



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

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

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : K. Lavanya
 Course Name & Code : R Programming & 17IT03
 L-T-P Structure : 3-0-0 Credits: 3
 Program/Sem/Sec : B.Tech., IT., VI-Sem., A.Y: 2021-22

PRE-REQUISITE: Mathematics, Computer programming.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The Students will be able to learn the basic elements of R programming structures like data types, expressions, control statements, various I/O functions, how to solve mathematical problems using control structures. Modular programming using functions, derived data types like lists, strings and various operations, implementing tuples, sets and various operations on it, basics of files and its I/O operations and implementing various types of statistics and packages techniques and to expand their knowledge of R on their own.

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

CO	Target	BL	
CO 1	75	L2	Identify the basic concepts of R Programming such as Datatypes, Variables, and Operators.
CO 2	63	L3	Make use of various types of statements, string handling functions and Design their own customized functions
CO 3	75	L2	Demonstrate lists and matrices operations
CO 4	75	L2	Illustrate Arrays, Data frames and packages.
CO 5	65	L3	Apply appropriate statistical tests on data using R

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

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

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

TEXTBOOKS:

- T1** Statistical Programming in R by K G Srinivas G.M.Siddesh,ChetanShetty&SowmyaB.J.-2017 edition
- T2** R Fundamentals and Programming Techniques, Thomas Lumely.
- T3** R for Everyone Advanced Analytics and Graphics, Jared P. Lander-Addison Wesley Series.
- T4** The Art of R Programming, Norman Matloff, Cengage Learning

REFERENCEBOOKS:

- R1** R-programming for Data science, Roger D. Peng
- R2** An Introduction to statistical learning-with applications in R, Trevor Hastie and Rob Tibshirani.

PART-B**COURSE DELIVERY PLAN(LESSONPLAN):****UNIT-I: Introduction to R:**

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 and Cos, Introduction to Unit-1	1	21-02-2022		TLM1,2	
2.	Evolution of R, features of R, installation of R.	1	22-02-2022		TLM1,2,4	
3.	Introduction to R –basic syntax, R-command prompt, R-Script file	1	25-02-2022		TLM1,2,4	
4.	R-data types: vectors, lists	1	26-02-2022		TLM1,2,4	
5.	R-data types: vectors, lists	1	28-02-2022		TLM1,2,4	
6.	matrices, factors, data frames	1	4-03-2022		TLM1,2,4	
7.	matrices, factors, data frames	1	5-03-2022		TLM1,2,4	
8.	R variables: variable assignment, Data type of variables, finding variables, deleting variables,	1	7-03-2022		TLM1,2,4	
9.	R-operators: arithmetic operators, Relational operators,	1	8-03-2022		TLM1,2,4	
10.	Logical operators, assignment operators	1	11-03-2022		TLM1,2,4	
11.	Miscellaneous operators.	1	14-03-2022		TLM1,2,4	
12.	Revision on Unit-1	1	15-03-2022		TLM1,2,4	
13.	Assignment-I	1	19-03-2022		TLM5,6	
No. of classes required to completeUNIT-I:13				No. of classes taken:		

UNIT-II: R-Decision making & R-loops:

S.No.	Topicstobecoved	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Course and Cos, Introduction to Unit-2	1	21-03-2022		TLM1,2,4	
2.	R- Decision making: if statement, if-else statement, the if –else–if–else statement, Switch statement,	1	22-03-2022		TLM1,2,4	
3.	R-loops: Repeat loop, while loop, for loop.	1	25-03-2022		TLM1,2,4	
4.	Loop control statements: Break Statement, Next Statement.	1	26-03-2022		TLM1,2,4	

5.	R-Function: Function definition, function components, built-in functions	1	28-03-2022		TLM1,2,4
6.	User defined function, calling function, lazy evaluation of function.	1	29-03-2022		TLM1,2,4
7.	User defined function, calling function, lazy evaluation of function.	1	01-04-2022		TLM1,2,4
8.	R-strings: Introduction to strings, rules applied in string construction.	1	04-04-2022		TLM1,2,4
9.	String manipulation functions With example programs.	1	08-04-2022		TLM1,2,4
10.	Revision of UNIT-2 & Assignment-2	1	09-04-2022		TLM1,2,4
No. of classes required to complete UNIT-II: 10				No. of classes taken:	

UNIT-III: R-List & R-Matrices

S.No.	Topic 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 and Cos, Introduction to Unit-3	1	18-04-2022		TLM1,2	
2.	Introduction to lists, creating a list, naming list elements, accessing list elements,	1	19-04-2022		TLM1,2,4	
3.	Manipulating list elements, merging lists	1	22-04-2022		TLM1,2,4	
4.	Converting list to vector.	1	23-04-2022		TLM1,2,4	
5.	R-matrices: accessing elements of a matrix, matrix Computations.	1	25-04-2022		TLM1,2,4	
6.	Matrix computations.	1	26-04-2022		TLM1,2,4	
7.	Matrix computations.	1	29-04-2022		TLM1,2,4	
8.	Revision of UNIT-3 & Assignment-3		30-04-2022		TLM1, 5,6	
No. of classes required to complete UNIT-III: 8				No. of classes taken:		

UNIT-IV: R-arrays & R-Data frames:

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 and Cos, Introduction to Unit-4	1	02-05-2022		TLM1,2	
2.	Introduction to arrays, naming columns and rows, accessing array elements.	1	06-05-2022		TLM1,2,4	
3.	Manipulating array elements,	1	07-05-2022		TLM1,2,4	
4.	Calculations across array elements.	1	09-05-2022		TLM1,2,4	
5.	R-Data frames: Extract data from data frame, expand data frame	1	10-05-2022		TLM1,2,4	
6.	R-Data frames: Extract data from data frame, expand data frame	1	13-05-2022		TLM1,2,4	
7.	R-Packages: R-Data reshaping.	1	13-05-2022		TLM1,2,4	
8.	Revision of UNIT-4 & Assignment-4	1	14-05-2022		TLM1, 5,6	
No. of classes required to complete UNIT-III: 7				No. of classes taken:		

UNIT-V: Graphics & Regression:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HO D Sign Weekly
1.	Introduction to Course and Cos, Introduction to Unit-5	1	16-05-2022		TLM1,2	
2.	R-CSV files, R-Binary files. R-multiple regression,	1	17-05-2022		TLM1,2,4	
3.	R-pie charts, R-bar charts,	1	20-05-2022		TLM1,2,4	
4.	R-mean, median & mode, R-normal distribution,	1	21-05-2022		TLM1,2,4	
5.	R-binomial distribution	1	23-05-2022		TLM1,2,4	
6.	Graphics, Creating Graphs, The Work horse of R Base Graphics,	1	24-05-2022		TLM1,2,4	
7.	The plot () Function Customizing Graphs, Saving Graphs to Files,	1	27-05-2022		TLM1,2,4	
8.	T-Tests, ANOVA. Splines-Decision,	1	28-05-2022		TLM1,2,4	
9.	Random Forests,	1	30-05-2022		TLM1,2,4	
10.	Revision of UNIT-5 & Assignment-5	1	31-05-2022		TLM1,2,4,6	
No. of classes required to complete UNIT-III: 10				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	HOD Sign Weekly
1.	Time series analysis	1	01-06-2022		TLM1,2,5	
2.	Missing data analysis	1	03-06-2022		TLM1,2,5	
		1	04-06-2022		TLM1,2,5	

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

PART-C**EVALUATION PROCESS (R17 Regulations):**

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Course Instructor	Course Coordinator	Module Coordinator	HOD
(Dr. K. Lavanya)	(Dr. K. Lavanya)	(Dr. S. Naganjaneyulu)	(Dr. B, Srinivasa Rao)



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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

PROGRAM : B.Tech. VI-Sem-A., IT
ACADEMIC YEAR : 2021-2022
COURSE NAME & CODE : Automata Theory & Compiler Design –17CI15
L-T-P STRUCTURE : 3-0-0
COURSE CREDITS 3
COURSE INSTRUCTOR : SAMBASIVARAO CHINDAM

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

COURSE OBJECTIVE:

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

COURSE OUTCOMES (CO):

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

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

CO3: Design and implement lexical analyzer and syntax analyzer.

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

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

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

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

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

BOS APPROVED TEXT BOOKS:

- T1** John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.
- T2** Alfred V.Aho,Jeffery Ullman,Ravi sethi,"Compiler Principles, Techniques and Tools",Pearson Education,2ndEdition,2008.

BOS APPROVED REFERENCE BOOKS:

- 1.Sipser —Introduction to Theory of Computation| ,Thomson,2ndEdition
- 2.Mishra and Chandrashekar, |Theory of Computer Science –Automata languages and computation —2nd edition,PHI
- 3.ParagH.Dave, HimanshuB.Dave —Compilers Principles and Practicel , Person Education, First Edition,2012.
4. Andrew W.appel —Modern compiler implementation in C| Cambridge, Revised Edition, 2010.
- 5.<http://nptel.ac.in/courses/111103016/> (Video lectures for Automata theory and formal languages)
- 6.<http://nptel.ac.in/courses/106108052/> (Video lectures for Compilerdesign)

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT – 1: Introduction to Automata and formal language theory, Finite state Machine, Regular expressions**

S. No.	Topics to be covered	No. ofClasses Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1	Basic Mathematical notations and techniques	1	22-02-2022		TLM1	CO1	T1	
2	Classification of Automata, definitions and its applications.	1	24-02-2022		TLM1 TLM4	CO1	T1	
3	Deterministic Finite state Automaton (DFA)	1	26-02-2022		TLM1 TLM4	CO1	T1	
4	Nondeterministic Finite state Automaton (NFA), Equivalence of NFA and	1	03-03-2022		TLM1 TLM4	CO1	T1, R1	

	DFA						
5	Minimization of DFA, examples.	2	05-03-2022 08-03-2022		TLM1 TLM4	CO1	T1, R1
6	Equivalence of Regular expressions and Finite Automata	1	10-03-2022		TLM1 TLM4	CO1	T1, R1
7	Pumping lemma	1	12-03-2022		TLM1 TLM4	CO1	T1, R1
8	Closure properties.	1	15-03-2022		TLM1 TLM4	CO1	T1
9	TUTORIAL – 1		17-03-2022		TLM3	CO1	---
10	Assignment / Quiz – 1		19-03-2022		TLM6	CO1	---
No. of classes required to complete UNIT-I:		9	No. of classes taken:				

UNIT – 2: Introduction to Grammar, Pushdown Automata

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
11	Context free Grammar (CFG)	1	22-03-2022		TLM1 TLM4	CO2	T1	
12	Derivation, parse tree, ambiguity	1	24-03-2022		TLM1 TLM4	CO2	T1	
13	Simplification of CFG	1	26-03-2022		TLM1 TLM4	CO2	T1	
14	Chomsky Normal Form (CNF) and Greibach Normal Form (GNF)	1	29-03-2022		TLM1 TLM4	CO2	T1	
15	Push Down Automata-Definition	1	31-03-2022		TLM1 TLM4	CO2	T1, R2	
16	Equivalence of Context Free Languages.	1	05-04-2022		TLM1 TLM4	CO2	T1, R2	
17	Deterministic Pushdown Automaton.	1	07-04-2022		TLM1	CO2	T1, R2	

					TLM4			
18	Pumping lemma of Context Free languages.	1	09-04-2022		TLM1 TLM4	CO2	T1, R2	
19	Properties of Context Free languages.	1	09-04-2022		TLM1 TLM4	CO2	T1, R2	
20	TUTORIAL – 2		09-04-2022		TLM3	CO2	---	
21	Assignment / Quiz – 2		09-04-2022		TLM6	CO2	---	
No. of classes required to complete UNIT-II:		9	No. of classes taken:					

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
22	Basic Language processing system, phases of a compiler	1	19-04-2022		TLM1 TLM4	CO3	T2, R2	
23	Bootstrapping.	1	21-04-2022		TLM1 TLM4	CO3	T2, R2	
24	The role of a Lexical analyzer, input buffering	1	21-04-2022		TLM1 TLM4	CO3	T2	
25	Specification and Recognition of tokens	1	26-04-2022		TLM1 TLM4	CO3	T2, R2	
26	LEX tool	1	28-04-2022		TLM1 TLM4	CO3	T2, R2	
27	The role of a Parser top down parsing-recursive descent and predictive parsing	2	30-04-2022 05-05-2022		TLM1 TLM4	CO3	T2, R2	
28	Bottom -up parsing-Handle pruning, shift-reduce parsing	1	07-05-2022		TLM1 TLM4		T2, R2	
29	LR parsers-SLR, CLR and	2	10-05-2022		TLM1		T2, R2	

	LALR, YACC tool.				TLM4			
30	TUTORIAL – 3		12-05-2022		TLM3	CO3	---	
31	Assignment / Quiz – 3		12-05-2022		TLM6	CO3	---	
No. of classes required to complete UNIT-III:		10	No. of classes taken:					

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
32	Attribute grammar, Syntax-Directed Definitions (SDD), and Translation schemes	1	14-05-2022		TLM1 TLM4	CO4	T2, R2	
33	Syntax tree, three-address code and static single-Assignment.	1	17-05-2022		TLM1 TLM4	CO4	T2, R3	
34	Translation of expressions and statements.	1	19-05-2022		TLM1 TLM4	CO4	T2, R2	
35	Storage organization	1	21-05-2022		TLM1 TLM4	CO4	T2	
36	Storage allocation strategies	1	24-05-2022		TLM1 TLM4	CO4	T2	
37	Access to non-local data, Parameter passing techniques.	1	24-05-2022		TLM1 TLM4	CO4	T2	
38	TUTORIAL – 4	1	24-05-2022		TLM1 TLM4	CO4	T2	
39	Assignment / Quiz – 4		24-05-2022		TLM1 TLM4	CO4	T2	
No. of classes required to complete UNIT-IV		7	No. of classes taken:					

UNIT – 5: Basics of Code optimization, Code generation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
40	Basic blocks and flow graphs.	1	26-05-2022		TLM1 TLM4	CO5	T2, R2	
41	The principal sources of optimization	1	28-05-2022		TLM1 TLM4	CO5	T2, R4	
42	Optimization of Basic blocks	1	31-05-2022		TLM1 TLM4	CO5	T2, R2	
43	Loops in flow graph	1	02-06-2022		TLM1 TLM4	CO5	T2, R2	
44	Issues in the design of a code generator	1	02-06-2022		TLM1 TLM4	CO5	T2, R6	
45	Generic code generation algorithm	1	02-06-2022		TLM1 TLM4	CO5	T2	
46	Register allocation and assignment	1	04-06-2022		TLM1 TLM4	CO5	T2	
47	DAG representation of basic blocks	1	04-06-2022		TLM1 TLM4	CO5	T2	
48	Peep hole optimization Generating code from DAG.	1	04-06-2022		TLM1 TLM4	CO5	T2,R6	
49	TUTORIAL – 5	1	04-06-2022		TLM3	CO5	---	
50	Assignment / Quiz – 5	1	04-06-2022		TLM6	CO5	---	
No. of classes required to complete UNIT-V		11	No. of classes taken:					

Contents beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
51	Minimization of FSM	1	04-06-2022		TLM1	CO1	T1	
52	LALR related examples	2	04-06-2022		TLM1	CO3	T2	
53	DAG examples	1	04-06-2022		TLM1	CO4	T2	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

Program Educational Objectives (PEOs):

PEO1: Pursue a successful career in the area of Information Technology or its allied fields.

PEO2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.

PEO3: Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.

PEO4: Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication, team work and leadership skills in their job.

Program Outcomes (POs):

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - 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.

PO3 - 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.

PO4 - 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.

PO5 - 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.

PO6 - The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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PO11 - Project Management and Finance: Demonstrate knowledge and understanding of the ring 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.

PO12 - Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

PSO1: Organize, Analyze and Interpret the data to extract meaningful conclusions.

PSO2: Design, Implement and Evaluate a computer-based system to meet desired needs.

PSO3: Develop IT application services with the help of different current engineering tools.

Course Instructor
(Mr. Sambasivarao ch)

Module Coordinator
(Dr. K.Lavanya)

HOD
(Dr. B.Srinivasarao)



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

PROGRAM	: B.Tech. VI-Sem-B., IT
ACADEMIC YEAR	: 2021-2022
COURSE NAME & CODE	: Automata Theory & Compiler Design –17CI15
L-T-P STRUCTURE	: 3-0-0
COURSE CREDITS	3
COURSE INSTRUCTOR	: Dr. ANNAPAREDDY V N REDDY

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

COURSE OBJECTIVE:

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

COURSE OUTCOMES (CO):

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

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

CO3: Design and implement lexical analyzer and syntax analyzer.

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

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

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

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

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

BOS APPROVED TEXT BOOKS:

- T1** John.E .Hopcroft and J.D Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications,1999.
- T2** Alfred V.Aho,Jeffery Ullman,Ravi sethi,"Compiler Principles, Techniques and Tools",Pearson Education,2ndEdition,2008.

BOS APPROVED REFERENCE BOOKS:

- 1.Sipser —Introduction to Theory of Computation| ,Thomson,2ndEdition
- 2.Mishra and Chandrashekar, |Theory of Computer Science –Automata languages and computation —2nd edition,PHI
- 3.ParagH.Dave, HimanshuB.Dave —Compilers Principles and Practicel , Person Education, First Edition,2012.
4. Andrew W.appel —Modern compiler implementation in C| Cambridge, Revised Edition, 2010.
- 5.<http://nptel.ac.in/courses/111103016/> (Video lectures for Automata theory and formal languages)
- 6.<http://nptel.ac.in/courses/106108052/> (Video lectures for Compilerdesign)

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT – 1: Introduction to Automata and formal language theory, Finite state Machine, Regular expressions**

S. No.	Topics to be covered	No. ofClasses Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1	Basic Mathematical notations and techniques	1	21-02-2022		TLM1	CO1	T1	
2	Classification of Automata, definitions and its applications.	1	23-02-2022		TLM1 TLM4	CO1	T1	
3	Deterministic Finite state Automaton (DFA)	1	25-02-2022		TLM1 TLM4	CO1	T1	
4	Nondeterministic Finite state Automaton (NFA), Equivalence of NFA and	1	28-02-2022		TLM1 TLM4	CO1	T1, R1	

	DFA						
5	Minimization of DFA, examples.	2	02-03-2022 04-03-2022		TLM1 TLM4	CO1	T1, R1
6	Equivalence of Regular expressions and Finite Automata	1	07-03-2022		TLM1 TLM4	CO1	T1, R1
7	Pumping lemma	1	09-03-2022		TLM1 TLM4	CO1	T1, R1
8	Closure properties.	1	09-03-2022		TLM1 TLM4	CO1	T1
9	TUTORIAL – 1		11-03-2022		TLM3	CO1	---
10	Assignment / Quiz – 1		11-03-2022		TLM6	CO1	---
No. of classes required to complete UNIT-I:		9	No. of classes taken:				

UNIT – 2: Introduction to Grammar, Pushdown Automata

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
11	Context free Grammar (CFG)	1	14-03-2022		TLM1 TLM4	CO2	T1	
12	Derivation, parse tree, ambiguity	1	16-03-2022		TLM1 TLM4	CO2	T1	
13	Simplification of CFG	1	21-03-2022		TLM1 TLM4	CO2	T1	
14	Chomsky Normal Form (CNF) and Greibach Normal Form (GNF)	1	23-03-2022		TLM1 TLM4	CO2	T1	
15	Push Down Automata-Definition	1	25-03-2022		TLM1 TLM4	CO2	T1, R2	
16	Equivalence of Context Free Languages.	1	28-03-2022		TLM1 TLM4	CO2	T1, R2	
17	Deterministic Pushdown Automaton.	1	30-03-2022		TLM1	CO2	T1, R2	

					TLM4			
18	Pumping lemma of Context Free languages.	1	01-04-2022		TLM1 TLM4	CO2	T1, R2	
19	Properties of Context Free languages.	1	04-04-2022		TLM1 TLM4	CO2	T1, R2	
20	TUTORIAL – 2		06-04-2022		TLM3	CO2	---	
21	Assignment / Quiz – 2		08-04-2022		TLM6	CO2	---	
No. of classes required to complete UNIT-II:		9	No. of classes taken:					

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
22	Basic Language processing system, phases of a compiler	1	18-04-2022		TLM1 TLM4	CO3	T2, R2	
23	Bootstrapping.	1	20-04-2022		TLM1 TLM4	CO3	T2, R2	
24	The role of a Lexical analyzer, input buffering	1	22-04-2022		TLM1 TLM4	CO3	T2	
25	Specification and Recognition of tokens	1	25-04-2022		TLM1 TLM4	CO3	T2, R2	
26	LEX tool	1	27-04-2022		TLM1 TLM4	CO3	T2, R2	
27	The role of a Parser top down parsing-recursive descent and predictive parsing	2	29-04-2022 02-05-2022		TLM1 TLM4	CO3	T2, R2	
28	Bottom -up parsing-Handle pruning, shift-reduce parsing	1	04-05-2022		TLM1 TLM4		T2, R2	
29	LR parsers-SLR, CLR and	2	06-05-2022		TLM1		T2, R2	

	LALR, YACC tool.				TLM4			
30	TUTORIAL – 3		09-05-2022		TLM3	CO3	---	
31	Assignment / Quiz – 3		09-05-2022		TLM6	CO3	---	
No. of classes required to complete UNIT-III:		10	No. of classes taken:					

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
32	Attribute grammar, Syntax-Directed Definitions (SDD), and Translation schemes	1	11-05-2022		TLM1 TLM4	CO4	T2, R2	
33	Syntax tree, three-address code and static single-Assignment.	1	13-05-2022		TLM1 TLM4	CO4	T2, R3	
34	Translation of expressions and statements.	1	16-05-2022		TLM1 TLM4	CO4	T2, R2	
35	Storage organization	1	18-05-2022		TLM1 TLM4	CO4	T2	
36	Storage allocation strategies	1	20-05-2022		TLM1 TLM4	CO4	T2	
37	Access to non-local data, Parameter passing techniques.	1	20-05-2022		TLM1 TLM4	CO4	T2	
38	TUTORIAL – 4	1	23-05-2022		TLM1 TLM4	CO4	T2	
39	Assignment / Quiz – 4		23-05-2022		TLM1 TLM4	CO4	T2	
No. of classes required to complete UNIT-IV		7	No. of classes taken:					

UNIT – 5: Basics of Code optimization, Code generation

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
40	Basic blocks and flow graphs.	1	25-05-2022		TLM1 TLM4	CO5	T2, R2	
41	The principal sources of optimization	1	27-05-2022		TLM1 TLM4	CO5	T2, R4	
42	Optimization of Basic blocks	1	30-05-2022		TLM1 TLM4	CO5	T2, R2	
43	Loops in flow graph	1	01-06-2022		TLM1 TLM4	CO5	T2, R2	
44	Issues in the design of a code generator	1	01-06-2022		TLM1 TLM4	CO5	T2, R6	
45	Generic code generation algorithm	1	01-06-2022		TLM1 TLM4	CO5	T2	
46	Register allocation and assignment	1	03-06-2022		TLM1 TLM4	CO5	T2	
47	DAG representation of basic blocks	1	03-06-2022		TLM1 TLM4	CO5	T2	
48	Peep hole optimization Generating code from DAG.	1	03-06-2022		TLM1 TLM4	CO5	T2,R6	
49	TUTORIAL – 5	1	04-06-2022		TLM3	CO5	---	
50	Assignment / Quiz – 5	1	04-06-2022		TLM6	CO5	---	
No. of classes required to complete UNIT-V		11	No. of classes taken:					

Contents beyond the Syllabus:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
51	Minimization of FSM	1	30-05-2022		TLM1	CO1	T1	
52	LALR related examples	2	01-06-2022 03-06-2022		TLM1	CO3	T2	
53	DAG examples	1	03-06-2022		TLM1	CO4	T2	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

Program Educational Objectives (PEOs):

PEO1: Pursue a successful career in the area of Information Technology or its allied fields.

PEO2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.

PEO3: Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.

PEO4: Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication, team work and leadership skills in their job.

Program Outcomes (POs):

PO1 - Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - 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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PSO1: Organize, Analyze and Interpret the data to extract meaningful conclusions.

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Course Instructor
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(AUTONOMOUS)

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. Anupriya Koneru
 Course Name & Code : Data Mining and Data Warehousing & 17CI16
 L-T-P Structure : 3-1-0 Credits : 3
 Program/Sem/Sec : B.Tech., I.T., VI-Sem., A & B A.Y : 2021-22

PRE-REQUISITE: Database Management Systems

COURSE EDUCATIONAL OBJECTIVES (CEOs): Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply.

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

CO 1	Understand the basic concepts of data warehouse & data mining.	L1
CO 2	Apply data pre-processing, generalization and data characterization techniques to provide suitable input for a range of data mining algorithms.	L2
CO 3	Analyze and provide solutions for real world problems using mining association techniques.	L3
CO 4	Examine the different classification & clustering techniques in data mining.	L2
CO5	Apply data mining techniques to complex data objects like spatial data, multimedia data and web mining.	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	1	-	-	-	-	-	-	-	-	1	3	2	3
CO2	3	3	1	1	1	-	-	-	-	-	-	1	3	2	2
CO3	2	3	3	-	1	1	-	-	-	-	-	2	3	3	3
CO4	3	3	3	1	1	1	-	-	-	-	-	2	3	3	3
CO5	2	3	2	-	-	-	-	-	-	-	-	1	3	3	3

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

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

TEXT BOOKS:

T1 Jiawei Han, Micheline Kamber, Data Mining Concepts and Techniques, 2/e, 2006, Elsevier Publisher (I to V Units).

T2 GK Gupta , Introduction to Data Mining with Case Studies, 2/e, Prentice Hall of India Pvt Limited 2006 (V Unit-Web Mining)

REFERENCE BOOKS:

R1	Pang-Ning tan, Michael Steinbach, Vipin kumar, Introduction to Data Mining, Addison Wesley.
R2	Margaret H. Dunham, Data Mining Introductory and advanced topics, Pearson Education
R3	Arun K Pujari, Data Mining Techniques, University Press.
R4	https://www-users.cs.umn.edu/~kumar001/dmbook/index.php
R5	https://onlinecourses.nptel.ac.in/noc18_cs14/preview

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Data mining and Data warehousing

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 and COs	1	22/02/2022		TLM1/TLM2	
2.	Introduction to Unit-I	1	23/02/2022		TLM1/TLM2	
3.	Fundamentals of data mining	1	24/02/2022		TLM1/TLM2	
4.	Data Mining Functionalities	1	25/02/2022		TLM1/TLM2	
5.	Classification of Data Mining systems	1	2/3/2022		TLM1/TLM2	
6.	Major issues in Data Mining.	1	3/3/2022		TLM1/TLM2	
7.	Data Warehouse	1	4/3/2022		TLM1/TLM2	
8.	Tutorial-I	1	8/3/2022		TLM3	
9.	Multidimensional Data Model	1	9/3/2022		TLM1/TLM2	
10.	Data Warehouse Architecture	1	10/3/2022		TLM1/TLM2	
11.	Data Warehouse Implementation	1	11/3/2022		TLM1/TLM2	
11.	Further Development of Data Cube Technology	1	15/3/2022		TLM1/TLM2	
12.	From Data Warehousing to Data Mining	1	16/3/2022		TLM1/TLM2	
13.	Assignment-I, Tutorial-II	1	17/3/2022		TLM3	
No. of classes required to complete UNIT-I:13				No. of classes taken:		

UNIT-II: Data Preprocessing

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.	Needs Pre-processing the Data	1	22/3/2022		TLM1/TLM2	
2.	Data Cleaning	1	23/3/2022		TLM1/TLM2	
3.	Data Integration and Transformation, Data Reduction	1	24/3/2022		TLM1/TLM2	

4.	Tutorial-III	1	25/3/2022		TLM3	
5.	Discretization and Concept Hierarchy Generation.	1	29/3/2022		TLM1/TLM2	
6.	Data Mining Primitives Data Mining Query Languages	1	30/3/2022		TLM1/TLM2	
7.	Concepts Description	1	31/3/2022		TLM1/TLM2	
8.	Data Generalization and Summarization based Characterization, Analytical Characterization	1	1/4/2022		TLM1/TLM2	
9.	Discriminating between Different Classes	1	6/4/2022		TLM1/TLM2	
10.	Mining Descriptive Statistical measures in Large Databases	1	7/4/2022		TLM1/TLM2	
11.	Tutorial-IV, Assignment-II	1	8/4/2022		TLM3	
No. of classes required to complete UNIT-II:11				No. of classes taken:		

11/04/2022 to 17/04/2022 **MID-I Examination**

UNIT-III: Association Rule Mining

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.	Association Rule Mining: Frequent patterns	1	19/4/2022		TLM1/TLM2	
2.	Apriori algorithm	1	20/4/2022		TLM1/TLM2	
3.	FP Growth algorithm	1	21/4/2022		TLM1/TLM2	
4.	Mining Single-Dimensional Boolean Association Rules from Transactional Databases	1	22/4/2022		TLM1/TLM2	
5.	Mining Multilevel Association Rules from transaction Databases	1	26/4/2022		TLM1/TLM2	
6.	Tutorial-V	1	27/4/2022		TLM3	
7.	Mining Multidimensional Association Rules from Relational Databases	1	28/4/2022		TLM1/TLM2	
8.	From Association Mining to Correlation analysis	1	29/4/2022		TLM1/TLM2	
9.	Constraint based Association Mining	1	3/5/2022		TLM1/TLM2	
10.	Tutorial-VI, Assignment-III	1	4/5/2022		TLM3	
No. of classes required to complete UNIT-III:10				No. of classes taken:		

UNIT-IV : Classification

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	1	5/5/2022		TLM1/TLM2	
2.	Classification and Prediction: Issues Regarding Classification and Prediction	1	6/5/2022		TLM1/TLM2	
3.	Bayesian Classification	1	10/5/2022		TLM1/TLM2	
4.	Classification by Decision Tree Induction	1	11/5/2022		TLM1/TLM2	
5.	Support Vector Machines, Tutorial-VII	1	12/5/2022		TLM1/TLM2/ TLM3	
6.	Classification Based on Concepts from Association Rule Mining	1	13/5/2022		TLM1/TLM2	
7.	Rule based induction algorithm, Prediction,	1	17/5/2022		TLM1/TLM2	
8.	Classifier Accuracy	1	18/5/2022		TLM1/TLM2/TLM3	
9.	Tutorial-VIII, Assignment - IV	1	19/5/2022		TLM3	
No. of classes required to complete UNIT-IV:9				No. of classes taken:		

UNIT-V : Clustering and Applications of data mining

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.	Cluster Analysis: Types of Data in Cluster Analysis	1	20/5/2022		TLM1/TLM2	
2.	A Categorization of Major Clustering Methods	1	24/5/2022		TLM1/TLM2	
3.	Partitioning Methods	1	25/5/2022		TLM1/TLM2	
4.	Density-Based Methods, Grid-Based Methods Tutorial-IX	1	26/5/2022		TLM1/TLM2/ TLM3	
5.	Model-Based Clustering Methods, Outlier Analysis.	1	27/5/2022		TLM1/TLM2	
6.	Applications and Trends in Data Mining: Overview of Data Mining Applications	1	31/5/2022		TLM1/TLM2	
7.	Web data mining: Introduction , Web terminology and characteristics	1	1/6/2022		TLM1/TLM2	
8.	Web content mining, Web usage mining, Web structure mining.	1	2/6/2022		TLM1/TLM2	

9.	Tutorial-X, Assignment-V	1	3/6/2022		TLM3	
No. of classes required to complete UNIT-V:9				No. of classes taken:		

Content beyond the Syllabus:

1.	ETL Tools	3/6/2022		TLM1/TLM2	
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06/06/2022 to 12/06/2022 MID-II Examination

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Course Instructor

(Dr.K.Anupriya)

Module Coordinator

(Mrs.K.Lavanya)

HOD

(Dr. B.Srinivasa Rao)



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

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

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : K.RAVITEJA
Course Name & Code : IMAGE PROCESSING (17CI24)
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech., IT., VI-Sem., A.Y : 2020-21

PRE-REQUISITE: Knowledge of computer graphics

COURSE EDUCATIONAL OBJECTIVES (CEOs): Image processing deals with processing of images which are digital in nature. Study of the subject is motivated by three major applications. The first application is in improvement of pictorial information for human perception i.e. enhancing the quality of the image so that the image will have a better look. The second is for autonomous machine applications which have wider applications in industries, particularly for quality control in assembly automation and many similar applications. This course will introduce various image processing techniques, algorithms and their applications.

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

CO 1	Summarize the fundamentals of digital image processing.
CO 2	Apply image enhancement techniques in spatial domain.
CO 3	Apply restoration and color image processing techniques to improve the fidelity of images.
CO 4	Analyze image compression, morphological image processing techniques for various applications.
CO 5	Evaluate the methodologies for image segmentation.

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

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

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

TEXT BOOKS:

T1 Digital Image Processing Rafeal C. Gonzalez, Richard E. Woods, Pearson Education/PHI, 2nd edition

REFERENCE BOOKS:

R1	Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing, Analysis, and Machine Vision, Thomson Learning, Second Edition
R2	Alasdair Mc. Andrew, Introduction to Digital Image Processing with Matlab, Thomson Course Technology.
R3	Computer Vision and Image Processing, Adrian Low, B.S. Publications, 2nd edition.
R4	Rafeal C. Gonzalez, Richard E. Woods, Steven L. Eddins, Digital Image Processing using Matlab, Pearson Education.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: INTRODUCTION**

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 Subject, Course Outcomes	1	30/03/21		TLM2	
2.	Introduction to UNIT-I	1	01/04/21		TLM2	
3.	Introduction: Examples of fields that use digital image processing	1	03/04/21		TLM2	
4.	Fundamental Steps In Digital Image Processing,	1	03/04/21		TLM2	
5.	Components Of Image Processing System	1	06/04/21		TLM2	
6.	Digital Image Fundamentals: A Simple Image Formation Model	1	10/04/21		TLM2	
7.	Image Sampling And Quantization	1	15/04/21		TLM2	
8.	Basic Relationships Between Pixels	1	17/04/21		TLM2	
9.	Assignment-1/Quiz	1	17/04/21		TLM1	
No. of classes required to complete UNIT-I: 10				No. of classes taken:		

UNIT-II: IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN

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 UNIT-II	1	20/04/21		TLM1	
2.	Image enhancement in the spatial domain: Basic gray-level transformation	1	22/04/21		TLM1	
3.	histogram processing	2	24/04/21 27/04/21		TLM1&2	
4.	enhancement using arithmetic and logic operators	1	27/04/21		TLM1	
5.	basic spatial filtering	1	29/04/21		TLM3	
6.	Smoothing of spatial filters	1	01/05/21		TLM1	
7.	sharpening of spatial filters	2	01/05/21 04/05/21		TLM1	
8.	Assignment/Quiz-2	1	06/05/21		TLM1	
No. of classes required to complete UNIT-II: 10				No. of classes taken:		

UNIT-III: IMAGE RESTORATION AND COLOR IMAGE PROCESSING

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 UNIT-III	1	08/05/21		TLM1	
2.	Image restoration: A model of the image degradation/restoration process	1	11/05/21		TLM1	
3.	noise models	1	13/05/21		TLM1&2	
4.	restoration in the presence of noise –only spatial filtering	2	15/05/21 20/05/21		TLM1	
5.	Weiner filtering	1	22/05/21		TLM1	
6.	constrained least squares filtering	1	25/05/21		TLM1	
7.	Geometric transformations.	1	27/05/21		TLM1	
8.	Introduction to Fourier transform and frequency domain	1	29/05/21		TLM1	
9.	Estimating the degradation function	1	01/06/21		TLM1	
10.	Color fundamentals,Color models	1	03/06/21		TLM1&2	
11.	Color models , Assignment	1	03/06/21		TLM1&2	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV:IMAGE COMPRESSION AND MORPHOLOGICAL IMAGE PROCESSING

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 UNIT-IV, Fundamentals	1	05/06/21		TLM1	
2.	image compression models	1	08/06/21		TLM1	
3.	Lossless Compression	2	10/06/21 12/06/21		TLM3	
4.	Lossy Compression	2	15/06/21 17/06/21		TLM1	
5.	compression standards	1	19/06/21		TLM1&2	
6.	Morphological processing	2	22/06/21 24/06/21		TLM3	
7.	basic morphologic algorithms Assignment	2	26/06/21 29/06/21		TLM1&2	
No. of classes required to complete UNIT-IV: 11				No. of classes taken:		

UNIT-V : IMAGE SEGMENTATION

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.	Image Segmentation: Detection of discontinuous	1	01/07/21		TLM1&2	
2.	Edge Linking and boundary detection	1	03/07/21		TLM1&2	
3.	Threshold	1	06/07/21		TLM1&2	
4.	Region based segmentation	1	08/07/21		TLM1&2	
5.	Assignment , Revision	1	08/07/21		TLM1&2	
No. of classes required to complete UNIT-V: 7				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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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.

Course Instructor
K.Raviteja

Module Coordinator
K.Lavanya

HOD
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DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : A.Sarvani
Course Name & Code : Information Security (17CI20)
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech., IT., VI-Sem. A Secion, **A.Y** : 2020-21

PRE-REQUISITE: Principles of Computer networks, Data transfer mechanisms in Internet. Security aspects in Internet and Data communication networks and storage media

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course elevates the security aspects and provides the knowledge to understand the basic concept of Cryptography and Network Security principles. It antilight's different types of cipher mechanisms and various symmetric and asymmetric algorithms. Also provides the knowledge on digital signatures, different threats, viruses, intruders and firewalls.

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

CO 1	Illustrate the use of private key encryption algorithms for achieving data confidentiality
CO 2	Apply various message authentication approaches in public key encryption to achieve authentication and data integrity
CO 3	Analyze the Email privacy algorithms and elevate the IP security architectural issues and its headers.
CO 4	Understand the web security protocols for achieving secure electronic transactions over the internet.
CO 5	Identify the threats and remedial measures for system security and authorization

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

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

TEXT BOOKS:

T1 William Stallings, Network Security Essentials (Applications and Standards), Pearson Education.

REFERENCE BOOKS:

R1	Stallings, Cryptography and Network Security, PHI/Pearson, Third edition
R2	Whitman, Principles of Information Security, Thomson
R3	Robert Bragg, Mark Rhodes, Network Security: The complete reference, TMH
R4	Buchmann, Springer Introduction to Cryptography

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: INTRODUCTION**

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: Security Services	1	21/2/22		TLM1	
2.	Security Mechanisms	1	23/2/22		TLM1	
3.	A Model for internetwork security	1	25/2/22		TLM1	
4.	Internet standards and RFCs	1	28/2/22		TLM1	
5.	Conventional encryption principals	1	02/3/22		TLM1	
6.	Conventional encryption algorithm(DES, triple DES)	2	04/3/22 05/3/22		TLM1	
7.	Cipher block modes of operation (CBC,CFB)	2	07/3/22 09/3/22		TLM1	
8.	Location of encryption devices	1	11/3/22		TLM1	
9.	Key distribution	1	12/3/22		TLM1	
10.	Approaches to message authentication	1	14/3/22		TLM1	
11.	Secure hash function and HMAC	1	16/3/22		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: PUBLIC -KEY CRYPTOGRAPHY

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.	Public Key Cryptography principles	1	18/3/22		TLM1	
2.	Public key cryptography algorithms	1	19/3/22		TLM1	
3.	Digital Signature	2	21/3/22 23/3/22		TLM1	
4.	Digital certificates	2	25/3/22 26/3/22		TLM1	
5.	Certificate authority and key management	2	28/3/22 02/4/22		TLM1	
6.	Kerberos	2	04/4/22 05/4/22		TLM1	
7.	X.509	1	07/4/22		TLM1	
8.	Directory authentication service	1	09/4/22		TLM1	
No. of classes required to complete UNIT-II: 12				No. of classes taken:		
Mid-I: 11-04-2022 to 16-04-2022						

UNIT-III: EMAIL PRIVACY

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.	Pretty good privacy(PGP)	1	18/4/22		TLM1	
2.	S/MIME	1	20/4/22		TLM1	
3.	IP Security overview	1	22/4/22		TLM1	
4.	IP Security architecture	2	23/4/22 25/4/22		TLM1	
5.	Authentication header	1	27/4/22		TLM1	
6.	Encapsulating security payload	1	29/4/22		TLM1	
7.	Combining Security associations	1	30/4/22		TLM1	
No. of classes required to complete UNIT-III: 08				No. of classes taken:		

UNIT-IV : WEB SECURITY

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.	Web Security Requirements	2	2/5/22 4/5/22		TLM1	
2.	Secure Socket layer(SSL)	2	6/5/22 7/5/22		TLM1	
3.	Transport layer security(TLS)	2	9/5/22 11/5/22		TLM1	
4.	Secure Electronic Transaction(SET)	3	13/5/22 14/5/22 16/5/22		TLM1	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : INTRUDERS

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.	Intruders	2	18/5/22 20/5/22		TLM1	
2.	Viruses	2	21/5/22 23/5/22		TLM1	
3.	Related threats	2	25/5/22 27/5/22		TLM1	
4.	Firewall	2	28/5/22 30/5/22		TLM1	
5.	Design Principles	2	01/06/22 03/06/22		TLM1	
6.	Trusted Systems	1	04/06/22		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		
Mid-II: 06-06-2022 to 11-06-2022						

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Course Instructor
A.Sarvani

Module Coordinator
K.Lavanya

HOD
Dr.B.Srinivasa Rao



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DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : A.Sarvani
Course Name & Code : Information Security (17CI20)
L-T-P Structure : 3-0-0 **Credits: 3**
Program/Sem/Sec : B.Tech., IT., VI-Sem. B Secion, **A.Y** : 2020-21

PRE-REQUISITE: Principles of Computer networks, Data transfer mechanisms in Internet. Security aspects in Internet and Data communication networks and storage media

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course elevates the security aspects and provides the knowledge to understand the basic concept of Cryptography and Network Security principles. It antilight's different types of cipher mechanisms and various symmetric and asymmetric algorithms. Also provides the knowledge on digital signatures, different threats, viruses, intruders and firewalls.

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

CO 1	Illustrate the use of private key encryption algorithms for achieving data confidentiality
CO 2	Apply various message authentication approaches in public key encryption to achieve authentication and data integrity
CO 3	Analyze the Email privacy algorithms and elevate the IP security architectural issues and its headers.
CO 4	Understand the web security protocols for achieving secure electronic transactions over the internet.
CO 5	Identify the threats and remedial measures for system security and authorization

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

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

TEXT BOOKS:

T1 William Stallings, Network Security Essentials (Applications and Standards), Pearson Education.

REFERENCE BOOKS:

R1	Stallings, Cryptography and Network Security, PHI/Pearson, Third edition
R2	Whitman, Principles of Information Security, Thomson
R3	Robert Bragg, Mark Rhodes, Network Security: The complete reference, TMH
R4	Buchmann, Springer Introduction to Cryptography

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: INTRODUCTION**

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: Security Services	1	21/2/22		TLM1	
2.	Security Mechanisms	1	22/2/22		TLM1	
3.	A Model for internetwork security	1	23/2/22		TLM1	
4.	Internet standards and RFCs	1	26/2/22		TLM1	
5.	Conventional encryption principals	1	28/2/22		TLM1	
6.	Conventional encryption algorithm(DES, triple DES)	2	01/3/22 02/3/22		TLM1	
7.	Cipher block modes of operation (CBC,CFB)	2	05/3/22 07/3/22		TLM1	
8.	Location of encryption devices	1	08/3/22		TLM1	
9.	Key distribution	1	09/3/22		TLM1	
10.	Approaches to message authentication	1	12/3/22		TLM1	
11.	Secure hash function and HMAC	1	14/3/22		TLM1	
No. of classes required to complete UNIT-I: 13				No. of classes taken:		

UNIT-II: PUBLIC -KEY CRYPTOGRAPHY

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.	Public Key Cryptography principles	1	15/3/22		TLM1	
2.	Public key cryptography algorithms	1	16/3/22		TLM1	
3.	Digital Signature	2	19/3/22 21/3/22		TLM1	
4.	Digital certificates	2	22/3/22 23/3/22		TLM1	
5.	Certificate authority and key management	2	26/3/22 28/3/22		TLM1	
6.	Kerberos	2	29/3/22 30/3/22		TLM1	
7.	X.509	1	02/4/22		TLM1	
8.	Directory authentication service	1	04/4/22		TLM1	
9.	Revision of Unit-I,II	3	05/4/22 06/4/22 09/4/22			
No. of classes required to complete UNIT-II: 15				No. of classes taken:		
Mid-I: 11-04-2022 to 16-04-2022						

UNIT-III: EMAIL PRIVACY

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.	Pretty good privacy(PGP)	1	18/4/22		TLM1	
2.	S/MIME	1	19/4/22		TLM1	
3.	IP Security overview	1	20/4/22		TLM1	
4.	IP Security architecture	2	23/4/22 25/4/22		TLM1	
5.	Authentication header	1	26/4/22		TLM1	
6.	Encapsulating security payload	1	27/4/22		TLM1	
7.	Combining Security associations	1	30/4/22		TLM1	
No. of classes required to complete UNIT-III: 08				No. of classes taken:		

UNIT-IV : WEB SECURITY

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.	Web Security Requirements	2	2/5/22 3/5/22		TLM1	
2.	Secure Socket layer(SSL)	2	4/5/22 7/5/22		TLM1	
3.	Transport layer security(TLS)	2	9/5/22 10/5/22		TLM1	
4.	Secure Electronic Transaction(SET)	3	11/5/22 14/5/22 16/5/22		TLM1	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : INTRUDERS

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.	Intruders	2	17/5/22 18/5/22		TLM1	
2.	Viruses	2	21/5/22 23/5/22		TLM1	
3.	Related threats	2	24/5/22 25/5/22		TLM1	
4.	Firewall	2	28/5/22 30/5/22		TLM1	
5.	Design Principles	2	31/05/22 01/06/22		TLM1	
6.	Trusted Systems	1	04/06/22		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		
Mid-II: 06-06-2022 to 11-06-2022						

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

PART-C

EVALUATION PROCESS (R17 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Course Instructor
A.Sarvani

Module Coordinator
K.Lavanya

HOD
Dr.B.Srinivasa Rao



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

COURSE HANDOUT

Part-A

PROGRAM	:	B.Tech.(IT), V-Semester
ACADEMIC YEAR	:	2021-2022
COURSE CODE&NAME	:	17IT91 &Network Programming
L-T-P STRUCTURE	:	3 - -
COURSE CREDITS	:	3
COURSE INSTRUCTOR	:	Rajasekhar Kommaraju
PRE-REQUISITES	:	Communication systems, Computer Networks

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn:

In this course, students will learn about Protocols, UNIX standards, the OSI model, TCP connection establishment and format. Socket addresses structures. Elementary UDP sockets and Inter process communication.

COURSE OUTCOMES (COs):

On successful completion of the course, students will be able to:

CO 1	Analyze the requirements of a networked programming environment and identify the issues to be solved
CO 2	Construct Network Programming by using TCP Sockets.
CO 3	Understand basic concepts of I/O Multiplexing and Socket Options.
CO 4	Construct Network Programming by using UDP Sockets.
CO 5	Implement Inter Process Communication Tools.

Course Articulation Matrix (Correlation between COs&POs,PSOs):

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

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

BOS APPROVED TEXT BOOKS:

T1 UNIX Network Programming, Vol. I, Sockets API, 2nd Edition- W.Richard Stevens.

T2 UNIX Network Programming, 1st Edition,- W. Richard Stevens. PHI

BOS APPROVED REFERENCE BOOKS:

R1 UNIX Systems Programming using C++ T CHAN, PHI

R2 UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education

R3 Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: INTRODUCTION TO NETWORK 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
1.	Discussion of Cos and CEOs of the course	1	21-02-2022		TLM2	
2.	Introduction to Network Programming	1	22-02-2022		TLM2	
3.	Reference models: ISO OSI model, TCP/IP model	1	23-02-2022		TLM2/ TLM1	
4.	Reference models: ISO OSI model, TCP/IP model	1	28-02-2022		TLM2/ TLM1	
5.	TCP Connection Establishment and Format	1	02-03-2022		TLM2/ TLM1	
6.	UNIX Standards, TCP and UDP	2	07-03-2022		TLM2	
7.	UNIX Standards, TCP and UDP		08-03-2022		TLM2	
8.	Buffer Sizes and Limitations	2	09-03-2022		TLM2	
9.	Standard Internet Services		14-03-2022		TLM2	
10.	Protocol usage by Common Internet Application	1	15-03-2022		TLM2	
11.	TUTORIAL-1, Quiz-1 & Assignment-1	1	16-03-2022		TLM3	
No. of classes required to complete UNIT-I		11				

UNIT-II: Sockets and TCP Client Server

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12	Introduction to Sockets	1	21-03-2022		TLM2	
13	Address structures, value – Result Arguments	1	22-03-2022		TLM2	
14	Byte Ordering and Manipulation Function	1	23-03-2022		TLM2	
15	Related Functions Elementary TCP Sockets	1	28-03-2022		TLM2	
16	Socket, connect, bind, listen, and accept, fork and exec functions	1	29-03-2022		TLM2	
18	Concurrent servers. Close function and Related function	1	30-03-2022		TLM2	

19	Introduction to TCP client Server, TCP Echo Server Functions, Normal Start-up	1	04-04-2022		TLM2	
20	Crashing and Rebooting of Server Host Shutdown of Server Host	1	05-04-2022		TLM2	
21.	TUTORIAL-2, Quiz-2 ASSIGNMENT-2	1	06-04-2022		TLM3	
No. of classes required to complete UNIT-II		09				

UNIT-III: I/O Multiplexing and socket options:

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22	I/O Models, Select Function, Batch Input, Shutdown Function	1	18-04-2022		TLM2/ TLM1	
23	Poll function, TCP Echo Server, getsockopt and setsockopt Functions	1	19-04-2022		TLM2/ TLM1	
24	Poll function, TCP Echo Server, getsockopt and setsockopt Functions	1	20-04-2022		TLM2/ TLM1	
25	Socket States, Generic Socket Option, IPV6 Socket Option	1	25-04-2022		TLM2	
26	Socket States, Generic Socket Option, IPV6 Socket Option	1	26-04-2022		TLM2	
27	ICMPV6 Socket Option IPV6 socket option	1	27-04-2022		TLM2	
28	ICMPV6 Socket Option IPV6 socket option, TCP socket options.	1	02-05-2022		TLM2	
29	TUTORIAL-3, Quiz-3 ASSIGNMENT-3	1	04-05-2022		TLM2	
No. of classes required to complete UNIT-III		08				

UNIT-IV: Elementary UDP sockets and Elementary Name and Address Conversions:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30	Introduction UDP Echo Server Function, Lost Datagram, Summary of UDP Example	1	09-05-2022		TLM2/ TLM1	
31	Lack of Flow Control with UDP	1	10-05-2022		TLM2/ TLM1	
32	Determining Outgoing Interface with UDP	1	11-05-2022		TLM2/ TLM1	
33	Elementary Name and Address Conversions	1	16-05-2022		TLM2	
34	DNS	1	17-05-2022		TLM2	
35	get host by Name function, Resolver option	1	18-05-2022		TLM2	

37	TUTORIAL4, Quiz-4 ASSIGNMENT-4	1	23-05-2022		TLM3		
No. of classes required to complete UNIT-IV		07					

UNIT-V: PRESENTATION AND APPLICATION LAYER PROTOCOLS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
38	Introduction to IPC, File and Record Locking	1	24-05-2022		TLM2/ TLM1		
39	Pipes, FIFOs Streams and Messages	1	25-05-2022		TLM2/ TLM1		
40	Name Spaces, System IPC	1	30-05-2022		TLM2/ TLM1		
41	Message Queues, Semaphores	1	31-05-2022		TLM2/ TLM1		
42	TUTORIAL-5, Quiz-5 ASSIGNMENT-5	1	01-06-2022		TLM3		
No. of classes required to complete UNIT-V		05					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign
43.	DNS, N/W Layer Design Issues	1	01-06-2022		TLM2	

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

Part - C

EVALUATION PROCESS:

Evaluation Task	Units	Marks
Assignment- 1	1	A1=5
Assignment- 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment- 3	3	A3=5
Assignment- 4	4	A4=5

Assignment- 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg (Best of Four (A1, A2, A3, A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations: E	1,2,3,4,5	60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	21-02-2022		
I Phase of Instructions	21-02-2022	09-04-2022	7W
I Mid Examinations	11-04-2022	16-04-2022	1W
II Phase of Instructions	18-04-2022	04-06-2022	7W
II Mid Examinations	06-06-2022	11-06-2022	1W
Preparation and Practical's	13-06-2022	18-06-2022	1W
Semester End Examinations	20-06-2022	02-07-2022	2W

Program Educational Objectives (PEOs):

PEO1: Pursue a successful career in the area of Information Technology or its allied fields.

PEO2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.

PEO3: Demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.

PEO4: Understand the professional code of ethics and demonstrate ethical behavior, effective communication, teamwork and leadership skills in their job.

PROGRAM OUTCOMES (POS):

PO1 - Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3 - Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

PO4 - Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5 - 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.

PO6 - The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal cultural issues and the consequent responsibilities relevant to the professional

engineering practice.

PO7 - Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9 - Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

PO10 - 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.

PO11 - Project Management and Finance: Demonstrate knowledge and understanding of 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.

PO12 - 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)

PSO1 Organize, Analyze and Interpret the data to extract meaningful conclusions.

PSO2 Design, Implement and Evaluate a computer-based system to meet desired needs.

PSO3 Develop IT application services with the help of different current engineering tools.

	Course Instructor	Course Coordinator	Module Coordinator	HOD
Signature				
Name of the Faculty	K. Rajasekhar	K. Rajasekhar	Dr.K. Anupriya	Dr. B. SrinivasaRao



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

COURSE HANDOUT

Part-A

PROGRAM	:	B.Tech.(IT), V-Semester
ACADEMIC YEAR	:	2021-2022
COURSE CODE&NAME	:	17IT91 &Network Programming
L-T-P STRUCTURE	:	3 - -
COURSE CREDITS	:	3
COURSE INSTRUCTOR	:	Rajasekhar Kommaraju
PRE-REQUISITES	:	Communication systems, Computer Networks

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn:

In this course, students will learn about Protocols, UNIX standards, the OSI model, TCP connection establishment and format. Socket addresses structures. Elementary UDP sockets and Inter process communication.

COURSE OUTCOMES (COs):

On successful completion of the course, students will be able to:

CO 1	Analyze the requirements of a networked programming environment and identify the issues to be solved
CO 2	Construct Network Programming by using TCP Sockets.
CO 3	Understand basic concepts of I/O Multiplexing and Socket Options.
CO 4	Construct Network Programming by using UDP Sockets.
CO 5	Implement Inter Process Communication Tools.

Course Articulation Matrix (Correlation between COs&POs,PSOs):

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

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

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T2 UNIX Network Programming, 1st Edition,- W. Richard Stevens. PHI

BOS APPROVED REFERENCE BOOKS:

R1 UNIX Systems Programming using C++ T CHAN, PHI

R2 UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education

R3 Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: INTRODUCTION TO NETWORK 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
1.	Discussion of Cos and CEOs of the course	1	23-02-2022		TLM2	
2.	Introduction to Network Programming	1	24-02-2022		TLM2	
3.	Reference models: ISO OSI model, TCP/IP model	1	26-02-2022		TLM2/ TLM1	
4.	Reference models: ISO OSI model, TCP/IP model	1	02-03-2022		TLM2/ TLM1	
5.	TCP Connection Establishment and Format	1	03-03-2022		TLM2/ TLM1	
6.	UNIX Standards, TCP and UDP	2	05-03-2022		TLM2	
7.	UNIX Standards, TCP and UDP		09-03-2022		TLM2	
8.	Buffer Sizes and Limitations	2	10-03-2022		TLM2	
9.	Standard Internet Services		12-03-2022		TLM2	
10.	Protocol usage by Common Internet Application	1	16-03-2022		TLM2	
11.	TUTORIAL-1, Quiz-1 & Assignment-1	1	17-03-2022		TLM3	
No. of classes required to complete UNIT-I		11				

UNIT-II: Sockets and TCP Client Server

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12	Introduction to Sockets	1	19-03-2022		TLM2	
13	Address structures, value – Result Arguments	1	23-03-2022		TLM2	
14	Byte Ordering and Manipulation Function	1	24-03-2022		TLM2	
15	Related Functions Elementary TCP Sockets	1	26-03-2022		TLM2	
16	Socket, connect, bind, listen, and accept, fork and exec functions	1	30-03-2022		TLM2	
18	Concurrent servers. Close function and Related function	1	31-03-2022		TLM2	

19	Introduction to TCP client Server, TCP Echo Server Functions, Normal Start-up	1	06-04-2022		TLM2	
20	Crashing and Rebooting of Server Host Shutdown of Server Host	1	07-04-2022		TLM2	
21.	TUTORIAL-2, Quiz-2 ASSIGNMENT-2	1	09-04-2022		TLM3	
No. of classes required to complete UNIT-II		09				

UNIT-III: I/O Multiplexing and socket options:

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22	I/O Models, Select Function, Batch Input, Shutdown Function	1	20-04-2022		TLM2/ TLM1	
23	Poll function, TCP Echo Server, getsockopt and setsockopt Functions	1	21-04-2022		TLM2/ TLM1	
24	Poll function, TCP Echo Server, getsockopt and setsockopt Functions	1	23-04-2022		TLM2/ TLM1	
25	Socket States, Generic Socket Option, IPV6 Socket Option	1	27-04-2022		TLM2	
26	Socket States, Generic Socket Option, IPV6 Socket Option	1	28-04-2022		TLM2	
27	ICMPV6 Socket Option IPV6 socket option	1	30-04-2022		TLM2	
28	ICMPV6 Socket Option IPV6 socket option, TCP socket options.	1	04-05-2022		TLM2	
29	TUTORIAL-3, Quiz-3 ASSIGNMENT-3	1	05-05-2022		TLM2	
No. of classes required to complete UNIT-III		08				

UNIT-IV: Elementary UDP sockets and Elementary Name and Address Conversions:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30	Introduction UDP Echo Server Function, Lost Datagram, Summary of UDP Example	1	07-05-2022		TLM2/ TLM1	
31	Lack of Flow Control with UDP	1	11-05-2022		TLM2/ TLM1	
32	Determining Outgoing Interface with UDP	1	12-05-2022		TLM2/ TLM1	
33	Elementary Name and Address Conversions	1	14-05-2022		TLM2	
34	DNS	1	18-05-2022		TLM2	
35	get host by Name function, Resolver option	1	19-05-2022		TLM2	
37	TUTORIAL4, Quiz-4 ASSIGNMENT-4	1	21-05-2022		TLM3	
No. of classes required to complete		07				

UNIT-IV	
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UNIT-V: PRESENTATION AND APPLICATION LAYER PROTOCOLS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
38	Introduction to IPC, File and Record Locking	1	25-05-2022		TLM2/ TLM1		
39	Pipes, FIFOs Streams and Messages	1	26-05-2022		TLM2/ TLM1		
40	Name Spaces, System IPC	1	28-05-2022		TLM2/ TLM1		
41	Message Queues, Semaphores	1	01-06-2022		TLM2/ TLM1		
42	TUTORIAL-5, Quiz-5 ASSIGNMENT-5	1	02-06-2022		TLM3		
No. of classes required to complete UNIT-V		05					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign
43.	DNS, N/W Layer Design Issues	1	04-06-2022		TLM2	

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

Part - C

EVALUATION PROCESS:

Evaluation Task	Units	Marks
Assignment- 1	1	A1=5
Assignment- 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment- 3	3	A3=5
Assignment- 4	4	A4=5

Assignment- 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg (Best of Four (A1, A2, A3, A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max (B1, B2) +25% of Min (B1, B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination: A+B+C+D	1,2,3,4,5	40
Semester End Examinations: E	1,2,3,4,5	60
Total Marks: A+B+C+D+E	1,2,3,4,5	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	21-02-2022		
I Phase of Instructions	21-02-2022	09-04-2022	7W
I Mid Examinations	11-04-2022	16-04-2022	1W
II Phase of Instructions	18-04-2022	04-06-2022	7W
II Mid Examinations	06-06-2022	11-06-2022	1W
Preparation and Practical's	13-06-2022	18-06-2022	1W
Semester End Examinations	20-06-2022	02-07-2022	2W

Program Educational Objectives (PEOs):

PEO1: Pursue a successful career in the area of Information Technology or its allied fields.

PEO2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real world problems.

PEO3: Demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.

PEO4: Understand the professional code of ethics and demonstrate ethical behavior, effective communication, teamwork and leadership skills in their job.

PROGRAM OUTCOMES (POS):

PO1 - Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2 - Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3 - Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

PO4 - Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5 - 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.

PO6 - The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal cultural issues and the consequent responsibilities relevant to the professional

engineering practice.

PO7 - Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

PO8 - Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9 - Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

PO10 - 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.

PO11 - Project Management and Finance: Demonstrate knowledge and understanding of 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.

PO12 - 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)

PSO1 Organize, Analyze and Interpret the data to extract meaningful conclusions.

PSO2 Design, Implement and Evaluate a computer-based system to meet desired needs.

PSO3 Develop IT application services with the help of different current engineering tools.

	Course Instructor	Course Coordinator	Module Coordinator	HOD
Signature				
Name of the Faculty	K. Rajasekhar	K. Rajasekhar	Dr.K. Anupriya	Dr. B. SrinivasaRao

**DEPARTMENT OF INFORMATION TECHNOLOGY****COURSE HANDOUT****PART-A**

Name of Course Instructor	: Mr. S. PRAVEEN KUMAR	
Course Name	: OOSE	Code : 17IT05
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech.(IT), VI-Sem., Sections-A,B	A.Y : 2021-22

PRE-REQUISITE: Object orientation techniques and software engineering.

COURSE EDUCATIONAL OBJECTIVES (CEOs): Object-Oriented Software Development is an approach/paradigm of developing software by identifying and implementing a set of objects and their interactions to meet the desired objectives. The first step towards this kind of software development is to learn and master the various concepts, tools and techniques that are to be used design and implementation of such systems.

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

CO 1	Explore the fundamental principles underlying Object-Oriented software design.
CO 2	Design formal methods to produce effective software designs as solutions to specific tasks.
CO 3	Develop structured sets of simple user-defined classes using Object-Oriented principles to achieve overall programming goals.
CO 4	Apply error identification techniques and testing strategies for code development.
CO5	Analyze assignments, within the specified parameters and to a professional standard.

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

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

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

TEXT BOOKS:

1. Roger S Pressman, —Software Engineering -A Practitioner's Approach, The McGraw Hill Publications V edition
2. J. Rumbauch. M Blaha, W.Premieriani. F Eddy, W.Lorensen, "Object-Oriented Modeling and Design, Prentice Hall, 1991.

REFERENCE BOOKS:

1. Jacobson M. Christerson, P.Jousson, G.Overgaard: "Object-Oriented Software Engineering", A Use Case driven approach, Addison-Wesley , 1992.
2. Waman S Jawadekar: "Software Engineering Principles and Practicel. The McGraw Hill Publications V edition.

E-Books and Online Course Materials:

1. https://catalyst.library.jhu.edu/catalog/bib_5713353
2. https://catalyst.library.jhu.edu/catalog/bib_5712813.
3. <https://edutechlearners.com/download/books/OOSE/OOAD.pdf>
4. <https://www.academia.edu/13327216/OOSE>
5. <https://lecturenotes.in/m/22249-note-of-object-oriented-software-engineering-by-mohd-waseem>
6. <http://www.imit.ac.in/note/se.pdf>

Online Courses and Video Lectures:

1. NPTEL COURSE : Object Oriented Analysis and Design
2. https://onlinecourses.nptel.ac.in/noc20_cs59/

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: UNIT I: INTRODUCTION TO OBJECT ORIENTATION.

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.	Real-world Domains: Generalized Object-Oriented Software Development Cycle	1	23/2/2022		TLM2	
2.	Object Oriented Programming Language	1	24/2/2022		TLM2	
3.	Object – Oriented Analysis	1	26/2/2022		TLM2	
4.	Object – Oriented Analysis of a Real-World Domain Object Model.	1	2/2/2022			
5.	Object Model for Object – Oriented Analysis of a Real-World Domain Object Model.	1	3/3/2022		TLM2	
6.	The Notion of Encapsulation and Information Hiding.	1	5/3/2022		TLM2	
7.	Object Identity: Entity and Attributes,	1	9/3/2022		TLM2	
8.	Data and knowledge: The Notion of Inheritance	1	10/3/2022		TLM2	
9.	Relationship between Objects: Association, Generalization / Specialization, Aggregation,	1	12/3/2022		TLM2	
10	Object and States. Dynamic behaviour of objects	1	16/3/2022		TLM2	
No. of classes required to complete UNIT-I:			10	No. of classes taken: 10		

UNIT-II: OBJECT-ORIENTED ANALYSIS

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.	IntroductionToObject – Oriented Analysis	1	17/3/2022		TLM2	
2.	Techniques for Information gathering for RA	1	19/3/2022		TLM2	
3.	Use case driven Object-Oriented analysis,	1	23/3/2022		TLM2	
4.	concepts and principles. Identifying the elements of an Object model,	1	24/3/2022		TLM2	
5.	Management of Object – Oriented software projects.	1	26/3/2022		TLM2	
6.	Object oriented analysis, domain analysis	1	30/3/2022		TLM2	
7.	generic components of Object- Oriented analysis model	1	31/3/2022		TLM2	
8.	object behavior model.	1	2/4/2022		TLM2	
No. of classes required to complete UNIT-II :			18	No. of classes taken:18		

UNIT-III: UNIT III: OBJECT-ORIENTED SYSTEM DESIGN

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.	IntroductionTo Object-Oriented design	1	6/4/2022		TLM2	
2.	System design concepts and the Object-Oriented Approach	1	7/4/2022		TLM2	
3.	Conventional versus Object –Oriented approaches,	1	9/4/2022		TLM2	
4.	Design issues, the generic components of the Object – Oriented design model,	1	13/4/2022		TLM2	
5.	the system design process, the object design process, Object –Oriented Design landscape,	1	16/4/2022		TLM2	
6.	Useful design patterns,	1	20/4/2022		TLM2	
7.	Object-Oriented design process, Design patterns.	1	21/4/2022		TLM2	
No. of classes required to complete UNIT-III : 7				No. of classes taken: 7		

UNIT-IV : OBJECT ORIENTED TESTING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Testing Object – Oriented Analysis and Object – Oriented Design models	1	23/4/2022		TLM2	
2.	Object-Oriented testing strategies,	1	27/4/2022		TLM2	
3.	Test case design for Object – Oriented software	1	28/4/2022		TLM2	
4.	testing methods applicable at the class level, interclass test case design.	1	30/4/2022		TLM2	
5.	Technical metrics for Object –Oriented Systems: The intent of Object- Oriented metrics,	1	4/5/2022		TLM2	
6.	the distinguishing characteristics, and metrics for the Object-Oriented design model,	1	5/5/2022		TLM2	
7.	class oriented metrics, operation oriented metrics,	1	7/5/2022		TLM2	
8.	metrics for object oriented testing, metrics for Object - Oriented projects.	1	11/5/2022		TLM2	
No. of classes required to complete UNIT-IV: 8				No. of classes taken: 8		

UNIT-V : OBJECT-ORIENTED PROGRAMMING PARADIGM

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.	Object-Oriented Support of software Qualities	1	12/5/2022		TLM2	
2.	Data Abstraction and Encapsulation	1	14/5/2022		TLM2	
3.	support for Reuse class design	1	18/5/2022		TLM2	
4.	guidelines morphism and polymorphism	1	20/5/2022		TLM2	
5.	Binding, Overloading, Overriding	1	21/5/2022		TLM2	
6.	Object-Life Cycle.	1	25/5/2022		TLM2	
7.	Persistent Objects Introduction to Object- Oriented Databases	1	27/5/2022		TLM2	
8.	Object Oriented Programming Environments,	1	28/5/2022		TLM2	
9.	comparison between C++, Java and C#.	1	1/6/2022		TLM2	
10.	Revision	1	3/6/2022		TLM2	
No. of classes required to complete UNIT-V : 10				No. of classes taken: 10		

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.	OOSE – Research Papers Presentation	2			TLM5	
2.	Seminar on Software Engineering in Real world Technologies application	5			TLM5	

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

PART-C

EVALUATION PROCESS (R20 Regulations):

<i>Evaluation Task</i>	<i>Marks</i>
<i>Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))</i>	<i>A1=5</i>
<i>I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))</i>	<i>M1=15</i>
<i>I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))</i>	<i>Q1=10</i>
<i>Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)</i>	<i>A2=5</i>
<i>II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)</i>	<i>M2=15</i>
<i>II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)</i>	<i>Q2=10</i>
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):

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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.
PO3	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.
PO4	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.
PO5	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
PO6	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
PO7	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.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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.
PO11	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.
PO12	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):

PSO1	Organize, Analyze and interpret the data to extract meaningful conclusions.
PSO2	Design, Implement and Evaluate a computer-based system to meet desired needs
PSO3	Develop IT application services with the help of different current engineering tools.

<i>Title</i>	<i>Course Instructor</i>	<i>Course Coordinator</i>	<i>Module Coordinator</i>	<i>Head of the Department</i>
<i>Name of the Faculty</i>	<i>Mr.S.Praveen Kumar</i>	<i>Mr.S.Praveen Kumar</i>	<i>Dr. B. Rama Devi</i>	<i>Dr. B. Srinivasa Rao</i>
<i>Signature</i>				



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

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

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : K.Rajasekhar
 Course Name & Code : Object Oriented Software Engineering & 17IT05
 L-T-P Structure : 3-0-0 Credits : 3
 Program/Sem/Sec : B.Tech., IT., VI-Sem., Sections- A A.Y : 2020-21

PRE-REQUISITE: Software Engineering and Object Oriented Analysis and Design

COURSE OBJECTIVE: Object-Oriented Software Development is an approach/paradigm of developing software by identifying and implementing a set of objects and their interactions to meet the desired objectives. The first step towards this kind of software development is to learn and master the various concepts, tools and techniques that are to be used design and implementation of such systems.

COURSE OUTCOMES (CO)

CO1: Explore the fundamental principles underlying Object-Oriented software design.

CO2: Design formal methods to produce effective software designs as solutions to specific tasks.

CO3: Develop structured sets of simple user-defined classes using Object-Oriented principles to achieve overall programming goals.

CO4: Apply error identification techniques and testing strategies for code development.

CO5: Analyze assignments, within the specified parameters and to a professional standard

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

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

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

BOS APPROVED TEXT BOOKS:

T1 Roger S Pressman, —Software Engineering -A Practitioner’s Approach, The McGraw Hill Publications V edition.

T2 J. Rumbauch. M Blaha, W.Premeriani. F Eddy, W.Lorensen, “Object-Oriented Modeling and Design”, Prentice Hall, 1991.

BOS APPROVED REFERENCE BOOKS:

R1 Waman S Jawadekar: “Software Engineering Principles and Practice”, The McGraw Hill Publications V edition.

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

UNIT-I: Software engineering Concepts, UML Overview and modeling concepts

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 Subject	1	30-03-21		TLM1	
2.	Course Outcomes	1	01-04-21		TLM1	
3.	Generalized Object-Oriented Software Development Cycle, Object Oriented Programming Language.	1	03-04-21		TLM1	
4.	System Concepts	1	06-04-21		TLM1	
5.	Software engineering Concepts	1	08-04-21		TLM1	
6.	Object – Oriented Analysis of a Real-World Domain Object Model.	1	10-04-21		TLM1	
7.	Object Identity: Entity and Attributes, Data and knowledge: The Notion of Inheritance	1	15-04-21		TLM1	
8.	Unified Modelling Language Overview	1	17-04-21		TLM1	
9.	TUTORIAL-1	1	20-04-21		TLM3	
10.	Relationship between Objects: Association, Generalization / Specialization, Aggregation, Object and States. Dynamic behaviour of objects.	1	22-04-21		TLM1	
11.	Project Organization-communication	1	24-04-21		TLM1	
12.	Assignment/Quiz-1	1	27-04-21		TLM6	
No. of classes required to complete UNIT-I:				No. of classes taken:		

UNIT-II: Requirements Elicitation Concepts, Analysis concepts and CaseStudies.

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Object – Oriented Analysis: Introduction, Techniques for Information gathering for RA	1	29-04-21		TLM1	
14.	Use case driven Object-Oriented analysis, concepts and principles.	1	01-05-21		TLM1	
15.	Identifying the elements of an Object model, Management of Object – Oriented software projects.	1	04-05-21		TLM9	
16.	Object oriented analysis, domain analysis	1	06-05-21		TLM2	
17.	Managing Analysis	1	08-05-21		TLM1	

18.	Generic components of Object-Oriented analysis model, object behavior model.	1	13-05-21		TLM9	
19.	Assignment/Quiz-2, TUTORIAL-2	1	15-05-21		TLM6	
No. of classes required to complete UNIT-II:				No. of classes taken:		

UNIT-III: System Design

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	Introduction to UNIT-III, Object-Oriented design introduction: System design concepts and the Object-Oriented Approach	1	18-05-21		TLM1	
21.	Conventional versus Object – Oriented approaches, Design issues, the generic components of the Object – Oriented design model	1	20-05-21		TLM1	
22.	The system design process, the object design process	1	22-05-21		TLM1	
23.	Object –Oriented Design landscape, Useful design patterns	1	25-05-21		TLM2	
24.	Object-Oriented design process, Design patterns.	1	27-05-21		TLM2	
25.	Managing System Design	1	29-05-21		TLM1	
26.	Case Study	1	01-06-21		TLM1	
27.	TUTORIAL-3 ,Assignment/Quiz-3	1	03-06-21		TLM3	
No. of classes required to complete UNIT-III:				No. of classes taken:		

UNIT-IV: OBJECT DESIGN AND IMPLEMENTATION ISSUES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	Introduction to UNIT-IV, – Oriented Analysis and Object – Oriented Design models	1	05-06-21		TLM1	
29.	Object-Oriented testing strategies, Test case design for Object – Oriented software	1	08-06-21		TLM2	
30.	testing methods applicable at the class level, interclass test case design	1	10-06-21		TLM9	
31.	Technical metrics for Object – Oriented Systems: The intent of Object- Oriented metrics	1	12-06-21		TLM2	
32.	The distinguishing characteristics, and metrics for the Object-Oriented design model	1	12-06-21		TLM2	
33.	class oriented metrics, operation oriented metrics	1	14-06-21		TLM1	
34.	Metrics for object oriented testing, metrics for Object - Oriented projects.	1	14-06-21		TLM1	

35.	TUTORIAL-4, Assignment/Quiz-4	1	15-06-21		TLM3	
No. of classes required to complete UNIT-IV:				No. of classes taken:		

UNIT-V: MANAGING CHANGE

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 UNIT-V, Object-Oriented Support of software Qualities Data Abstraction and Encapsulation	1	16-06-21		TLM2	
37.	support for Reuse class design, guidelines polymorphism and polymorphism	1	17-06-21		TLM2	
38.	Binding, Overloading, Overriding Object-Life Cycle	1	17-06-21		TLM2	
39.	Persistent Objects Introduction to Object- Oriented Databases Object Oriented Programming Environments	1	18-06-21		TLM2	
40.	Comparison between C++, Java and C#.	1	18-06-21		TLM1	
41.	TUTORIAL-5, Assignment/Quiz-5	1	18-06-21		TLM3	
No. of classes required to complete UNIT-V:				No. of classes taken:		

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Types of Testing	1	19-06-21		TLM1	
43.	White Box Testing	1	19-06-21		TLM1	
44.	Black Box Testing	1	19-06-21		TLM1	

Teaching Learning Methods

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

PART-C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20

Evaluation of Assignment/Quiz Marks: $A=(A1+A2+A3+A4+A5)/5$	1,2,3,4,5	A=5
Evaluation of Mid Marks: $B=75\%$ of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	1,2,3,4,5	A+B=25
Semester End Examinations	1,2,3,4,5	C=75
Total Marks: A+B+C	1,2,3,4,5	100

PART-D

PROGRAMME OUTCOMES (POs):

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

K. Rajasekhar	Dr. B.Ramadevi	Dr. B.SrinivasaRao
Course Instructor	Module Coordinator	HOD



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

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

L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr. K. Lavanya
Course Name & Code : R Programming Lab & 17IT63
L-T-P Structure : 0-0-2 Credits : 1
Program/Sem/Sec : B.Tech., IT., VI-Sem.,B A.Y : 2021-22

PRE-REQUISITE: Mathematics.

Course Educational Objective: In this course student will learn about the fundamentals of R programming and the standard R libraries, solid understanding of R functions, write programs using the R and gain skills in R programming Language, get acquaintances with Arrays, Files, Strings, Packages, and distributions using R.

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

CO 1	Develop the programs using basic concepts of R programming, and its different modules that includes conditional, looping, lists, Strings, Functions, Frames, and Arrays.
CO 2	Design the programs to handle the data using data frames and files.
CO 3	Apply different statistical tests on data using various packages.
CO4	Improve individual / team work 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	-	-	-	3	-	-	-	-	-	-	1	3	1	-
CO2	2	2	3	-	3	-	-	-	-	-	-	1	3	3	-
CO3	2	3	3	3	3	-	-	-	-	-	-	1	3	3	2
CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-

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

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

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

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.	Week 0	2	24/02/2022		TLM4	
2.	Week 1	2	03/03/22		TLM4	
3.	Week 2	2	10/03/22		TLM4	
4.	Week 3	2	17/03/22		TLM4	
5.	Week 4	2	24/03/22		TLM4	
6.	Week 5	2	31/03/22		TLM4	
7.	Week 6	2	07/04/22		TLM4	
8.	Week 7	2	21/04/22		TLM4	
9.	Week 8	2	28/04/22		TLM4	
10.	Week 9	2	05/05/22		TLM4	
11.	Week 10	2	12/05/22		TLM4	
12.	Week 11	2	19/05/22		TLM4	
13.	Week 12	2	26/05/22		TLM4	
14.	Week 13	2	02/06/22		--	

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

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Day-to-day work	D1=05
Record	R1=05
Internal Test	IT1=5
Continuous Internal Evaluation(CIE)=D1+R1+IT1	15
	P1=5

Procedure/Algorithm	
Experimentation/Program execution	E1=10
Observations/Calculations/Validation	O1=10
Result/Inference	R1=5
Viva voce	V1=5
Semester End Examination (SEE)= P1+ E1+ O1+ V1	30
Total Marks = CIE+SEE	50

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Course Instructor
(Dr. K. Lavanya)

Module Coordinator
(Dr .S. Naganjaneyulu)

HOD
(Dr. B, Srinivasa Rao)