRenuka**	**Mr. A. Sudhakar**	**Mr.G.Rajendra**	**Dr.B.SrinivasaRao**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: J.GeethaRenuka
Course Name & Code : 23FE11-DISCRETE MATHEMATICS AND GRAPH THEORY
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech/IT/III /B **A.Y.:** 2024-25

PREREQUISITE: Data Structures

COURSE EDUCATIONAL OBJECTIVES(CEO):

The main objectives of the course is to

- To introduce the students to the topics and techniques of discrete methods and combinatorial reasoning.
- To introduce a wide variety of applications. The algorithmic approach to the solution of problems is fundamental in discrete mathematics, and this approach reinforces the close ties between this discipline and the area of computer science.

COURSE OUTCOMES (COs): At the end of the course, student 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	Illustrate the basic principles/techniques to solve different combinatorial problems and linear recurrence relations**.(Apply- L3)**
CO4	Demonstrate the different types of graphs.**(Understand -L2)**
CO5	Apply the properties of graphs to solve the graph theory problems in computer science**.(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	-	-	-	-	-	-	-	-	-	-	1		
CO2	3	2	1	-	-	-	-	-	-	-	-	-			
CO3	3	3	1	1	-	-	-	-	-	-	-	-			
CO4	3	3	1	-	-	-	-	-	-	-	-	-			
CO5	3	3	1	1	-	-	-	-	-	-	-	-			1

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L.Liu and D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.

3. Theory and Problems of Discrete Mathematics, Schaum's Outline Series, Seymour Lipschutz and Marc Lars Lipson, 3rd Edition, McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L.Mott, A. Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, Bernand Kolman, Robert C. Busby and Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborty and B.K. Sarkar, Oxford, 2011.
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

PART-B

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	HOD Sign Weekly
1.	Propositional Calculus: Statements and Notations, Connectives	1	15-07-2024		TLM1	
2.	Well Formed Formulas, Truth Tables	1	18-07-2024		TLM1	
3.	Tutorial on : Statements and Notations, Connectives,TruthTables	1	19-07-2024		TLM3	
4.	Tautologies, Equivalence of Formulas, Duality Law	1	20-07-2024		TLM1	
5.	Tautological Implications, Normal Forms,	1	22-07-2024		TLM1	
6.	Theory of Inference for Statement Calculus, Consistency of Premises,	1	23-07-2024		TLM1	
7.	Tutorial on : Theory of Inference for Statement Calculus, Consistency of Premises	1	25-07-2024		TLM3	
8.	Indirect Method of Proof, Predicate Calculus: Predicates	1	27-07-2024		TLM1	
9.	Predicative Logic, Statement Functions	1	29-07-2024		TLM1	
10.	Variables and Quantifiers	1	01-08-2024		TLM1	
11.	Tutorial on : Predicates, Predicative Logic, Statement Functions,	1	02-08-2024		TLM3	
12.	Free and Bound Variables	1	03-08-2024		TLM1	
13.	Inference Theory for Predicate Calculus	2	05-08-2024 08-08-2024		TLM1	
14.	Tutorial on Unit 1	1	09-08-2024		TLM3	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Set Theory:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Sets: Operations on Sets	1	10-08-2024		TLM1	
16.	Principle of Inclusion-Exclusion	1	12-08-2024		TLM1	
17.	Relations: Properties, Operations	1	13-08-2024		TLM1	
18.	Tutorial on Practice the sets and Relations Problems	1	16-08-2024		TLM3	
19.	Partition and Covering,	1	17-08-2024		TLM1	
20.	Transitive Closure, Equivalence,	1	19-08-2024		TLM1	
21.	Compatibility and Partial Ordering, Hasse Diagrams	1	22-08-2024		TLM1	

22.	Tutorial on Transitive Closure, Equivalence,Hasse Diagrams	1	23-08-2024		TLM3	
23.	Functions: Bijective, Composition, Inverse,	1	24-08-2024		TLM1	
24.	Permutation, and Recursive Functions,	1	26-08-2024		TLM1	
25.	Tutorial on Functions& Recursive Functions	1	30-08-2024		TLM3	
26.	Lattice and its Properties	1	31-08-2024		TLM1	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Combinatorics and Recurrence Relations:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Basis of Counting, Permutations, Permutations with Repetitions	1	09-09-2024		TLM1	
28.	Circular and Restricted Permutations, Combinations,	1	12-09-2024		TLM1	
29.	Tutorial on Permutations, Combinations,	1	13-09-2024		TLM3	
30.	Restricted Combinations	1	14-09-2024		TLM1	
31.	Binomial and Multinomial Coefficients and Theorems.	1	17-09-2024		TLM1	
32.	Tutorial on Binomial and Multinomial Coefficients and Theorems.	1	20-09-2024		TLM3	
33.	Recurrence Relations: Generating Functions, Function of Sequences,	1	21-09-2024		TLM1	
34.	Partial Fractions, Calculating Coefficient of Generating Functions	1	23-09-2024		TLM1	
35.	Recurrence Relations, Formulation as Recurrence Relations	1	24-09-2024		TLM1	
36.	Tutorial on Partial Fractions, Recurrence Relations	1	27-09-2024		TLM3	
37.	Solving Recurrence Relations by Substitution and Generating Functions	1	28-09-2024		TLM1	
38.	Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations	2	30-10-2024 01-10-2024		TLM1	
39.	Tutorial on UNIT III	1	04-10-2024		TLM3	
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: Graph Theory:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
40.	Basic Concepts, Graph Theory and its Applications	1	05-10-2024		TLM1	
41.	Subgraphs, Graph Representations: Adjacency and Incidence Matrices	2	07-10-2024 08-10-2024		TLM1	
42.	Isomorphic Graphs,	1	14-10-2024		TLM1	
43.	Paths and Circuits	1	17-10-2024		TLM1	
44.	Tutorial on Graphs	1	18-10-2024		TLM3	
45.	Eulerian and Hamiltonian Graphs,	1	19-10-2024		TLM1	
No. of classes required to complete UNIT-IV: 6				**No. of classes taken:**		

UNIT-V: Multi Graphs

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
46.	Multigraphs,	1	21-10-2024		TLM1	
47.	Bipartite and Planar Graphs	1	24-10-2024		TLM1	
48.	Tutorial on Bipartite and Planar Graphs	1	25-10-2024		TLM3	
49.	Euler's Theorem	1	26-10-2024		TLM1	
50.	Graph Colouring	1	28-10-2024		TLM1	
51.	Covering	1	29-10-2024		TLM1	
52.	Tutorial on Graph Colouring, Euler Theorem	1	01-11-2024		TLM3	
53.	Chromatic Number	1	02-11-2024		TLM1	
54.	Spanning Trees, Prim's and Kruskal's Algorithms	1	04-11-2024		TLM1	
55.	BFS Spanning Trees.	1	07-11-2024		TLM1	
56.	Tutorial on UNIT V	1	08-11-2024		TLM3	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Pigeon Hole Principle	1	27-08-2024		**TLM1**			
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

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 (R23 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15

I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	**Organize, Analyze and Interpret the data to extract meaningful conclusions.**
PSO 2	**Design, Implement and Evaluate a computer-based system to meet desired needs.**
PSO 3	**Develop IT application services with the help of different current engineering tools.**

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs. J.GeethaRenuka	Mr. A. Sudhakar	Mr.G.Rajendra	Dr.B.SrinivasaRao
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. G. RAJENDRA
Course Name & Code : Digital Logic &Computer Organization & 20IT01
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : II B.Tech., III-Sem, B-Sec **A.Y.: 2024-25**

Prerequisites:

Course Objectives: The main objectives of the course

1. Provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals.
2. Describe memory hierarchy concepts.
3. Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices.

COURSE OUTCOMES (COs): At the end of the course, students 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 Sequential logic circuits and understand basic functional blocks a computer system. **(Apply- L3)**
CO3	Understand computer architecture and Data representation to perform computer arithmetic operations and processor organization. **(Understand- L2)**
CO4	Analyze the memory hierarchy in a computer system. **(Understand- L2)**
CO5	Understand the I/O operations and the interfaces **(Understand-L2)**

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	3	1	1	-	-	-	-	-	-	-	-	1	1	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	2	2	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-	-	1	1

Textbooks:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson.

Reference Books:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson
2. Computer Organization and Design, David A. Paterson, John L.Hennessy, Elsevier
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson

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 course Cos, POs and PSOs	1	15-07-2024		TLM1	
2.	Introduction to DLD, Number systems	1	16-07-2024		TLM2	
3.	Different Number systems	1	18-07-2024		TLM2	
4.	Conversions of one number to another number	1	20-07-2024		TLM2, TLM4, TLM7	
5.	Data Representations	1	22-07-2024		TLM2	
6.	**TUTORIAL-1**	1	23-07-2024		TLM3	
7.	Binary codes	1	24-07-2024		TLM2	
8.	Basic Logic gates and Universal gates	2	25-07-2024 27-07-2024		TLM2	
9.	Boolean Logic functions	2	29-07-2024 30-07-2024		TLM2	
10.	K-Maps Simplifications	2	31-07-2024 01-08-2024		TLM2	
11.	Combinational circuits	1	03-08-2024		TLM2	
12.	Designing Decoder and Multiplexers	1	05-08-2024		TLM2	
13.	Assignment / Quiz	1	6-08-2024		TLM6.	
No. of classes required to complete UNIT-I: 18				**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
14.	Introduction to sequential circuits,	1	07-08-2024		TLM2	
15.	Flip-flops(RS,JK,T,D),	2	08-08-2024 12-08-2024		TLM2, TLM6	
16.	Master slave flip-flop	1	13-08-2024		TLM1, TLM2	
17.	Conversion of flip-flops, Truth & excitation tables	2	14-08-2024 17-08-2024		TLM1, TLM2, TLM7	
18.	**TUTORIAL-2**	1	19-08-2024		TLM3	
19.	Registers	1	20-08-2024		TLM2	
20.	counters	1	21-08-2024		TLM1, TLM2	
21.	Basic structure of computer	1	22-08-2024		TLM2	
22.	Bus structure	1	23-08-2024		TLM2	
23.	Multi processors and multi computers	1	27-08-2024		TLM2	
24.	Computer generations	1	28-08-2024		TLM2	
25.	Von- Neumann Architecture	1	29-08-2024		TLM2	
26.	Assignment / Quiz	1	31-08-2024		TLM3, TLM6.	
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

I-MID EXAMINATIONS: **02-09-2024 TO 07-09-2024**

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
27.	Signed Number representation	1	09-09-2024		TLM2	
28.	Addition and Subtraction of Signed Numbers	1	10-09-2024		TLM2	
29.	Design of Fast Adders	1	11-09-2024		TLM2	
30.	Multiplication of Positive Numbers	1	12-09-2024		TLM2, TLM4	
31.	Signed-operand Multiplication	1	13-09-2024		TLM2, TLM7	
32.	**TUTORIAL-3**	1	17-09-2024		TLM3	
33.	Fast Multiplication	1	18-09-2024		TLM2	
34.	Integer Division,	1	19-09-2024		TLM2	
35.	Floating-Point Numbers and Operations	1	20-09-2024		TLM2	
36.	Processor Organization of Fundamental Concepts	1	23-09-2024		TLM2	
37.	Execution of a Complete Instruction	1	24-09-2024		TLM2	
38.	Multiple-Bus Organization	1	25-09-2024		TLM2	
39.	Hardwired Control	1	26-09-2024		TLM2	
40.	Micro programmed Control	1	28-09-2024		TLM2	
41.	Assignment / Quiz	1	30-09-2024		TLM6	
No. of classes required to complete UNIT-III: 15				**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
42.	Memory organization	1	01-10-2024		TLM2	
43.	Semiconductor RAM Memories	1	03-10-2024		TLM2	
44.	Concept of memory hierarchical organization	1	05-10-2024		TLM2	
45.	Read-Only Memories, Speed, Size and Cost	1	07-10-2024		TLM2	
46.	**TUTORIAL-4**	1	08-10-2024			
47.	Cache memory	1	14-10-2024		TLM2	
48.	Virtual Memories	1	15-10-2024 16-10-2024 17-10-2024		TLM2	
49.	Memory Management Requirements, Secondary Storage	3	19-10-2024		TLM2	
50.	Assignment / Quiz / **Tutorial -8**	1	21-10-2024		TLM6	
No. of classes required to complete UNIT-IV: 11				**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
51.	Input/Output Organization: Accessing I/O Devices	1	22-10-2024		TLM2	
52.	Interrupts	1	23-10-2024		TLM2	
53.	Processor Examples	1	24-10-2024		TLM2	
54.	Interface Circuits	1	25-10-2024		TLM2	
55.	Peripheral devices –I/O sub-systems	1	28-10-2024		TLM2	
56.	TUTORIAL-5	1	29-10-2024		TLM3	
57.	I/O device interface	1	30-10-2024		TLM2	
58.	I/O transfers-program controlled	1	01-11-2024		TLM2	
59.	Interrupt driven	1	04-11-2024		TLM2	
60.	DMA	1	05-11-2024		TLM2	
61.	Assignment / Quiz	1	06-11-2024		TLM6	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

II-MID EXAMINATIONS: 11-11-2024 TO 16-11-2024

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.	Pipeline Processing	1	07-11-2024		TLM2	
2.	Multicore Processors	1	08-11-2024		TLM2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM6**	Assignment or Quiz
TLM2	PPT	**TLM7**	Seminar or GD
TLM3	Tutorial	**TLM8**	Lab Demo
TLM4	Problem Solving	**TLM9**	Case Study
TLM5	Programming	**TLM10**	Sports/NSS/NCC/ TECH FEST

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III ,IV & V)	A2=5
II- Descriptive Examination (Unit-III ,IV & V)	M2=15
II-Quiz Examination (Unit-III ,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

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	**15-07-2024**		
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1W**
Preparation and Practical's	18-11-2024	23-11-204	1W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2W**

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.G.Rajendra	Dr.J.Nageswara Rao	Dr .D.Venkata Subbaiah	Dr.B. Srinivasa Rao
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. G. RAJENDRA
Course Name & Code : Digital Logic &Computer Organization & 20IT01
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : II B.Tech., III-Sem, A-Sec **A.Y.: 2024-25**

Prerequisites:

Course Objectives: The main objectives of the course

1. Provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals.
2. Describe memory hierarchy concepts.
3. Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices.

COURSE OUTCOMES (COs): At the end of the course, students 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 Sequential logic circuits and understand basic functional blocks a computer system. **(Apply- L3)**
CO3	Understand computer architecture and Data representation to perform computer arithmetic operations and processor organization. **(Understand- L2)**
CO4	Analyze the memory hierarchy in a computer system. **(Understand- L2)**
CO5	Understand the I/O operations and the interfaces **(Understand-L2)**

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	3	1	1	-	-	-	-	-	-	-	-	1	1	-
CO2	3	2	1	-	-	-	-	-	-	-	-	-	-	1	-
CO3	3	3	1	-	-	-	-	-	-	-	-	-	-	1	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	2	2	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-	-	1	1

Textbooks:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson.

Reference Books:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson
2. Computer Organization and Design, David A. Paterson, John L.Hennessy, Elsevier
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson

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 course Cos, POs and PSOs	1	15-07-2024		TLM1	
2.	Introduction to DLD, Number systems	1	16-07-2024		TLM2	
3.	Different Number systems	1	18-07-2024		TLM2	
4.	Conversions of one number to another number	1	19-07-2024		TLM2, TLM4, TLM7	
5.	Data Representations	1	22-07-2024		TLM2	
6.	**TUTORIAL-1**	1	23-07-2024		TLM3	
7.	Binary codes	1	24-07-2024		TLM2	
8.	Basic Logic gates and Universal gates	2	25-07-2024 26-07-2024		TLM2	
9.	Boolean Logic functions	2	29-07-2024 30-07-2024		TLM2	
10.	K-Maps Simplifications	2	31-07-2024 01-08-2024		TLM2	
11.	Combinational circuits	1	02-08-2024		TLM2	
12.	Designing Decoder and Multiplexers	1	05-08-2024		TLM2	
13.	Assignment / Quiz	1	6-08-2024		TLM6	
No. of classes required to complete UNIT-I: 18				**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
14.	Introduction to sequential circuits,	1	07-08-2024		TLM2	
15.	Flip-flops(RS,JK,T,D),	2	08-08-2024 09-08-2024		TLM2, TLM6	
16.	Master slave flip-flop	1	12-08-2024		TLM1, TLM2	
17.	Conversion of flip-flops, Truth & excitation tables	2	13-08-2024 14-08-2024		TLM1, TLM2, TLM7	
18.	**TUTORIAL-2**	1	16-08-2024		TLM3	
19.	Registers	1	19-08-2024		TLM2	
20.	counters	1	20-08-2024		TLM1, TLM2	
21.	Basic structure of computer	1	21-08-2024		TLM2	
22.	Bus structure	1	22-08-2024		TLM2	
23.	Multi processors and multi computers	1	23-08-2024		TLM2	
24.	Computer generations	1	27-08-2024		TLM2	
25.	Von- Neumann Architecture	1	28-08-2024		TLM2	
26.	Assignment / Quiz	1	29-08-2024		TLM6	
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

I-MID EXAMINATIONS **02-09-2024 TO 07-09-2024**

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
27.	Signed Number representation	1	30-08-2024		TLM2	
28.	Addition and Subtraction of Signed Numbers	1	09-09-2024		TLM2	
29.	Design of Fast Adders	1	10-09-2024		TLM2	
30.	Multiplication of Positive Numbers	1	11-09-2024		TLM2, TLM4	
31.	Signed-operand Multiplication	1	12-09-2024		TLM2, TLM7	
32.	**TUTORIAL-3**	1	13-09-2024		TLM3	
33.	Fast Multiplication	1	17-09-2024		TLM2	
34.	Integer Division,	1	18-09-2024		TLM2	
35.	Floating-Point Numbers and Operations	1	19-09-2024		TLM2	
36.	Processor Organization of Fundamental Concepts	1	20-09-2024		TLM2	
37.	Execution of a Complete Instruction	1	23-09-2024		TLM2	
38.	Multiple-Bus Organization	1	24-09-2024		TLM2	
39.	Hardwired Control	1	25-09-2024		TLM2	
40.	Micro programmed Control	1	26-09-2024		TLM2	
41.	Assignment / Quiz	1	27-09-2024		TLM6	
No. of classes required to complete UNIT-III: 15				**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
42.	Memory organization	1	30-09-2024		TLM2	
43.	Semiconductor RAM Memories	1	01-10-2024		TLM2	
44.	Concept of memory hierarchical organization	1	03-10-2024		TLM2	
45.	Read-Only Memories, Speed, Size and Cost	1	04-10-2024		TLM2	
46.	**TUTORIAL-4**	1	07-10-2024			
47.	Cache memory	1	08-10-2024		TLM2	
48.	Virtual Memories	1	14-10-2024		TLM2	
49.	Memory Management Requirements, Secondary Storage	3	15-10-2024 16-10-2024 17-10-2024		TLM2	
50.	Assignment / Quiz	1	18-10-2024		TLM6	
No. of classes required to complete UNIT-IV: 11				**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
51.	Input/Output Organization: Accessing I/O Devices	1	21-10-2024		TLM2	
52.	Interrupts	1	22-10-2024		TLM2	
53.	Processor Examples	1	23-10-2024		TLM2	
54.	Interface Circuits	1	24-10-2024		TLM2	
55.	Peripheral devices –I/O sub-systems	1	25-10-2024		TLM2	
56.	**TUTORIAL-5**	1	28-10-2024		TLM3	
57.	I/O device interface	1	29-10-2024		TLM2	
58.	I/O transfers-program controlled	1	30-10-2024		TLM2	
59.	Interrupt driven	1	01-11-2024		TLM2	
60.	DMA	1	04-11-2024		TLM2	
61.	Assignment / Quiz	1	05-11-2024		TLM6	
No. of classes required to complete UNIT-V: 11				**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.	Pipeline Processing	2	06-11-2024 07-11-2024		TLM2	
2.	Multicore Processors	1	08-11-2024		TLM2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM6**	Assignment or Quiz
TLM2	PPT	**TLM7**	Seminar or GD
TLM3	Tutorial	**TLM8**	Lab Demo
TLM4	Problem Solving	**TLM9**	Case Study
TLM5	Programming	**TLM10**	Sports/NSS/NCC/ TECH FEST

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III ,IV & V)	A2=5
II- Descriptive Examination (Unit-III ,IV & V)	M2=15
II-Quiz Examination (Unit-III ,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

ACADEMIC CALENDAR:

Description	**From**	**To**	**Weeks**
Commencement of Class Work	**15-07-2024**		
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1W**
Preparation and Practical's	18-11-2024	23-11-204	1W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2W**

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.G.Rajendra	Dr.J.Nageswara Rao	Dr .D.Venkata Subbaiah	Dr.B. Srinivasa Rao
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr S.Naganjaneyulu
Course Name & Code : OBJECT ORIENTED PROGRAMMING THROUGH JAVA, 23CS05
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / III SEM / A
A.Y. : 2024-25

PREREQUISITE : **Introduction to Programming**

COURSE EDUCATIONAL OBJECTIVES (CEO):

The main objectives of the course is to:

1. Identify Java language components and how they work together in applications
2. Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. Learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. Understand how to design applications with threads in Java
5. Understand how to use Java APIs for program development

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

CO1	Identify the syntax and semantics of java programming language and basic concepts of Java. **(Understand-L2)**
CO2	Understand the basic concepts of object-oriented programming **(Understand-L2)**
CO3	Develop reusable programs using the concepts of inheritance, polymorphism, and interfaces. **(Apply-L3)**
CO4	Apply the concepts of packages, exception handling & I/O streams to develop secure, error free, and efficient applications **(Apply-L3)**
CO5	Design multithreaded and GUI based applications which mimic the real word scenarios. **(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	-	-	**1**
CO2	3	2	-	-	-	-	-	-	-	-	-	2	-	-	**1**
CO3	3	2	-	-	-	-	-	-	-	-	-	2	-	-	**2**
CO4	3	2	-	-	-	-	-	-	-	-	-	2	-	**1**	**2**
CO5	3	2	-	-	-	-	-	-	-	-	-	2	-	**1**	**2**
1 - Low						**2 –**Medium							**3 -** High		

TEXTBOOKS:

T1 JAVA one step ahead, Anitha Seth, B. L. Juneja, Oxford.

T2 Joy with JAVA, Fundamentals of Object-Oriented Programming, Debasis Samanta, Monalisa Sarma, Cambridge, 2023.

T3 JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCE BOOKS:

R1 The complete Reference Java, 11thedition, Herbert Schildt, TMH

R2 Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Object Oriented Programming, Data Types, Variables, Introduction to Operators and Control Statements

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and CO discussion	1	16-07-2024		TLM1&2	
2.	Basic concepts, Principles	1	18-07-2024		TLM1&2	
3.	Program Structure in Java	2	20-07-2024 23-07-2024		TLM1&2	
4.	Command Line Arguments, User Input to Programs.	2	24-07-2024 25-07-2024		TLM1&2	
5.	Data Types, Variables	2	27-07-2024 30-07-2024		TLM1&2	
6.	Static Variables and Methods, Attribute Final	2	31-07-2024 01-08-2024		TLM1&2	
7.	Introduction to Operators	2	03-08-2024 06-08-2024		TLM1&2	
8.	Control Statements	1	07-08-2024		TLM1&2	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: Classes and Objects, Constructors and Methods and String Handling in Java

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.	Classes and Objects	1	08-08-2024		TLM1&2	
2.	Class Declaration and Modifiers, Class Members	1	13-08-2024		TLM1&2	
3.	Declaration of Class Objects, Assigning One Object to Another	1	14-08-2024		TLM1&2	
4.	Access Control for Class Members, Accessing Private Members of Class.	1	17-08-2024		TLM1&2	
5.	Constructors and Methods Introduction ,Defining Methods, Constructor Methods for Class ,Overloaded Constructor Methods	1	20-08-2024		TLM1&2	
6.	Overloaded Methods, Nested Classes	1	21-08-2024		TLM1&2	
7.	Passing Arguments by Value and by Reference, Keyword this	1	22-08-2024		TLM1&2	

8.	Class Objects as Parameters in Methods, Access Control	1	24-08-2024		TLM1&2	
9.	Recursive Methods, Nesting of Methods, Attributes Final and Static	2	27-08-2024 28-08-2024		TLM1&2	
10.	String Handling in Java, String class	1	29-08-2024		TLM1&2	
11.	StringTokenizer, StringBuffer classes	1	31-08-2024		TLM1&2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Arrays, Inheritance and Interfaces

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Arrays	1	10-09-2024		TLM1&2	
2.	Operations on Array Elements	1	11-09-2024		TLM1&2	
3.	Sorting & Searching values in Arrays	1	12-09-2024		TLM1&2	
4.	Two & Three-Dimensional Arrays and Vectors	2	17-09-2024 18-09-2024		TLM1&2	
5.	Inheritance and Polymorphism	2	19-09-2024 21-09-2024		TLM1&2	
6.	Method overloading & overriding, abstract classes	2	24-09-2024 25-09-2024		TLM1&2	
7.	Interface concepts	1	24-09-2024		TLM1&2	
8.	Functional Interfaces, Annotations	1	26-09-2024		TLM1&2	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Packages and Java Library, Exception Handling and Java I/O, File

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.	Packages and Java Library Introduction	1	28-09-2024		TLM1&2	
2.	Packages related concepts	2	01-10-2024 03-10-2024		TLM1&2	
3.	Wrapper Classes, Auto-boxing and Auto-unboxing	1	05-10-2024		TLM1&2	
4.	Java util Classes and Interfaces	1	08-10-2024		TLM1&2	
5.	Exception Handling Hierarchy & keywords	2	09-10-2024 15-10-2024		TLM1&2	
6.	Generating user defined exception	2	16-10-2024 17-10-2024		TLM1&2	
7.	Java I/O streams and Files	2	19-10-2024 22-10-2024		TLM1&2	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Multithreaded Programming, Java Collections and Java FX GUI

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.	Multithreaded Programming	1	23-10-2024		TLM1&2	
2.	Thread life cycle, naming, priories of the threads, states	2	24-10-2024 26-10-2024		TLM1&2	
3.	Synchronization & Inter-thread communication	1	29-10-2024		TLM1&2	
4.	Java Collections & Hierarchy, List, Set Interfaces	1	30-10-2024		TLM1&2	
5.	Map Interface with examples	1	02-11-2024		TLM1&2	
6.	Java FX, Overview of AWT & Swings API	1	05-11-2024		TLM1,2&6	
7.	Event handling	1	06-11-2024		TLM1&2	
8.	Layouts, mouse events	1	07-11-2024		TLM1&2	
No. of classes required to complete UNIT-V: 09				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text book followed	HOD Sign Weekly
1.	Java new features , Realtime applications examples	1	09-11-2024		TLM1&2			
No. of classes required to complete - 1					No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

Teaching Learning Methods

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

ACADEMIC CALENDAR: A.Y 2024-25

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr S Naganjaneyulu**	**Dr. Y.V.B Reddy**	**Dr.K.Phaneendra**	**Dr. B.Srinivasa Rao**
Signature				

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L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. M. Rajesh Reddy
Course Name & Code : OBJECT ORIENTED PROGRAMMING THROUGH JAVA, 23CS05
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / III SEM / B
A.Y. : 2024-25

PREREQUISITE : **Introduction to Programming**

COURSE EDUCATIONAL OBJECTIVES (CEO):

The main objectives of the course is to:

1. Identify Java language components and how they work together in applications
2. Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. Learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. Understand how to design applications with threads in Java
5. Understand how to use Java APIs for program development

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

CO1	Identify the syntax and semantics of java programming language and basic concepts of Java. **(Understand-L2)**
CO2	Understand the basic concepts of object-oriented programming **(Understand-L2)**
CO3	Develop reusable programs using the concepts of inheritance, polymorphism, and interfaces. **(Apply-L3)**
CO4	Apply the concepts of packages, exception handling & I/O streams to develop secure, error free, and efficient applications **(Apply-L3)**
CO5	Design multithreaded and GUI based applications which mimic the real word scenarios. **(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	-	-	**1**
CO2	3	2	-	-	-	-	-	-	-	-	-	2	-	-	**1**
CO3	3	2	-	-	-	-	-	-	-	-	-	2	-	-	**2**
CO4	3	2	-	-	-	-	-	-	-	-	-	2	-	**1**	**2**
CO5	3	2	-	-	-	-	-	-	-	-	-	2	-	**1**	**2**
1 - Low						**2 –**Medium							**3 -** High		

TEXTBOOKS:

T1 JAVA one step ahead, Anitha Seth, B. L. Juneja, Oxford.

T2 Joy with JAVA, Fundamentals of Object-Oriented Programming, Debasis Samanta, Monalisa Sarma, Cambridge, 2023.

T3 JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCE BOOKS:

R1 The complete Reference Java, 11thedition, Herbert Schildt, TMH

R2 Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Object Oriented Programming, Data Types, Variables, Introduction to Operators and Control Statements

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and CO discussion	1	15-07-2024		TLM1&2	
2.	Basic concepts, Principles	1	18-07-2024		TLM1&2	
3.	Program Structure in Java	2	19-07-2024 22-07-2024		TLM1&2	
4.	Command Line Arguments, User Input to Programs.	2	24-07-2024 25-07-2024		TLM1&2	
5.	Data Types, Variables	2	26-07-2024 29-07-2024		TLM1&2	
6.	Static Variables and Methods, Attribute Final	2	31-07-2024 01-08-2024		TLM1&2	
7.	Introduction to Operators	2	02-08-2024 05-08-2024		TLM1&2	
8.	Control Statements	1	07-08-2024		TLM1&2	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: Classes and Objects, Constructors and Methods and String Handling in Java

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.	Classes and Objects	1	08-08-2024		TLM1&2	TLM1&2
2.	Class Declaration and Modifiers, Class Members	1	09-08-2024		TLM1&2	
3.	Declaration of Class Objects, Assigning One Object to Another	1	12-08-2024		TLM1&2	
4.	Access Control for Class Members, Accessing Private Members of Class.	1	14-08-2024		TLM1&2	
5.	Constructors and Methods Introduction ,Defining Methods, Constructor Methods for Class ,Overloaded Constructor Methods	1	16-08-2024		TLM1&2	
6.	Overloaded Methods, Nested Classes	1	19-08-2024		TLM1&2	
7.	Passing Arguments by Value and by Reference, Keyword this	1	21-08-2024		TLM1&2	

8.	Class Objects as Parameters in Methods, Access Control	1	22-08-2024		TLM1&2	
9.	Recursive Methods, Nesting of Methods, Attributes Final and Static	2	23-08-2024 28-08-2024		TLM1&2	
10.	String Handling in Java, String class	1	29-08-2024		TLM1&2	
11.	StringTokenizer, StringBuffer classes	1	30-08-2024		TLM1&2	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Arrays, Inheritance and Interfaces

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Arrays	1	09-09-2024		TLM1&2	
2.	Operations on Array Elements	1	11-09-2024		TLM1&2	
3.	Sorting & Searching values in Arrays	1	12-09-2024		TLM1&2	
4.	Two & Three-Dimensional Arrays and Vectors	2	13-09-2024 18-09-2024		TLM1&2	
5.	Inheritance and Polymorphism	2	19-09-2024 20-09-2024		TLM1&2	
6.	Method overloading & overriding, abstract classes	2	23-09-2024 25-09-2024		TLM1&2	
7.	Interface concepts	1	26-09-2024		TLM1&2	
8.	Functional Interfaces, Annotations	1	27-09-2024		TLM1&2	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Packages and Java Library, Exception Handling and Java I/O, File

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.	Packages and Java Library Introduction	1	30-09-2024		TLM1&2	
2.	Packages related concepts	2	03-10-2024 04-10-2024		TLM1&2	
3.	Wrapper Classes, Auto-boxing and Auto-unboxing	1	07-10-2024		TLM1&2	
4.	Java util Classes and Interfaces	1	09-10-2024		TLM1&2	
5.	Exception Handling Hierarchy & keywords	2	14-10-2024 16-10-2024		TLM1&2	
6.	Generating user defined exception	2	17-10-2024 18-10-2024		TLM1&2	
7.	Java I/O streams and Files	1	21-10-2024		TLM1&2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Multithreaded Programming, Java Collections and Java FX GUI

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.	Multithreaded Programming	1	23-10-2024		TLM1&2	
2.	Thread life cycle, naming, priories of the threads, states	2	24-10-2024		TLM1&2	
3.	Synchronization & Inter-thread communication	1	25-10-2024 28-10-2024		TLM1&2	
4.	Java Collections & Hierarchy, List, Set Interfaces	1	30-10-2024		TLM1&2	
5.	Map Interface with examples	1	01-11-2024		TLM1&2	
6.	Java FX, Overview of AWT & Swings API	1	04-11-2024		TLM1&2	
7.	Event handling,	1	06-11-2024		TLM1&2	
8.	Layouts, mouse events	1	07-11-2024		TLM1&2	
No. of classes required to complete UNIT-V: 09				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text book followed	HOD Sign Weekly
1.	Java new features , Realtime applications examples	1	08-11-2024		TLM1&2			
No. of classes required to complete - 1					No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

Teaching Learning Methods

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

ACADEMIC CALENDAR: A.Y 2024-25

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**M. Rajesh Reddy**	**Dr. Y.V.B Reddy**	**Dr.K.Phaneendra**	**Dr. B.Srinivasa Rao**
Signature				

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

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. D RATNA KISHOR
Course Name & Code : ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS 23CS04
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/IT/III /A **A.Y.:** 2024-25

PREREQUISITE: Data Structures

COURSE EDUCATIONAL OBJECTIVES (CEO):

The main objectives of the course is to

1. Provide knowledge on advance data structures frequently used in Computer Science domain
2. Develop skills in algorithm design techniques popularly used
3. Understand the use of various data structures in the algorithm design

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

CO1	Identify the characteristics of an algorithm, analyze its time and space complexity and construct balanced binary trees. **(Apply-L3)**
CO2	Understand Heap structures and graph terminology to perform various operations on non-linear data structures. **(Understand-L2)**
CO3	Apply Divide and Conquer, Greedy algorithm and dynamic programming for solving problems**. (Apply - L3)**
CO4	Analyze the backtracking and branch-and-bound search methods on optimization problems **(Apply - L3)**
CO5	Summarize the importance of NP-Hard and its applications. **(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	3	-	-	-	-	-	-	-	-	-	-	2	-	
CO2	2	2	-	-	-	-	-	-	-	-	-	-	2	-	
CO3	2	2	3	-	-	-	-	-	-	-	-	-		2	
CO4	2	2	3	-	-	-	-	-	-	-	-	-		2	
CO5	2	2	-	1	-	-	-	-	-	-	-	-		3	
1 - Low **2** –Medium **3** - High															

TEXTBOOKS:

T1 Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh, 2ndEdition Universities Press

T2 Computer Algorithms in C++, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2nd Edition University Press

REFERENCE BOOKS:

R1 Data Structures and program design in C, Robert Kruse, Pearson Education Asia

R2 An introduction to Data Structures with applications, Trembley& Sorenson, McGraw Hill

R3 The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.

R4 Data Structures using C & C++: Langsam, Augenstein &Tanenbaum, Pearson, 1995

Algorithms + Data Structures & Programs: N.Wirth, PHI

R5 Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.

R6 Data structures in Java: Thomas Standish, Pearson Education Asia

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction, AVL Tree, B-Tree

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and CO discussion	1	15-07-2024		TLM1	
2.	Introduction to Algorithm-Characteristics	1	16-07-2024		TLM1	
3.	Pseudo code specifications-Sample Algorithms	1	18-07-2024		TLM6	
4.	Tutorial on writing algorithms using Pseudo Code	1	20-07-2024		TLM3	
5.	Algorithm Analysis- Time and Space Complexity - Examples	2	22-07-2024 23-07-2024		TLM1	
6.	Asymptotic Notations	2	24-07-2024 25-07-2024		TLM1	
7.	Tutorial on finding space & time complexity of algorithms	1	27-07-2024		TLM3	
8.	AVL Tree Operations	2	29-07-2024 30-07-2024		TLM1	
9.	B-Tree operations	2	31-07-2024 01-08-2024		TLM1	
10.	Tutorial on AVL & B Tree operations	1	03-08-2024		TLM3	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Heap Tress, Graphs, Divide and Conquer

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.	Heap Trees (Priority Queue) - Introduction	1	05-08-2024		TLM1	
12.	Max Heap, Min Heap Construction-operations	1	06-08-2024		TLM1	
13.	Implementation of Heap Tree	1	07-08-2024		TLM1	
14.	Graph Terminology, Representations of Graphs	1	08-08-2024		TLM1	
15.	Tutorial on Heap Tree Construction	1	10-08-2024		TLM3	
16.	Basic Search and Traversal Techniques – DFS	2	12-08-2024 13-08-2024		TLM1	
17.	BFS – Example, Implementation	1	14-08-2024		TLM1	
18.	Tutorial on BFS & DFS traversals	1	17-08-2024		TLM3	
19.	Connected Components, Biconnected Components	2	19-08-2024 20-08-2024		TLM1	
20.	Divide and Conquer General Method, Finding Max and Min	1	21-08-2024		TLM1	
21.	Merge Sort	1	22-08-2024		TLM1	
22.	Tutorial on Merge Sort Analysis	1	24-08-2024		TLM3	
23.	Quick sort	2	27-08-2024 28-08-2024		TLM1	
24.	Strassen' Matrix Multiplication	1	29-08-2024		TLM1	
25.	Tutorial on Divide & Conquer Technique problems	1	31-08-2024		TLM6	
No. of classes required to complete UNIT-II: 18				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Greedy Method:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Introduction to Greedy Method	1	09-09-2024		TLM1	
27.	Job Sequencing with dead Lines	1	10-09-2024		TLM1	
28.	Knapsack Problem	1	11-09-2024		TLM1	
29.	Minimum Cost Spanning Tree- Kruskal Algorithm	1	12-09-2024		TLM6	
30.	Tutorial on different knapsack problem instances	1	14-09-2024		TLM3	
31.	Prims Algorithm	2	17-09-2024 18-09-2024		TLM1	
32.	Single Source Shortest Path	1	19-09-2024		TLM1	
33.	Tutorial on analysis of prims & kruskal's algorithm	1	21-09-2024		TLM3	
34.	Optimal Storage on tapes	1	23-09-2024		TLM1	
35.	Huffman Coding	1	24-09-2024		TLM1	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Dynamic Programming

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
36.	Introduction to Dynamic Programming	1	25-09-2024		TLM1	
37.	All pairs shortest path	1	26-09-2024		TLM1	
38.	Tutorial on Tabular & Memorization methods in Dynamic Programming	1	28-09-2024		TLM3	
39.	Bellman Ford Algorithm	1	30-09-2024		TLM1	
40.	0/1 knapsack problem	2	01-10-2024 03-10-2024		TLM1	
41.	Tutorial on Analysis of Bellman Ford & Floyd Warshall Algorithms	1	05-10-2024		TLM3	
42.	Optimal binary search tree	2	07-10-2024 08-10-2024		TLM1	
43.	String editing	2	14-10-2024 15-10-2024		TLM1	
44.	Travelling salesperson problem	2	16-10-2024 17-10-2024		TLM1	
45.	Tutorial on Analysis of OBST	1	19-10-2024		TLM6	
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: Back tracking & Branch and bound

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
46.	Backtracking Introduction	1	21-10-2024		TLM1	
47.	N-queens Problem	2	22-10-2024 23-10-2024		TLM1	
48.	Graph Coloring	1	24-10-2024		TLM6	
49.	Tutorial on Analysis of N-Queens	1	26-10-2024		TLM6	
50.	Sum of subsets problem	1	28-10-2024		TLM1	

51.	Introduction to Branch and Bound	1	29-10-2024		TLM1	
52.	0/1 Knapsack-LCBB, FIFOBB	1	30-10-2024		TLM1	
53.	Tutorial on 0/1 Knapsack	1	02-11-2024			
54.	Travelling Salesperson Problem -LC Search	1	04-11-2024		TLM1	
55.	Introduction to P and NP	1	05-11-2204		TLM1	
56.	NP-Complete Problems	1	06-11-2024		TLM1	
57.	Revision	1	07-11-2024		TLM1	
No. of classes required to complete UNIT-V: 13				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Np-Hard Problems	1	09-11-2024					
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

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 (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. D.RATNA KISHOR**			**Dr. B.SRINIVASA RAO**
Signature				

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

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: D.Vijaya Sri
Course Name & Code : ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS & 23CS04
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/CSE/III /B **A.Y.:** 2024-25

PREREQUISITE: Data Structures

COURSE EDUCATIONAL OBJECTIVES (CEO):

The main objectives of the course is to

1. Provide knowledge on advance data structures frequently used in Computer Science domain
2. Develop skills in algorithm design techniques popularly used
3. Understand the use of various data structures in the algorithm design

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

CO1	Identify the characteristics of an algorithm, analyze its time and space complexity and construct balanced binary trees. **(Apply-L3)**
CO2	Understand Heap structures and graph terminology to perform various operations on non-linear data structures. **(Understand-L2)**
CO3	Apply Divide and Conquer, Greedy algorithm and dynamic programming for solving problems**. (Apply - L3)**
CO4	Analyze the backtracking and branch-and-bound search methods on optimization problems **(Apply - L3)**
CO5	Summarize the importance of NP-Hard and its applications. **(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	3	-	-	-	-	-	-	-	-	-	-	**2**	-	
CO2	2	2	-	-	-	-	-	-	-	-	-	-	2	-	
CO3	2	2	3	-	-	-	-	-	-	-	-	-		2	
CO4	2	2	3	-	-	-	-	-	-	-	-	-		2	
CO5	2	2	-	1	-	-	-	-	-	-	-	-		3	
1 - Low				**2** –Medium							**3** – High				

TEXTBOOKS:

T1 Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh, 2ndEdition Universities Press

T2 Computer Algorithms in C++, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2nd Edition University Press

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R3 The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.

R4 Data Structures using C & C++: Langsam, Augenstein &Tanenbaum, Pearson, 1995 Algorithms + Data Structures & Programs: N.Wirth, PHI

R5 Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.

R6 Data structures in Java: Thomas Standish, Pearson Education Asia

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction, AVL Tree, B-Tree

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction and CO discussion	1	15-07-2024		TLM1	
2.	Introduction to Algorithm-Characteristics	1	16-07-2024		TLM1	
3.	Pseudo code specifications-Sample Algorithms	2	18-07-2024 19-07-2024		TLM1	
4.	Algorithm Analysis- Time and Space Complexity - Examples	2	20-07-2024 22-07-2024		TLM1	
5.	Tutorial on finding space & time complexity of algorithms	1	23-07-2024		TLM3	
6.	Asymptotic Notations	2	24-07-2024 26-07-2024		TLM1	
7.	AVL Tree Operations	2	27-07-2024 29-07-2024		TLM1	
8.	Tutorial on AVL Tree operations	1	30-07-2024		TLM3	
9.	B-Tree operations	2	01-08-2024 02-08-2024		TLM1	
No. of classes required to complete UNIT-I: 14				**No. of classes taken:**		

UNIT-II: Heap Tress, Graphs, Divide and Conquer

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	Heap Trees (Priority Queue) - Introduction	1	03-08-2024		TLM1	
11.	Max Heap, Min Heap Construction-operations	1	05-08-2024		TLM1	
12.	Tutorial on Heap Tree Construction	1	06-08-2024		TLM1	
13.	Implementation of Heap Tree	1	08-08-2024		TLM3	
14.	Graph Terminology	1	09-08-2024		TLM1	
15.	Representations of Graphs	1	10-08-2024		TLM1	
16.	Basic Search and Traversal Techniques – DFS	1	12-08-2024		TLM1	
17.	Tutorial on DFS traversal	1	13-08-2024		TLM1	
18.	BFS – Example, Implementation	1	16-08-2024		TLM3	
19.	Connected Components, Biconnected Components	2	17-08-2024 19-08-2024		TLM1	
20.	Tutorial on examples of Connected Components	1	20-08-2024		TLM1	
21.	Divide and Conquer General Method	1	22-08-2024		TLM3	
22.	Finding Max and Min	1	23-08-2024		TLM1	
23.	Merge Sort	1	24-08-2024		TLM1	
24.	Tutorial on Merge Sort Analysis	1	27-08-2024		TLM3	
25.	Quick sort	2	29-08-2024 30-08-2024		TLM1	
26.	Strassen' Matrix Multiplication	1	31-08-2024		TLM1	
No. of classes required to complete UNIT-II: 19				**No. of classes taken:**		
I MID EXAMINATIONS (02-09-2024 TO 07-09-2024)						

UNIT-III: Greedy Method:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Introduction to Greedy Method	1	09-09-2024		TLM1	
28.	Job Sequencing with dead Lines	1	10-09-2024		TLM1	
29.	Knapsack Problem	1	12-09-2024		TLM1	
30.	Minimum Cost Spanning Tree- Kruskal Algorithm	2	13-09-2024 14-09-2024		TLM1	
31.	Tutorial on different knapsack problem instances	1	17-09-2024		TLM3	
32.	Prims Algorithm	2	19-09-2024 20-09-2024		TLM1	
33.	Single Source Shortest Path	1	21-09-2024		TLM1	
34.	Optimal Storage on tapes	1	23-09-2024		TLM1	
35.	Tutorial on analysis of prims & kruskal's algorithm	1	24-09-2024		TLM3	
36.	Huffman Coding	1	26-09-2024		TLM1	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Dynamic Programming

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Introduction to Dynamic Programming	1	27-09-2024		TLM1	
38.	All pairs shortest path	1	28-09-2024		TLM1	
39.	Bellman Ford Algorithm	1	30-09-2024		TLM1	
40.	0/1 knapsack problem	2	01-10-2024 03-10-2024		TLM1	
41.	Optimal binary search tree	2	04-10-2024 05-10-2024		TLM1	
42.	String editing	2	08-10-2024 14-10-2024		TLM1	
43.	Tutorial on Analysis of OBST	1	15-10-2024		TLM3	
44.	Travelling salesperson problem	2	17-10-2024 18-10-2024		TLM1	
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: Back tracking & Branch and bound

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Backtracking Introduction	1	19-10-2024		TLM1	
46.	N-queens Problem	2	21-10-2024 22-10-2024		TLM1	
47.	Tutorial on Analysis of N-Queens	1	24-10-2024		TLM3	
48.	Graph Coloring	1	25-10-2024			
49.	Sum of subsets problem	1	26-10-2024		TLM1	
50.	Introduction to Branch and Bound	1	28-10-2024		TLM1	
51.	0/1 Knapsack-LCBB, FIFOBB	1	29-10-2024		TLM1	
52.	Tutorial on Least Cost BB	1	01-11-2024		TLM3	
53.	Travelling Salesperson Problem -LC Search	2	02-11-2024 04-11-2024		TLM1	

54.	Introduction to P and NP	1	05-11-2204		TLM1	
55.	NP-Complete Problems	1	07-11-2024		TLM1	
56.	Revision	1	08-11-2024		TLM1	
No. of classes required to complete UNIT-V: 14				**No. of classes taken:**		

Content Beyond Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Np-Hard Problems	1	09-11-2024					
No. of classes		1			No. of classes taken:			
II MID EXAMINATIONS (11-11-2024 TO 16-11-2024)								

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 (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, 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	**Organize, Analyze and Interpret the data to extract meaningful conclusions.**
PSO 2	**Design, Implement and Evaluate a computer-based system to meet desired needs.**
PSO 3	**Develop IT application services with the help of different current engineering tools**

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	D.Vijaya Sri	Dr. M. Sitha Ram	Dr. Phaneendra K	Dr. B.Srinivasa Rao
Signature				

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L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. S. Naganjaneyulu
Course Name & Code : OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB & 23CS54
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/IT/III/A **A.Y.:** 2024-25

PREREQUISITE: Computer Programming Lab

COURSE EDUCATIONAL OBJECTIVE:

The objectives of the course is to

- Practice Object-Oriented Programming in the Java Programming Language.
- Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User Defined Exception Handling Mechanism.
- Illustrate Inheritance, Exception Handling Mechanism.
- Construct Threads, Event Handling, implement packages, Java FX GUI.

COURSE OUTCOMES (CO):

CO1: Implement basic concepts of the java programming language. **(Apply-L3)**
CO2: Implement object-oriented programming concepts and exception handling **(Apply- L3)**
CO3: Design multithreaded and GUI based applications. **(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	2	-	2	-	-	-	-	-	-	2	-	-	2
CO2	3	2	2	-	2	-	-	-	-	-	-	2	-	-	2
CO3	3	2	2	-	2	-	-	-	-	-	-	2	-	-	2
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	HOD Sign
1.	Exercise – 1	03	19-07-2024		
2.	Exercise – 2	03	26-07-2024		
3.	Exercise – 3	06	02-08-2024 09-08-2024		
4.	Exercise – 4	03	16-08-2024 23-08-2024		
5.	Exercise – 5	03	30-08-2024		
6.	Exercise – 6	03	13-09-2024 20-09-2024		
7.	Exercise – 7	06	27-09-2024 04-10-2024		
8.	Exercise – 8	03	18-10-2024		
9.	Exercise – 9	03	25-10-2024		
10.	**Add-on:** JDBC connectivity program	03	01-11-2024		
11.	Internal Exam	03	08-11-2024		

Academic Calendar:

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. S. Naganjaneyulu**	**Dr. Y. V. B. Reddy**	**Dr. K. Phanindra**	**Dr. B. Srinivasa Rao**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. M. Rajesh Reddy
Course Name & Code : OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB & 23CS54
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/IT/III/B **A.Y.:** 2024-25

PREREQUISITE: Computer Programming Lab

COURSE EDUCATIONAL OBJECTIVE:

The objectives of the course is to

- Practice Object-Oriented Programming in the Java Programming Language.
- Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User Defined Exception Handling Mechanism.
- Illustrate Inheritance, Exception Handling Mechanism.
- Construct Threads, Event Handling, implement packages, Java FX GUI.

COURSE OUTCOMES (CO):

CO1: Implement basic concepts of the java programming language. **(Apply-L3)**
CO2: Implement object-oriented programming concepts and exception handling **(Apply- L3)**
CO3: Design multithreaded and GUI based applications. **(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	2	-	2	-	-	-	-	-	-	2	-	-	2
CO2	3	2	2	-	2	-	-	-	-	-	-	2	-	-	2
CO3	3	2	2	-	2	-	-	-	-	-	-	2	-	-	2
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	HOD Sign
1.	Exercise – 1	03	24-07-2024		
2.	Exercise – 2	03	31-07-2024		
3.	Exercise – 3	06	07-08-2024 14-08-2024		
4.	Exercise – 4	03	21-08-2024		
5.	Exercise – 5	03	30-08-2024		
6.	Exercise – 6	03	11-09-2024 18-09-2024		
7.	Exercise – 7	06	25-09-2024 09-10-2024		
8.	Exercise – 8	03	16-10-2024		
9.	Exercise – 9	03	23-10-2024		
10.	**Add-on:** JDBC connectivity program	03	30-10-2024		
11.	Internal Exam	03	06-11-2024		

Academic Calendar:

Description	From	To	Weeks
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Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
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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	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	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. M. Rajesh Reddy**	**Dr. Y. V. B. Reddy**	**Dr. K. Phanindra**	**Dr. B. Srinivasa Rao**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: DR. D RATNA KISHOR
Course Name & Code **:** ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS LAB & 23CS53
L-T-P Structure **: 0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/IT/III/A **A.Y.:** 2024-25

PREREQUISITE: DATA STRUCTURES LAB

COURSE EDUCATIONAL OBJECTIVE:
The objectives of the course is to

- Acquire practical skills in constructing and managing Data structures
- Apply the popular algorithm design methods in problem-solving scenarios

COURSE OUTCOMES (CO):
CO1: Implement balanced binary trees, heaps and graph traversals using arrays and linked list. **(Apply-L3)**
CO2: Implement Various Sorting Techniques. **(Apply - L3)**
CO3: : Implement optimization problems using greedy, dynamic programming, backtracking and branch-and-bound techniques. **(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	-	2	1	-		-	-	-	-	-	-	-	2	-	2
CO2	-	2	1	-		-	-	-	-	-	-	-		2	2
CO3	-	2	1	-		-	-	-	-	-	-	-		2	2
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	HOD Sign
1.	AVL tree	03	24-07-2024		
2.	B-Tree	03	31-07-2024		
3.	Heap Construction	03	07-08-2024		
4.	BFT	03	14-08-2024		
5.	DFT	03	21-08-2024		
6.	Finding Biconnected Components	03	28-08-2024		
7.	, Finding Max and Min	03	11-09-2024		
8.	Merge sort, Quick sort	03	18-09-2024		
9.	Single source shortest path	03	25-09-2024		
10.	Job sequencing with dead lines	03	09-10-2024		
11.	0/1 knapsack -Dynamic Programming	03	16-10-2024		
12.	N-queens Problem	03	23-10-2024		
13.	Travelling Sales person Problem-Branch and bound	03	30-10-2024		
14.	Internal Exam	03	06-11-2024		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
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.
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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	Organize, Analyze and Interpret the data to extract meaningful conclusions..
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. D RATNA KISHOR**			**Dr. B.SRINIVASA RAO**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: D.Vijaya Sri
Course Name & Code **:** ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS LAB & 23CS53
L-T-P Structure **: 0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/CSE/III/B **A.Y.:** 2024-25

PREREQUISITE: DATA STRUCTURES LAB

COURSE EDUCATIONAL OBJECTIVE:
The objectives of the course is to

- Acquire practical skills in constructing and managing Data structures
- Apply the popular algorithm design methods in problem-solving scenarios

COURSE OUTCOMES (CO):
CO1: Implement balanced binary trees, heaps and graph traversals using arrays and linked list. **(Apply-L3)**
CO2: Implement Various Sorting Techniques. **(Apply - L3)**
CO3: : Implement optimization problems using greedy, dynamic programming, backtracking and branch-and-bound techniques. **(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
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CO2	-	2	1	-		-	-	-	-	-	-	-		2	2
CO3	-	2	1	-		-	-	-	-	-	-	-		2	2
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	HOD Sign
1.	AVL tree	03	23-07-2024		
2.	B-Tree	03	30-07-2024		
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6.	Finding Biconnected Components	03	27-08-2024		
7.	, Finding Max and Min	03	10-09-2024		
8.	Merge sort, Quick sort	03	17-09-2024		
9.	Single source shortest path	03	24-09-2024		
10.	Job sequencing with dead lines	03	01-10-2024		
11.	0/1 knapsack -Dynamic Programming	03	08-10-2024		
12.	N-queens Problem	03	15-10-2024		
13.	Travelling Sales person Problem-Branch and bound	03	29-10-2024		
14.	Internal Exam	03	05-11-2024		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
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Viva-voce	20
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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PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**D.Vijaya Sri**	**Dr. M. Sitha Ram**	**Dr. Phaneendra K**	**Dr. B.Srinivasa Rao**
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. M. RAJESH REDDY
Course Name & Code : FULL SATCK DEVELOPMENT-I & 23CSS2
L-T-P Structure : **0-1-2** **Credits:** 2
Program/Sem/Sec : B.Tech/IT/III/A **A.Y.:** 2024-25

Pre-requisite: Knowledge of basic Computer hardware & software.

COURSE EDUCATIONAL OBJECTIVE:

The main objectives of the course are to

- Make use of HTML elements and their attributes for designing static web pages
- Build a web page by applying appropriate CSS styles to HTML elements
- Experiment with JavaScript to develop dynamic web pages and validate forms

Course Outcomes: After successful completion of the course the students are able to

CO1: Design static web pages by using HTML elements. (Apply-L3)
CO2: Develop a web page by applying appropriate CSS styles to HTML elements. (Apply-L3)
CO3: Develop dynamic web pages and validate forms using JavaScript. (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	2	1	3										3
CO2	3	2	2	1	3										3
CO3	3	2	2	1	3										3
CO4								2	2	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	HOD Sign
1.	Introduction to Web and its applications & basic tags in HTML programming	3	15-07-2024		
2.	Lists, Links and Images	3	22-07-2024		
3.	HTML Tables, Forms and Frames	3	29-07-2024		
4.	HTML Tables, Forms and Frames	3	05-08-2024		
5.	HTML 5 and Cascading Style Sheets, Types of CSS	3	12-08-2024		
6.	Selector forms	3	19-08-2024		
7.	CSS with Color, Background, Font, Text and CSS Box Model	3	09-09-2024		
8.	Introduction to Java script and how to embedded JS in html	3	23-09-2024		
9.	Applying JavaScript - internal and external, I/O, Type Conversion	3	30-09-2024		
10.	JavaScript Conditional Statements and Loops, Pre-defined and User-defined Objects	3	07-10-2024		
11.	JavaScript Functions and Events	3	14-10-2024		
12.	Node.js	3	21-10-2024		
13.	**Add-ON**: Database connectivity using NodeJS Project	3	28-10-2024		
14.	Internal Exam	3	04-09-2024		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
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	Organize, Analyze and Interpret the data to extract meaningful conclusions
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Academic Calendar:

Description	From	To	Weeks
I Phase of Instructions	15-07-2024	31-08-2024	7W
I Mid Examinations	**02-09-2024**	**07-09-2024**	**1 W**
II Phase of Instructions	09-09-2024	09-11-2024	9W
II Mid Examinations	**11-11-2024**	**16-11-2024**	**1 W**
Preparation and Practical	18-11-2024	23-11-2024	1 W
Semester End Examinations	**25-11-2024**	**07-12-2024**	**2 W**

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Signature				
Name of the Faculty	**Mr. M. Rajesh Reddy**	**Mr. M. Vijay Kumar**	**Dr. K. Phanindra**	**Dr.B.Srinivasa Rao**

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, KRISHNA DIST., A.P.-521 230.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. M. VIJAY KUMAR
Course Name & Code : FULL SATCK DEVELOPMENT-I & 23CSS2
L-T-P Structure : **0-1-2** **Credits:** 2
Program/Sem/Sec : B.Tech/IT/III/B **A.Y.:** 2024-25

Pre-requisite: Knowledge of basic Computer hardware & software.

COURSE EDUCATIONAL OBJECTIVE:

The main objectives of the course are to

- Make use of HTML elements and their attributes for designing static web pages
- Build a web page by applying appropriate CSS styles to HTML elements
- Experiment with JavaScript to develop dynamic web pages and validate forms

Course Outcomes: After successful completion of the course the students are able to

CO1: Design static web pages by using HTML elements. (Apply-L3)
CO2: Develop a web page by applying appropriate CSS styles to HTML elements. (Apply-L3)
CO3: Develop dynamic web pages and validate forms using JavaScript. (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	2	1	3										3
CO2	3	2	2	1	3										3
CO3	3	2	2	1	3										3
CO4								2	2	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	HOD Sign
1.	Introduction to Web and its applications & basic tags in HTML programming	3	19/07/2024		
2.	Lists, Links and Images	3	26/07/2024		
3.	HTML Tables, Forms and Frames	3	02/08/2024		
4.	HTML Tables, Forms and Frames	3	09/08/2024		
5.	HTML 5 and Cascading Style Sheets, Types of CSS	3	16/08/2024		
6.	HTML 5 and Cascading Style Sheets, Types of CSS	3	23/08/2024		
7.	Selector forms	3	30/08/2024		
8.	CSS with Color, Background, Font, Text and CSS Box Model	3	13/09/2024		
9.	CSS with Color, Background, Font, Text and CSS Box Model	3	20/09/2024		
10.	Introduction to Java script and how to embedded JS in html	3	27/09/2024		
11.	Applying JavaScript - internal and external, I/O, Type Conversion	3	04/10/2024		
12.	JavaScript Conditional Statements and Loops, Pre-defined and User-defined Objects	3	18/10/2024		
13.	JavaScript Functions and Events	3	25/10/2024		
14.	Node.js	3	01/11/2024		
15	Add-ON: Database connectivity using NodeJS Project	3	08/11/2024		

PART-C

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Signature				
Name of the Faculty	**Mr.M.Vijay Kumar**	**Mr.M. Vijay Kumar**	**Dr.K. Phaneendra**	**Dr.B.Srinivasa Rao**