LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222 933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mrs. B.Swathi
Course Name & Code **:** Compiler Design 23CS15
L-T-P Structure **: 3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI/A **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Fundamental knowledge of **C programming, and Formal Languages & Automata theory.**

COURSE EDUCATIONAL OBJECTIVES (CEOs):
Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

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

CO1	Design and implement a lexical analyzer using LEX & regular expressions and illustrate the ambiguity in context-free grammars.**(Apply-L3)**
CO2	Design parsers using top-down (recursive-descent / LL) and bottom-up (LR / shift-reduce) parsing techniques; construct parse tables and detect conflicts**(Apply-L3)**
CO3	Design syntax-directed translation schemes and implement intermediate code generation using syntax trees & three-address code. **(Apply-L3)**
CO4	Describe the principles of code optimization, including flow analysis, loop optimization, and structure-preserving transformations**(Understand-L2)**
CO5	Describe the design issues of the code generator and run-time environment of the program**(Understand-L2)**

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

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

TEXTBOOKS:

T1 Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson, 2007.

REFERENCE BOOKS:

R1 Compiler Construction, Principles and Practice, Kenneth C Louden, Cengage Learning, 2006.

R2 Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.

R3 Optimizing Compilers for Modern Architectures, Randy Allen, Ken Kennedy,Morgan Kauffmann, 2001.

R4 Levine, J.R., T. Mason and D. Brown, Lex and Yacc, edition, O'Reilly & Associates, 1990

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: 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	HOD Sign Weekly
1.	Introduction to Compiler Design ,Course Objectives and Course Outcome's Discussion	1	02/12/2025		TLM2	
2.	Language Processors	1	03/12/2025		TLM2	
3.	Structure of a Compiler	1	05/12/2025		TLM2	
4.	Bootstrapping	1	06/12/2025		TLM1,3	
5.	Lexical Analysis, The Role of the Lexical Analyzer, Input Buffering,	1	09/12/2025		TLM2	
6.	Specification of Tokens, Recognition of Tokens,	1	10/12/2025		TLM2	
7.	Lexical Analyzer Generator-LEX	1	12/12/2025		TLM2	
8.	Tutorial-Finite Automata, Regular Expressions	1	16/12/2025		TLM1	
9.	Design of a Lexical Analyzer Generator.	1	17/12/2025		TLM1	
10.	Syntax Analysis: The Role of the Parser,	1	19/12/2025		TLM1	
11.	Context-Free Grammars, Derivations, Parse Trees	1	20/12/2025		TLM3	
12.	Activity Based Learning- Lexical Analysis& Syntax Analysis		20/12/2025		TLM3	
13.	Ambiguity, Left Recursion, Left Factoring,	1	23/12/2025		TLM1	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: TOP DOWN PARSING &BOTTOM UP PARSING:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Pre Processing Steps of Top Down Parsing, Backtracking	1	24/12/2025		TLM2	
15.	Recursive Descent Parsing				TLM1 TLM 3	
16.	LL (1) Grammars,	2	26/12/2025 27/12/2025		TLM1	

17.	Non-recursive Predictive Parsing,	1	30/12/2025		TLM1	
18.	Error Recovery in Predictive Parsing, Tutorial,	1	31/12/2025		TLM1,3	
19.	**BOTTOM UP PARSING** : Introduction, Difference between LR and LL Parsers, Types of LR Parsers,	1	02/01/2026		TLM2	
20.	SLR Parsers, Construction of SLR Parsing Tables	2	06/01/2026 07/01/2026		TLM1	
21.	More Powerful LR Parses, Construction of CLR (1) parsing Tables	1	09/01/2026		TLM1	
22.	LALR Parsing Tables	1	20/01/2026		TLM1	
23.	Dangling Else Ambiguity, Error Recovery in LR Parsing,	1	21/01/2026		TLM1	
24.	Handling Ambiguity Grammar with LR Parsers	1	23/01/2026		TLM2 TLM3	
25.	Tutorial &Activity Based Learning- Top Down Parsing	1	24/01/2026		TLM7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Syntax-Directed Definitions	1	02/02/2026		TLM1	
27.	Tutorial, Evaluation Orders for SDD's,		02/02/2026		TLM1 TLM3	
28.	Applications of Syntax Directed Translation	1	06/02/2026		TLM1	
29.	Syntax-Directed Translation Schemes	1	07/02/2026		TLM1	
30.	Implementing L-Attributed SDD's	1	09/02/2026		TLM1	
31.	Activity Based Learning- Syntax Directed translation, Type Checker	1	10/02/2026		TLM1,7	
32.	Intermediate Code Generation: Variants of Syntax Trees,	1	13/02/2026		TLM1	
33.	Three Address Code	1	14/02/2026		TLM1	
34.	Tutorial & Types and Declarations,	1	16/02/2026		TLM1	
35.	Translation of Expressions	1	17/02/2026		TLM1,3	
36.	Type Checking, Control Flow	1	20/02/2026		TLM1	
37.	Activity Based Learning- Intermediate Code generation	1	21/02/2026		TLM 7	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: CODE OPTIMIZATION

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.	The Principle Sources of Optimization	1	24/02/2026		TLM2	
39.	Basic Blocks, Optimization of Basic Blocks	1	25/02/2026		TLM1	
40.	DAG representation of Basic Blocks	1	27/02/2026		TLM1	
41.	Tutorial & Activity Based learning	1	28/02/2026		TLM3,7	
42.	Structure Preserving Transformations	1	03/03/2026		TLM1	
43.	Flow Graphs	1	06/03/2026		TLM1	

44.	Tutorial	1	07/03/2026		TLM3	
45.	Loop Optimization	1	10/03/2026		TLM1	
46.	Data-Flow Analysis,	1	11/03/2026		TLM1	
47.	Peephole Optimization	1	13/03/2026		TLM1	
48.	Activity Based Learning	1	14/03/2026		TLM7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: RUN TIME ENVIRONMENTS& CODE GENERATION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	Storage Organization	1	17/03/2026		TLM2	
50.	Run Time Storage Allocation	1	18/03/2026		TLM2	
51.	Activation Records	1	20/03/2026		TLM2	
52.	Tutorial	1	21/03/2026		TLM3	
53.	Procedure Calls	1	24/03/2026		TLM2	
54.	Displays	1	25/03/2026		TLM2	
55.	Code Generation: Issues in the Design of a Code Generator,	1	27/03/2026		TLM3	
56.	Object Code Forms	1	28/03/2026		TLM1	
57.	Code Generation Algorithm	1	31/03/2026		TLM2	
58.	Register Allocation and Assignment	1	01/04/2026		TLM1	
59.	Activity Based Learning	1	04/04/2026		TLM7	
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	HOD Sign Weekly
1.						

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
TLM7	Activity Based learning		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mrs B.Swathi**	**Dr. D. Veeraiah**	**Dr. D. Venkata Subbaiah**	**Dr. S.Nagurjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr.T N V S Praveen

Course Name & Code : CRYPTOGRAPHY & NETWORK SECURITY (23CS13)

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

Program/Sem/Sec : B.Tech., CSE, VI-Sem., Section – A A. Y: 2025-26

PRE-REQUISITE : Computer Networks, Number theory and programming language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objectives of this course are to explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, public key algorithms, design issues and working principles of various authentication protocols and various secure communication standards including Kerberos, IPsec, and SSL/TLS.

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

CO1	Summarize the fundamental concepts of security, cryptographic attacks, and Eucledian Algorithm**(Understand-L2)**
CO2	Summarize symmetric key cryptographic algorithms such as DES and AES, including their mathematical foundations, structures, and security aspects. **(Understand-L2)**
CO3	Apply the concepts of asymmetric key cryptography and related mathematical principles to design and evaluate public-key cryptosystems. **(Apply-L3)**
CO4	Demonstrate knowledge of message integrity, authentication mechanisms, digital signature schemes, and key management techniques. **(Understand- L2)**
CO5	Evaluate and implement various network security mechanisms and protocols such as PGP, S/MIME, SSL/TLS, and IPSec. **(Apply-L3)**

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

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

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

1- Low **2 –**Medium **3** High

TEXTBOOKS:

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

T2 Education, 1999.
William Stallings, "Cryptography and Network Security", PHI/Pearson, fourth edition, 2000.

REFERENCE BOOKS:

R1 Whitman, "Principles of Information Security", Thomson, PHI, 2000.
R2 Robert Bragg, Mark Rhodes, Network Security: The complete reference, TMH
R3 Buchmann, Introduction to Cryptography, Springer,2010.
R4 Jeetendra pande, Ajay, "Digital Foresnsics', ISBN: 978-93-84813-94-9.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: BASIC PRICIPLES

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.	Basic Principles	1	01-12-2025			
2.	Security Goals	1	02-12-2025			
3.	Cryptographic Attacks	1	03-12-2025			
4.	Services & Mechanisms	1	06-12-2025			
5.	Classical Encryption Techniques	1	08-12-2025			
6.	Substitution Techniques	1	09-12-2025			
7.	Transposition techniques	1	10-12-2025			
8.	Stegnography	1	13-12-2025			
9.	Mathematics of Cryptography	1	15-12-2025			
10.	Examples on mathematical cryptography	1	16-12-2025			
11.	Integer Arithmetic	1	17-12-2025			
12.	Eucledian Algorithm	1	20-12-2025			
13.	Assignment-1	1	22-12-2025			
No. of classes required to complete UNIT-I		13				

UNIT-II: SYMMETRIC ENCRYPTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Mathematics of Symmetric Key Cryptography	1	23-12-2025			
15	Introduction to Modern Symmetric key Ciphers	1	24-12-2025			
16	Modern block ciphers	1	27-12-2025			
17	Stream Ciphers	1	29-12-2025			
18	DES, DES structure, DES Analysis	1	31-12-2025			
19	Multiple DES	1	03-01-2026			
20	Advanced Encryption standard	1	05-01-2026			
21	AES-Transformations	1	07-01-2026			
22	Key Expansions	1	10-01-2026			
23	AES Ciphers, Analysis of AES	1	12-01-2026			
24	Assignment-2	1	19-01-2026			
sNo. of classes required to complete UNIT-II		10		No. of classes taken:		

UNIT-III: ASSYMETRIC ENCRYPTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25	Mathematics of Assymetric Key Cryptography	1	20-01-2026			
26	Primes, Primality Testing	1	24-01-2026			
27	Factorization, CRT	1	02-02-2026			
28	Assymetric Key Cryptography	1	03-02-2026			
29	RSA crypto system	1	04-02-2026			
30	Rabin Cryptosystem	1	07-02-2026			
31	Elgamal Crypto system	1	09-02-2026 10-02-2026			
32	ECC	1	14-02-2026			
33	Unit Overview and Discussion	1	16-02-2026			
34	Assignment - 3	1	18-02-2026			
No. of classes required to complete UNIT-III		10		No. of classes taken:		

UNIT-IV: DATA INTEGRITY, DSS SCHEMES & KEY MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35	Message Integrity & Message Authentication	1	21-02-2026			
36	SHA-512	1	23-02-2026			
37	Digital Signature Process	1	25-02-2026			
38	Services, Attacks, Schemes	1	28-02-2026			
39	Applications-key management	1	02-03-2026			
40	Symmetric key distribution	1	07-03-2026			
41	Kerberos	1	09-03-2026			
42	Unit Overview and Discussion	1	11-03-2026			
No. of classes required to complete UNIT-IV		08		No. of classes taken:		

UNIT-V: NS-I AND NS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43	Security at Application Layer	1	14-03-2026			
44	PGP & S/MIME	1	16-03-2026			
45	Security at the Transport Layer	1	18-03-2026			
46	SSL and TLS	1	21-03-2026			
47	Security at the Network Layer	1	23-03-2026			
48	IPSEC- Two Modes	1	24-03-2026			
49	Security associations	1	25-03-2026			
50	IKE, ISAKMP	1	28-03-2026			
51	System Security-users, Trust, trust systems, malicious software	1	30-03-2026			
52	Worms, viruses, IDS, Firewalls.	1	31-03-2026			
53	Assignment-5	1	01-04-2026			
No. of classes required to complete UNIT-V		12		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– 1 (Units I,II&III(Half of the Syllabus))	**A1=5**
I-Descriptive Examination (Units I, II&III (Half of the Syllabus))	**M1=15**
I-Quiz Examination (Units I, II&III (Half of the Syllabus))	**Q1=10**
Assignment– 2 (Units III (remaining Half of the Syllabus),IV&V))	**A2=5**
II- Descriptive Examination (Units III (remaining Half of the Syllabus), IV&V))	**M2=15**
II-Quiz Examination (Units III (remaining Half of the Syllabus), IV&V))	**Q2=10**
Mid Marks=80% of Max((M1+A1+Q1),(M2+A2+Q2))+ 20% of Min((M1+A1+Q1),(M2+A2+Q2))	**M=30**
Cumulative Internal Examination (CIE): M	**30**
Semester End Examination (SEE):	**70**
Total Marks=CIE+SEE	**100**

PART D

PROGRAMME OUTCOMES (POs):

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

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**T N V S Praveen**	**T N V S Praveen**	**Dr.D.V. Subbaiah**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr B SIVARAMAKRISHNA
Course Name & Code : CLOUD COMPUTING 23CS11
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI SEM /A **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To explain the evolving utility computing model called cloud computing.
- To introduce the various levels of services offered by cloud.
- To discuss the fundamentals of cloud enabling technologies such as distributed computing, service-oriented architecture and virtualization.
- To emphasize the security and other challenges in cloud computing.
- To introduce the advanced concepts such as containers, serverless computing and cloud-centric Internet of Things.

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

CO1	Understand the concept of cloud computing reference models, Services, Deployment models and cloud service providers. **(Understand-L2)**
CO2	Understand the cloud enabling technologies for Parallel and distributed computing, Service-Oriented Architecture and Web services. **(Understand-L2)**
CO3	Implement the levels of virtualization tools and containers for resource provisioning and the orchestration tools. **(Apply-L3)**
CO4	Understand the challenges of cloud computing and know the security issues in cloud computing. **(Understand-L2)**
CO5	Analyze the advanced concepts of cloud computing for server-less-computing, fog, edge and quantum computing. (**Analyze-L4)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
R2	Essentials of cloud Computing, K. Chandrasekhran, CRC press, 2014.
R3	https://www.ibm.com/cloud/learn/cloud-computing
R4	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J NPTEL Cloud Computing
R5	https://www.youtube.com/watch?v=10jm7Waan8M&list=PLdpzxOOAlwvIcxgCUyBHVOcWs0Krjx9xR Azure Course Videos
R6	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos
R7	https://www.youtube.com/watch?v=GkKNxyLp_V0&list=PLdpzxOOAlwvLNOxX0RfndiYSt1Le9azze Aws Course Videos
R8	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos https://www.youtube.com/watch?v=jVE7qKWg8mc GCP Course Videos

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Cloud Computing Fundamentals

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 CO's & PO'S	1	02/12/25		TLM1, 2	
2.	Cloud computing at a glance, defining a cloud	1	03/12/25		TLM1, 2	
3.	cloud computing reference model	1	04/12/25		TLM1, 2	
4.	Types of services (IaaS, PaaS, SaaS)	1	05/12/25		TLM1, 2	
5.	Cloud Deployment models (Public, private, hybrid)	1	08/12/25		TLM1, 2	
6.	utility computing	1	09/12/25		TLM1, 2	
7.	cloud computing characteristics and benefits	1	11/12/25		TLM1, 2	
8.	Cloud service providers Amazon Web Services	1	12/12/25		TLM1, 2	
9.	Microsoft Azure	1	15/12/25		TLM1, 2	
10.	Google App Engine	1	16/12/25		TLM 1, 2	
11.	Tutorial / Activity	1	18/12/25		TLM 3/7	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Cloud Enabling Technologies

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.	Ubiquitous Internet	1	19/12/25		TLM1,2	
13.	parallel and distributed computing	1	22/12/25		TLM1,2	
14.	elements of parallel computing,	1	23/12/25		TLM1,2	
15.	hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD),	3	26/12/25 29/12/25 30/12/25		TLM1,2	
16.	elements of distributed computing	1	02/01/26		TLM1,2	
17.	Inter-process communication	1	05/01/26		TLM1,2	
18.	technologies for distributed computing	1	06/01/26		TLM1,2	
19.	remote procedure calls (RPC), service-oriented architecture (SOA),	1	08/01/26		TLM1,2	
20.	Web services	1	19/01/26		TLM1,2	
21.	virtualization.	1	20/01/26		TLM1,2	
22.	Tutorial / Activity/ Assignment	1	22/01/26		TLM 3/7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Virtualization and Containers

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Characteristics of virtualized environments	1	23/01/26		TLM1,2	
24.	Taxonomy of virtualization techniques	1	02/02/26		TLM1,2	
25.	Virtualization and cloud Computing	1	03/02/26		TLM1,2	
26.	Pros and cons of virtualization technology examples (XEN, VMware)	1	05/02/26		TLM1,2	
27.	building blocks of containers,	1	09/02/26		TLM1,2	
28.	Container platforms (LXC, Docker)	1	10/02/26		TLM1,2	
29.	container orchestration,	1	12/02/26		TLM1,2	
30.	Docker Swarm and Kubernetes	1	13/02/26		TLM1,2	
31.	Public cloud VM (e.g. Amazon EC2)	1	16/02/26		TLM1,2	
32.	Container (e.g. Amazon Elastic Container Service) offerings.	1	17/02/26		TLM1,2	
33.	Tutorial/ Activity / Assignment	1	19/02/26		TLM 3/7	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Cloud computing challenges

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Economics of the cloud	1	20/02/26		TLM1,2	
35.	Cloud interoperability and standards.	1	23/02/26		TLM1,2	
36.	Scalability and fault tolerance	1	24/02/26		TLM1,2	
37.	Energy efficiency in clouds	1	26/02/26		TLM1,2	

38.	federated clouds	1	27/02/26		TLM1,2	
39.	Cloud computing security	1	02/03/26		TLM1,2	
40.	Fundamentals of computer security	1	05/03/26		TLM1,2	
41.	Cloud security architecture,	1	06/03/26		TLM1,2	
42.	Cloud shared responsibility model	1	09/03/26		TLM1,2	
43.	Security in cloud deployment models.	1	10/03/26		TLM1,2	
44.	Tutorial /Activity / Assignment	1	12/03/26		TLM 3/7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Advanced concepts in cloud computing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Server less computing	1	13/03/26		TLM1,2	
46.	Function-as-a Service	1	16/03/26		TLM1,2	
47.	Server less computing architecture	1	17/03/26		TLM1,2	
48.	Public cloud (e.g. AWS Lambda) and open source (e.g. Open FaaS) server less platforms	2	20/03/26 23/03/26		TLM1,2	
49.	Internet of Things (IoT) applications,	1	24/03/26		TLM1,2	
50.	Cloud centric IoT and layers	1	26/03/26		TLM1,2	
51.	Edge and fog computing, DevOps,	1	30/03/26		TLM1,2	
52.	Infrastructure-as-code	1	31/03/26		TLM1,2	
53.	Quantum cloud computing	1	02/03/26		TLM1,2	
54.	Tutorial / Activity / Assignment	1	03/03/26		TLM3/7	
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	HOD Sign Weekly
1.					**TLM6**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. B. Sivaramakrishna**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

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

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : Dr.C Rajamallu
Course Name & Code : DISASTER MANAGEMENT & 23CE81
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE(A),VI-Sem., A.Y : 2025-26

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

CO 1	Identify the basic terms, types of disasters and their impact (Understand – L2)
CO 2	Illustrate the role of technology in handling disaster management situations (Understand-L2)
CO 3	Identify the stake-holders concerned and design the different action plans for responding in case of disaster occurrence (Understand – L2)
CO 4	Evaluate the importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

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

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

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

TEXT BOOKS:

T1 Tushar Bhattacharya, "Disaster Science and Management", Tata McGraw Hill Publications, New Delhi, 2012.
T2 R.Subramanian, "Disaster Management ", Vikas Publishing house Pvt. Ltd, 2022.

REFERENCE BOOKS:

R1 G.K. Ghosh, "Disaster Management", APH Publishing Corporation, 2006.
R2 U.K. Chakrabarty, "Industrial Disaster Management and Emergency Response", Asian Books Pvt. Ltd., New Delhi 2007.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: DEFINITIONS & TYPES OF DISASTER

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 Disaster Management	1	1/12/2025		**TLM2**	
2.	Basic definitions	1	3/12/2025		**TLM2**	
3.	Types of Disasters	1	6/12/2025		**TLM2**	
4.	Concept of disaster management	1	8/12/2025		**TLM2**	
5.	Disaster management cycle	1	10/12/2025		**TLM2**	
6.	Vulnerability	1	13/12/2025		**TLM2**	
7.	Mitigation	1	15/12/2025		**TLM2**	
8.	Natural disasters: Drought and cyclone	1	17/12/2025		**TLM2**	
9.	Natural disasters: Earthquake and landslides	1	20/12/2025		**TLM2**	
10.	Engineering and technical failure	1	22/12/2025		**TLM2**	
11.	Nuclear and chemical disaster	1	27/12/2025		**TLM2**	
12.	Accident-related disasters	1	29/12/2025		**TLM2**	
13.	HPC on DM in India- DM Act 2005	1	31/12/2025		**TLM2**	
14.	HPC on DM in India- DM Act 2005	1	03/01/2026		**TLM2**	
15.	Revision		05/01/2026		**TLM2**	
No. of classes required to complete UNIT-I:14				No. of classes taken:		

UNIT-II: IMPACT OF DISASTERS

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.	Impacts due to earthquake and cyclone	1	7/1/2026		**TLM2**	
2.	Impacts due to landslides and fire hazards	1	10/1/2026		**TLM2**	
3.	Impacts due to life &live stock and habitation	1	12/1/2026		**TLM2**	
4.	Agriculture & livelihood loss- health hazards	1	17/1/2026		**TLM2**	
5.	Malnutrition problems	1	19/1/2026		**TLM2**	
6.	Contamination of water	1	21/1/2026		**TLM2**	
7.	Impact on children- environmental loss	1	24/1/2026		**TLM2**	
8.	Revision	1	2/2/2026		**TLM2**	
No. of classes required to complete UNIT-II:08				No. of classes taken:		

UNIT-III: ROLE OF TECHNOLOGY IN DISASTER MANAGEMENT

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.	Role of remote sensing	1	4/2/2026		**TLM2**	
2.	Information system and decision-making tool	1	4/2/2026		**TLM2**	
3.	DM for infra structure	1	7/2/2026		**TLM2**	

4.	DM for electrical substances	1	7/2/2026		**TLM2**	
5.	DM for roads and bridges	1	9/2/2026		**TLM2**	
6.	Mitigation programme for earthquakes	1	11/2/2026		**TLM2**	
7.	Geospatial information in agriculture drought assessment	1	14/2/2026		**TLM2**	
8.	Multimedia technology in disaster risk management and training	1	16/2/2026		**TLM2**	
9.	Transformable indigenous knowledge in disaster reduction	1	18/2/2026		**TLM2**	
10.	Transformable indigenous knowledge in disaster reduction	1	21/2/2026		**TLM2**	
11.	Revision	1	23/2/2026		**TLM2**	
No. of classes required to complete UNIT-III:11				No. of classes taken:		

UNIT- IV: PLANNING & RISK PREVENTION

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.	Planning	1	25/2/2026		**TLM2**	
2.	Early warning system	1	28/2/2026		**TLM2**	
3.	Crisis intervention and management	1	2/3/2026		**TLM2**	
4.	Response and Rehabilitation after Disasters	1	7/3/2026		**TLM2**	
5.	Temporary shelter – food and nutrition-safe drinking water	1	9/3/2026		**TLM2**	
6.	Rehabilitation after cyclones	1	11/3/2026		**TLM2**	
7.	Response to drought	1	14/3/2026		**TLM2**	
8.	Response to river erosion	1	16/3/2026		**TLM2**	
9.	Response after earthquake	1	18/3/2026		**TLM2**	
10.	Response after Tsunami- Hunger and Disaster	1	23/3/2026		**TLM2**	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V: EDUCATION AND COMMUNITY PREPAREDNESS & CASE STUDIES

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.	Essentials of disaster education	1	25/3/2026		**TLM2**	
2.	School awareness and safety programs, Community based disaster recovery	1	25/3/2026		**TLM2**	
3.	Voluntary agencies and community participation at various stages of disaster management	1	28/3/2026		**TLM2**	
4.	Building community capacity for action	1	28/3/2026		**TLM2**	
5.	Corporate sector and disaster risk reduction	1	30/3/2026		**TLM2**	
6.	A community focused approach	1	30/3/2026		**TLM2**	

7.	Case studies on different disasters in the world-1	1	1/4/2026		**TLM2**	
8.	Case studies on different disasters in the world-2	1	1/4/2026		**TLM2**	
9.	Case studies on different disasters in the world-3	1	4/4/2026		**TLM2**	
10.	Case studies on different disasters in the world-4	1	4/4/2026		**TLM2**	
No. of classes required to complete UNIT-V:10				No. of classes taken:		

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

PART-C

EVALUATION PROCESS (R23 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=15
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=15
II-Quiz Examination (Units-III, IV & V)	Q2=10
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
CIE-I (Mid-I, Assignment-I. Quiz-I)	30
CIE-II (Mid-II, Assignment-II. Quiz-II)	30
Cumulative Internal Examination (CIE): 75% best and 25% least	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

	Course Instructor	Course Coordinator	Module Coordinator	HOD-Civil
Faculty Name	(Dr.C Rajamallu)			Dr KV Ramana
Signature				

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. A. Koteswara Rao

Course Name & Code : MACHINE LEARNING-23AM01

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

Program/Sem/Sec : B.Tech/VI SEM /A **A.Y.:** 2025-26

Regulations : R23

PREREQUISITE: Probability and Statistics, Data Warehousing and Data Mining

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- Apply supervised learning algorithms including decision trees and k-nearest neighbours (k-NN).
- Implement unsupervised learning techniques, such as K-means clustering.

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

CO1	Understand development steps of model building and evaluation approaches. **(Understand - L2)**
CO2	Apply Nearest Neighbor-based models to solve real-time regression and classification problems **(Apply-L3)**
CO3	Make use of supervised learning algorithms to solve classification problems **(ApplyL3)**
CO4	Apply linear discriminants and perceptron classifiers to classify datasets **(Apply-L3)**
CO5	Apply various clustering techniques to solve complex problems **(Apply-L3)**

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

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

TEXTBOOKS:

T1	"Machine Learning Theoryand Practice", M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

REFERENCE BOOKS:

R1	"Machine Learning", Tom M. Mitchell, McGraw-Hill Publication, 2017
R2	"Machine Learning in Action",Peter Harrington, DreamTech
R3	"Introduction to Data Mining", Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

Web Resources:

https://nptel.ac.in/courses/106106139

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Machine Learning

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- Course Objective & Outcomes	1	03-12-2025		TLM1, 2	
2.	Introduction to Machine Learning	1	04-12-2025		TLM1, 2	
3.	Evolution of Machine Learning, Paradigms for ML	1	06-12-2025		TLM1, 2	
4.	Learning by Rote, Learning by Induction	1	10-12-2025		TLM1, 2	
5.	Reinforcement Learning, Types of Data	1	11-12-2025		TLM1, 2	
6.	Matching, Stages in Machine Learning	1	13-12-2025		TLM1, 2	
7.	Data Acquisition, Feature Engineering	1	17-12-2025		TLM1, 2	
8.	Data Representation, Model Selection, Model Learning	1	18-12-2025		TLM1, 2	
9.	Model Evaluation, Model Prediction	1	20-12-2025		TLM1, 2	
10.	Search and Learning, Data Sets.	1	24-12-2025		TLM1, 2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: Nearest Neighbor-Based Models:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Introduction to Proximity Measures.	1	27-12-2025		TLM1,2	
12.	Distance Measures, Non-Metric Similarity Functions	1	31-12-2025		TLM1,2	
13.	Proximity Between Binary Patterns,	1	03-01-2026		TLM1,2	
14.	Different Classification Algorithms Based on the Distance Measures	2	07-01-2026 08-01-2026		TLM1,2	
15.	K-Nearest Neighbor Classifier	1	10-01-2026		TLM1,2	
16.	Radius Distance Nearest Neighbor Algorithm	1	21-01-2026		TLM1,2	
17.	KNN Regression	1	22-01-2026		TLM1,2	
18.	Performance of Classifiers	1	22-01-2026			
19.	Performance of Regression Algorithms.	1	24-01-2026		TLM1,2	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Models Based on Decision Trees:

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.	Decision Trees for Classification	1	04-02-2026		TLM1,2	
21.	Impurity Measures, Properties	1	05-02-2026		TLM1,2	
22.	Regression Based on Decision Trees,	1	07-02-2026		TLM1,2	
23.	Bias–Variance Trade-off	1	11-02-2026		TLM1,2	
24.	Random Forests for Classification and Regression.	1	12-02-2026		TLM1,2	
25.	The Bayes Classifier: Introduction to the Bayes Classifier	1	14-02-2026		TLM1,2	
26.	Bayes' Rule and Inference, The Bayes Classifier and its Optimality.	1	18-02-2026		TLM1,2	
27.	Multi-Class Classification	1	19-02-2026		TLM1,2	
28.	Class Conditional Independence and Naive Bayes Classifier (NBC)	1	21-02-2026		TLM1,2	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: Linear Discriminants for Machine Learning:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Introduction to Linear Discriminants	1	25-02-2026		TLM1,2	
30.	Linear Discriminants for Classification	1	26-02-2026		TLM1,2	
31.	Perceptron Classifier,	1	26-02-2026		TLM1,2	
32.	Perceptron Learning Algorithm	1	28-02-2026		TLM1,2	
33.	Support Vector Machines,	1	05-03-2026		TLM1,2	
34.	Linearly Non-Separable Case	1	07-03-2026		TLM1,2	
35.	Non-linear SVM, Kernel Trick	1	07-03-2026		TLM1,2	
36.	Logistic Regression, Linear Regression	1	11-03-2026		TLM1,2	
37.	Multi-Layer Perceptrons (MLPs),	1	12-03-2026		TLM1,2	
38.	Backpropagation for Training an MLP	1	14-03-2026		TLM1,2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Clustering:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Introduction to Clustering, Partitioning of Data	1	18-03-2026		TLM1,2	
40.	Matrix Factorization Clustering of Patterns	1	21-03-2026		TLM1,2	
41.	Divisive Clustering,	1	25-03-2026		TLM1,2	

	Agglomerative Clustering					
42.	Partitional Clustering, K-Means Clustering	1	28-03-2026		TLM1,2	
43.	Soft Partitioning, Soft Clustering	1	26-03-2026		TLM1,2	
44.	Fuzzy C-Means Clustering, Rough Clustering	1	01-04-2026		TLM1,2	
45.	Rough K-Means Clustering Algorithm	1	02-04-2026		TLM3	
46.	Expectation Maximization-Based Clustering	1	02-04-2026		TLM1,2	
47.	Spectral Clustering.	1	04-04-2026		TLM1,2	
No. of classes required to complete UNIT-V: 09				**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
1.	Generative AI and Large Language Models (LLMs)	1	04-04-2026		**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Mr. A. Koteswara Rao**	**Dr. D. Venkata Subbaiah**	**Dr. K. Devi Priya**	**Dr. S. Nagarjuna Reddy**
Signature				

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hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Mrs.B.Nirosha	
Course Name & Code	: Software Project Management & 23IT07	
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech., CSE., VI-Sem., Sec-A	A.Y: 2025-26

PRE-REQUISITE: Software Engineering, Software Testing Methodologies, Object oriented Analysis and Design.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course is centered on the unique aspects of Software Project Management at three levels:

To describe and determine the purpose and importance of project management from the perspectives of effective planning, continuous tracking, and successful completion of projects.

To compare and differentiate various organizational structures and project structures, enabling learners to understand how organizational design influences project execution and outcomes.

To implement a project by managing schedules, expenses, and resources using appropriate project management tools and techniques for effective project delivery.

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

CO 1	Understand conventional and modern software management practices and describe their impact on software economics. **(Understand-L2)**
CO 2	Apply software life cycle phases and associated artifacts to structure and document a complete software development process. **(Apply – L3)**
CO 3	Develop iterative project plans by utilizing model-based architectures, process workflows, and milestone checkpoints. **(Apply-L3)**
CO 4	Apply basic concepts of project organization, automation, and software metrics to interpret project monitoring information. **(Apply-L3)**
CO5	Understand the fundamental concepts of Agile and DevOps and their role in improving software development and delivery. **(Understand-L2)**

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

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

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

TEXT BOOKS:

T1 Software Project Management, Walker Royce, PEA, 2005.
T2 Succeeding with Agile: Software Development Using Scrum, Mike Cohn, Addison Wesley.
T3 The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.

REFERENCE BOOKS:

R1 Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH
R2 Software Project Management, Joel Henry, PEA
R3 Software Project Management in practice, Pankaj Jalote, PEA, 2005,

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Conventional Software Management

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.	UNIT - I: The waterfall model	1	04-12-2025		TLM2	
2.	Conventional software management performance	1	05-12-2025		TLM2	
3.	**Evolution of Software economics:** Software Economics	1	06-12-2025		TLM2	
4.	Pragmatic Software cost estimation	1	11-12-2025		TLM2	

5.	**Improving Software Economics:**Reducing Software product size, Improving software processes	1	12-12-2025		TLM2	
6.	Improving team effectiveness, automation, achieving required quality & peer inspection	1	13-12-2025		TLM2	
7.	The principles of conventional software Engineeringmodern software management	1	18-12-2025		TLM2	
8.	Transitioning to an iterative process	1	19-12-2025		TLM2	
9.	·	1	20-12-2025		TLM 7	
No. of classes required to complete UNIT-I:09				No. of classes taken:		

UNIT-II: Life cycle phases

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.	Engineering and production stages	1	26-12-2025		TLM2	
2.	Inception	1	27-12-2025		TLM2	
3.	Elaboration	1	02-01-2026		TLM2	
4.	Construction	1	03-01-2026		TLM2	
5.	Transition phases	1	08-01-2026		TLM2	
6.	**Artifacts of the process:** The artifact sets	1	09-01-2026		TLM2	
7.	Management artifacts	1	10-01-2026		TLM2	
8.	Engineering artifacts	1	22-01-2026		TLM2	
9.	Programmatic artifacts	1	23-01-2026		TLM2	
10.		1	24-01-2026		TLM7	

No. of classes required to complete UNIT-II:10	No. of classes taken:
I MID EXAMINATIONS 26-01-2026 TO 31-01-2026	

UNIT-III: Model based Architectures

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.	A management perceptive and technical perceptive	1	05-02-2026			
2.	**Work flows of the process**: Software process workflows	1	06-02-2026		TLM2	
3.	Iteration workflows	1	07-02-2026		TLM2	
4.	**Check points of the process:** Major milestones, Minor milestones	1	12-02-2026		TLM2	
5.	Periodic status assessments	1	13-02-2026		TLM2	
6.	**Iterative Process Planning:** Work break down structures	1	14-02-2026		TLM2	
7.	Planning guidelines, cost and schedule estimating	1	19-02-2026		TLM2	
8.	Iteration planning process, Pragmatic planning	1	20-02-2026		TLM2	
9.		1	21-02-2026		TLM7	
No. of classes required to complete UNIT-III:09				No. of classes taken:		

UNIT-IV : Project Organization sand Responsibilities

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.	Line-of-Business Organizations	1	26-02-2026		TLM2	
2.	Project Organizations, Evolution of Organizations	1	27-02-2026		TLM2	
3.	**Process Automation:** Automation Building blocks	1	28-03-2026		TLM2	

4.	The Project Environment	1	05-03-2026		TLM2	
5.	**Project Control and Process instrumentation:** The seven core Metrics	1	06-03-2026		TLM2	
6.	Management indicators,Quality indicators	1	07-03-2026		TLM2	
7.	Life cycle expectations	1	12-03-2026		TLM2	
8.	Pragmatic Software Metrics, Metrics metrics	1	13-03-2026		TLM2	
9.	Pragmatic Software Metrics, Metrics metrics	1	14-03-2026		TLM2	
10.		1	20-03-2026		TLM2	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V: Agile Methodology and DevOps

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.	Agile Methodology, ADAPTing to Scrum	1	21-03-2026		TLM2	
2.	Patterns for Adopting Scrum, Iterating towards Agility	1	26-03-2026		TLM2	
3.	**Fundamentals of DevOps:** Architecture, deployment	1	27-03-2026		TLM2	
4.	orchestration Need, instance of application	1	28-04-2026		TLM2	
5.	DevOps delivery pipepeline, DevOps eco system	1	02-04-26		TLM2	
6.	DevOps adoption in projects: Technology aspects, Agiling capabilities	1	03-04-26		TLM2	
7.	Tool stack implementation, people aspect ,process	1	04-04-26		TLM2	
No. of classes required to complete UNIT-V:07				No. of classes taken:		
II MID EXAMINATIONS 06-04-2026 TO 11-04-2026						

PART-C

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

EVALUATION PROCESS (R23 Regulations):

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
TLM 7	Activity based learning		

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Mrs. B.Nirosha	**Dr. S. Jayaprada**	**Dr. Y.V. B Reddy**	**Dr. S. Nagarjuna Reddy**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr B SIVARAMAKRISHNA
Course Name & Code : CLOUD COMPUTING LAB 23CS11
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/VI SEM /A **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To introduce the various levels of services offered by cloud.
- To give practical knowledge about working with virtualization and containers.
- To introduce the advanced concepts such as serverless computing and cloud simulation.

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

CO1	Implement cloud service models, deployment models, virtualization, and containerization using open-source cloud platforms. **(Apply–L3)**
CO2	Analyze the security, performance, and operational challenges in cloud environments through hands-on experiments. **(Analyze–L4)**
CO3	Develop solutions using advanced cloud paradigms such as serverless computing, fog computing, and edge computing to address real-world problems. **(Apply–L3)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018
R2	Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011
R3	Online documentation and tutorials from cloud service providers (e.g. AWS, Google App Engine)
R4	Docker, Reference documentation, https://docs.docker.com/reference/
R5	OpenFaaS, Serverless Functions Made Simple, https://docs.openfaas.com/

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign Weekly
1.	Lab on web services	03	05/12/25		
2.	Lab on IPC, messaging, publish/subscribe	03	12/12/25		
3.	Install Virtual Box/VMware Workstation with different flavours of Linux or windows OS on top of windows8 or above	03	19/12/25		
4.	Install a C compiler in the virtual machine created using Virtual Box and execute Simple Programs.	03	26/12/25		
5.	Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance. In the process, create a security group allowing access to port 80 on the instance.	06	02/01/26 09/01/26		
6.	Install Google App Engine. Create a Hello World app and other simple web applications using python/java.	06	23/01/26 06/02/26		
7.	Start a Docker container and set up a webserver (e.g. apache2 or Python based Flask micro web framework) on the instance. Map the host directory as a data volume for the container.	03	13/02/26		
8.	Find a procedure to transfer the files from one virtual machine to another virtual machine. Similarly, from one container to another container.	03	20/02/26		
9.	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	03	27/02/26		
10.	Install Hadoop single node cluster and run simple applications like word count.	03	06/03/26		
11.	Utilize OpenFaaS – Serverless computing framework and demonstrate basic event driven function invocation.	03	13/03/26		
12.	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.	6	20/03/26 27/03/26		
13.	Internal Exam	03	03/04/26		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. B. Sivaramakrishna**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. VI-Sem., CSE A Sec

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : **CRYPTOGRPAHY & NETWORK SECURITY LAB & 23CS60**

L-T-P STRUCTURE : 0-0-3 **COURSE CREDITS** : 1.5

COURSE INSTRUCTOR : **T N V S Praveen**

Pre-requisites: : Computer Programming, Mathematics, Computer Networks.

Course Educational Objectives (CEOs):

The Objective of the course is to provide practical level training that enables the usage of security algorithms for handling security projects. It also provides foundation level training for network analysis to find out the intruders in a network traffic.

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

CO 1 Summarize basic encryption and decryption techniques such as Caesar Cipher, Substitution Cipher, and Hill Cipher to understand the fundamental principles of cryptography. (Understand-L2)

CO 2 Apply and analyze modern symmetric and asymmetric key cryptographic algorithms including DES, Blowfish, Rijndael (AES), and RSA using C/Java. (Apply-L3)

CO 3 Apply key management, hashing, and secure communication mechanisms through Diffie–Hellman key exchange and message digest generation using SHA algorithms. (Apply-L3)

CO 4 Improve individual / teamwork skills, communication & report writing skills with ethical values.

1. Course Articulation Matrix:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	-	1	3	3	3
CO2	3	3	3	2	2	-	-	-	-	-	-	1	3	3	3
CO3	2	3	2	2	3	-	-	-	-	-	-	2	-	3	-
CO4	-	-	-	-	-	-	-	2	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 William Stallings, "Network Security Essentials (Applications and Standards)", Pearson Education, 1999.

T2 Snort 2.1 Intrusion Detection by Jay Beale, Andrew R.Baker , Second Editio

REFERENCE BOOK(S):

1. William Stallings, "Cryptography and Network security", Pearson Education, Fourth Edition.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language UserGuide", Pearson Education, 2nd Edition, ISBN: 0- 201-57168-4, 1998.

2. https://www.snort.org/documents/snort-3-1-0-0-on-ubuntu-18-202007.

3. https://www.wireshark.org/download/docs/user-guide.pdf

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1	Lab Cycle-1	3 3	04-12-2025		**DM5**	
2.	Lab Cycle -2	3 3	18-12-2025		**DM5**	
3.	Lab Cycle-3	3 3	08-01-2026		**DM5**	
4.	Lab Cycle-4	3	22-01-2026		**DM5**	
5.	Lab Cycle-5	3	05-02-2026		**DM5**	
6.	Lab Cycle-6	3	19-02-2026		**DM5**	
7.	Lab Cycle-7	3	26-02-2026		**DM5**	
8.	Lab Cycle-8	3	12-03-2026		**DM5**	
9.	Lab Cycle-9	3	26-03-2026		**DM5**	
10.	Lab Cycle-9	3	02-04-2026		**DM5**	

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

PART-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
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PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**T N V S Praveen**	**T N V S Praveen**	**Dr.D.V. Subbaiah**	**Dr. S.Nagarjuna Reddy**
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor : **Mr.V.V.VAMSI KRISHNA**
Course Name & Code : Soft Skills & 23HSS1
L-T-P Structure : **0**-1-2 **Credits:** 02
Program/Sem/Sec : B. Tech- VI SEM /
Academic Year : 2025-26

PREREQUISITE : Basic language proficiency and cognitive skills with an exposure to academic contexts.

Course Objectives:

- To equip the students with the skills to effectively communicate in English.
- To train the students in interview skills, group discussions and presentation skills.
- To motivate the students to develop confidence.
- To enhance the students' interpersonal skills.
- To improve the students' writing skills.

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

CO1	Demonstrate analytical thinking skills by effectively introducing themselves, evaluating their own strengths and weaknesses, and understanding the role of perception and attitude in personality development. **L2 -Understand**
CO2	Make use of self-management competencies, leadership qualities, and etiquette skills to function confidently and professionally in workplace environments. **L3 - Apply**
CO3	Utilize grammatical proficiency, writing skills, and documentation techniques to communicate clearly and professionally in academic and workplace settings. **L3 - Apply**
CO4	Take part in effectively in group discussions by demonstrating logical thinking, clarity of expression, and collaborative communication. **L4 - Analyze**
CO5	Identify the key factors that influence interpersonal relationships and analyze how they affect communication and collaboration. **L3 - Apply**

COURSE ARTICULATION MATRIX
(Correlation between COs & POs)

Course Outcomes / PO's	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.		1			2			3	3	3		3
CO2.		1			2			3	3	3		3
CO3.		1			2			3	3	3		3
CO4.		1			2			3	3	3		3
CO5.		1			2			3	3	3		3
1 = Slight (Low)				**2= Moderate (Medium)**						**3 = Substantial (High)**		

UNIT – I

Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

Communication Skills: Verbal Communication; Non Verbal Communication (Body Language)

UNIT – II

Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

Etiquette: Social Etiquette, Business Etiquette, Telephone Etiquette, Dining Etiquette

UNIT – III

Standard Operation Methods: Basic Grammars, Tenses, Prepositions, Pronunciation, Letter Writing; Note Making, Note Taking, Minutes Preparation, Email & Letter Writing.

UNIT-IV

Job-Oriented Skills: Group Discussion, Mock Group Discussions, Resume Preparation, Interview Skills, Mock Interviews

UNIT-V

Interpersonal relationships: Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships, Accommodating different styles, Consequences of interpersonal relationships

Text books:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.

References:

1. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand& Company Ltd., 2018.
2. Raman, Meenakshi& Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-resources:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

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 method	HOD Sign
1.	***Analytical Thinking & Listening Skills:*** Self-Introduction	1+2	01/12/2025		TLM1 TLM4	
2.	Self – Analysis, Developing Positive Attitude, Perception	1+2	08/12/2025		TLM1 TLM5	
3.	Verbal Communication; Non Verbal Communication (Body Language)	1+2	15/12/2025		TLM1 TLM4 TLM3	
4.	***Self-Management Skills:*** Anger Management, Stress Management	1+2	22/12/2025		TLM2 TLM4	
5.	Time Management, Six Thinking Hats	1+2	29/12/2025		TLM2 TLM4	
6.	Team Building and Leadership Qualities	1+2	05/01/2026		TLM2 TLM4	
7.	***Standard Operation Methods :*** Basic Grammars, Tenses, and Prepositions	1+2	19/01/2026		TLM1 TLM3	
8.	Pronunciation, Letter Writing	1+2	02/02/2026		TLM1 TLM3	
9.	Note Making, Note Taking, Minutes Preparation, Email	1+2	09/02/2026		TLM2 TLM5	
10.	***Job-Oriented Skills:*** Group Discussion, Mock Group Discussions	1+2	16/02/2026		TLM4, TLM6	
11.	Mock Group Discussions	1+2	23/02/2026		TLM4, TLM6	
12.	Resume Preparation	1+2	02/03/2026		TLM1, TLM5	
13.	Interview Skills, Mock Interviews	1+2	09/03/2026		TLM1, TLM6	
14.	Interview Skills, Mock Interviews	1+2	16/03/2026		TLM1, TLM6	
15.	***Interpersonal relationships:*** Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships	1+2	23/03/2026		TLM1 TLM3 TLM5	
16.	Accommodating different styles, Consequences of interpersonal relationships	1+2	30/03/2026		TLM1 TLM3 TLM5	
No. of classes required to complete Syllabus:						

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

Evaluation Task	**Marks**
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Title	**Course Instructor**	**Lab. Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**V.V.Vamsi Krishna**	**Dr. B. Samrajya Lakshmi**	**Dr. Padma Venkat**	**Dr. T. Satyanarayana**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. S. Nagarjuna Reddy
Course Name & Code : Compiler Design 23CS15
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI/B **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Fundamental knowledge of **C programming, and formal languages and automata theory.**

COURSE EDUCATIONAL OBJECTIVES (CEOs):
Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

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

CO1	Design and implement a lexical analyzer using LEX & regular expressions and illustrate the ambiguity in context-free grammars.**(Apply-L3)**
CO2	Design parsers using top-down (recursive-descent / LL) and bottom-up (LR / shift-reduce) parsing techniques; construct parse tables and detect conflicts**(Apply-L3)**
CO3	Design syntax-directed translation schemes and implement intermediate code generation using syntax trees & three-address code. **(Apply-L3)**
CO4	Describe the principles of code optimization, including flow analysis, loop optimization, and structure-preserving transformations**(Understand-L2)**
CO5	Describe the design issues of the code generator and run-time environment of the program**(Understand-L2)**

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

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

TEXTBOOKS:

T1 Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson, 2007.

REFERENCE BOOKS:

R1 Compiler Construction, Principles and Practice, Kenneth C Louden, Cengage Learning, 2006.

R2 Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.

R3 Optimizing Compilers for Modern Architectures, Randy Allen, Ken Kennedy,Morgan Kauffmann, 2001.

R4 Levine, J.R., T. Mason and D. Brown, Lex and Yacc, edition, O'Reilly & Associates, 1990

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: 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	HOD Sign Weekly
1.	Introduction to Compiler Design, Course Objectives and Course Outcome's Discussion	1	01/12/2025		TLM2	
2.	Language Processors	1	03/12/2025		TLM2	
3.	Structure of a Compiler	1	04/12/2025		TLM2	
4.	Bootstrapping	1	06/12/2025		TLM1,3	
5.	Lexical Analysis, The Role of the Lexical Analyzer, Input Buffering,	1	08/12/2025		TLM2	
6.	Specification of Tokens, Recognition of Tokens,	1	10/12/2025		TLM2	
7.	Lexical Analyzer Generator-LEX	1	11/12/2025		TLM2	
8.	Tutorial-Finite Automata, Regular Expressions	1	15/12/2025		TLM1	
9.	Design of a Lexical Analyzer Generator.	1	17/12/2025		TLM1	
10.	Syntax Analysis: The Role of the Parser,	1	18/12/2025		TLM1	
11.	Context-Free Grammars, Derivations, Parse Trees	1	20/12/2025		TLM3	
12.	Activity Based Learning- Lexical Analysis& Syntax Analysis		20/12/2025		TLM3	
13.	Ambiguity, Left Recursion, Left Factoring,	1	22/12/2025		TLM1	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: TOP DOWN PARSING &BOTTOM UP PARSING:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Pre Processing Steps of Top-Down Parsing, Backtracking	1	24/12/2025		TLM2	
15.	Tutorial & Recursive Descent Parsing				TLM1 TLM 3	
16.	LL (1) Grammars,	2	27/12/2025 29/12/2025		TLM1	
17.	Non-recursive Predictive Parsing,	1	31/12/2025		TLM1	
18.	Error Recovery in Predictive Parsing	1	31/12/2025		TLM1	

19.	**BOTTOM UP PARSING** : Tutorial, Introduction, Difference between LR and LL Parsers, Types of LR Parsers,	1	05/01/2026		TLM2 TLM 3	
20.	SLR Parsers, Construction of SLR Parsing Tables	2	07/01/2026 08/01/2026		TLM1	
21.	More Powerful LR Parses, Construction of CLR (1) parsing Tables	1	19/01/2026		TLM1	
22.	LALR Parsing Tables	1	21/01/2026		TLM1	
23.	Dangling Else Ambiguity, Error Recovery in LR Parsing,	1	22/01/2026		TLM1	
24.	Handling Ambiguity Grammar with LR Parsers		22/01/2026		TLM2 TLM3	
25.	Tutorial &Activity Based Learning- Top Down Parsing	1	24/01/2026		TLM7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Syntax-Directed Definitions	1	02/02/2026		TLM1	
27.	Tutorial& Evaluation Orders for SDD's,		02/02/2026		TLM1 TLM3	
28.	Applications of Syntax Directed Translation	1	04/02/2026		TLM1	
29.	Syntax-Directed Translation Schemes	1	05/02/2026		TLM1	
30.	Implementing L-Attributed SDD's	1	09/02/2026		TLM1	
31.	Activity Based Learning- Syntax Directed translation, Type Checker	1	11/02/2026		TLM1,7	
32.	Intermediate Code Generation: Variants of Syntax Trees,	1	12/02/2026		TLM1	
33.	Three Address Code	1	14/02/2026		TLM1	
34.	Tutorial & Types and Declarations,	1	16/02/2026		TLM1	
35.	Translation of Expressions	1	18/02/2026		TLM1,3	
36.	Type Checking, Control Flow	1	19/02/2026		TLM1	
37.	Activity Based Learning- Intermediate Code generation	1	21/02/2026		TLM 7	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: CODE OPTIMIZATION

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.	The Principle Sources of Optimization	1	23/02/2026		TLM2	
39.	Basic Blocks, Optimization of Basic Blocks	1	25/02/2026		TLM1	
40.	DAG representation of Basic Blocks	1	26/02/2026		TLM1	
41.	Tutorial & Activity Based learning	1	28/02/2026		TLM3,7	
42.	Structure Preserving Transformations	1	02/03/2026		TLM1	
43.	Flow Graphs	1	04/03/2026		TLM1	
44.	Tutorial	1	05/03/2026		TLM3	
45.	Loop Optimization	1	07/03/2026		TLM1	

46.	Data-Flow Analysis,	1	09/03/2026		TLM1	
47.	Peephole Optimization	1	11/03/2026		TLM1	
48.	Activity Based Learning	1	12/03/2026		TLM7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: RUN TIME ENVIRONMENTS& CODE GENERATION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	Storage Organization	1	14/03/2026		TLM2	
50.	Run Time Storage Allocation	1	16/03/2026		TLM2	
51.	Activation Records	1	23/03/2026		TLM2	
52.	Tutorial	1	25/03/2026		TLM3	
53.	Procedure Calls	1	28/03/2026		TLM2	
54.	Displays	1	30/03/2026		TLM2	
55.	Code Generation: Issues in the Design of a Code Generator,	1	01/04/2026		TLM3	
56.	Object Code Forms	1	02/04/2026		TLM1	
57.	Code Generation Algorithm	1	04/04/2026		TLM2	
58.	Register Allocation and Assignment				TLM1	
59.	Activity Based Learning	1	04/04/2026		TLM7	
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	HOD Sign Weekly
1.						

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
TLM7	Activity Based learning		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. S.Nagurjuna Reddy**	**Dr. D. Veeraiah**	**Dr. D. Venkata Subbaiah**	**Dr. S.Nagurjuna Reddy**
Signature				

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Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: M. Gayathri
Course Name & Code : CLOUD COMPUTING 23CS11
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI SEM /B **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To explain the evolving utility computing model called cloud computing.
- To introduce the various levels of services offered by cloud.
- To discuss the fundamentals of cloud enabling technologies such as distributed computing, service-oriented architecture and virtualization.
- To emphasize the security and other challenges in cloud computing.
- To introduce the advanced concepts such as containers, serverless computing and cloud-centric Internet of Things.

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

CO1	Understand the concept of cloud computing reference models, Services, Deployment models and cloud service providers. **(Understand-L2)**
CO2	Understand the cloud enabling technologies for Parallel and distributed computing, Service-Oriented Architecture and Web services. **(Understand-L2)**
CO3	Implement the levels of virtualization tools and containers for resource provisioning and the orchestration tools. **(Apply-L3)**
CO4	Understand the challenges of cloud computing and know the security issues in cloud computing. **(Understand-L2)**
CO5	Analyze the advanced concepts of cloud computing for server-less-computing, fog, edge and quantum computing. (**Analyze-L4)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
R2	Essentials of cloud Computing, K. Chandrasekhran, CRC press, 2014.
R3	https://www.ibm.com/cloud/learn/cloud-computing
R4	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J NPTEL Cloud Computing
R5	https://www.youtube.com/watch?v=10jm7Waan8M&list=PLdpzxOOAlwvIcxgCUyBHVOcWs0Krjx9xR Azure Course Videos
R6	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos
R7	https://www.youtube.com/watch?v=GkKNxyLp_V0&list=PLdpzxOOAlwvLNOxX0RfndiYSt1Le9azze Aws Course Videos
R8	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos https://www.youtube.com/watch?v=jVE7qKWg8mc GCP Course Videos

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Cloud Computing Fundamentals

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 CO's & PO'S	1	01/12/25		TLM1, 2	
2.	Cloud computing at a glance, defining a cloud	1	02/12/25		TLM1, 2	
3.	cloud computing reference model	1	04/12/25		TLM1, 2	
4.	Types of services (IaaS, PaaS, SaaS)	1	05/12/25		TLM1, 2	
5.	Cloud Deployment models (Public, private, hybrid)	1	08/12/25		TLM1, 2	
6.	utility computing	1	09/12/25		TLM1, 2	
7.	cloud computing characteristics and benefits	1	11/12/25		TLM1, 2	
8.	Cloud service providers Amazon Web Services	1	12/12/25		TLM1, 2	
9.	Microsoft Azure	1	15/12/25		TLM1, 2	
10.	Google App Engine	1	16/12/25		TLM 1, 2	
11.	Tutorial / Activity	1	18/12/25		TLM 3/7	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Cloud Enabling Technologies

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.	Ubiquitous Internet	1	19/12/25		TLM1,2	
13.	parallel and distributed computing	1	22/12/25		TLM1,2	
14.	elements of parallel computing,	1	23/12/25		TLM1,2	
15.	hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD),	3	26/12/25 29/12/25 30/12/25		TLM1,2	
16.	elements of distributed computing	1	02/01/26		TLM1,2	
17.	Inter-process communication	1	05/01/26		TLM1,2	
18.	technologies for distributed computing	1	06/01/26		TLM1,2	
19.	remote procedure calls (RPC), service-oriented architecture (SOA),	1	08/01/26		TLM1,2	
20.	Web services	1	19/01/26		TLM1,2	
21.	virtualization.	1	20/01/26		TLM1,2	
22.	Tutorial / Activity/ Assignment	1	22/01/26		TLM 3/7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Virtualization and Containers

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Characteristics of virtualized environments	1	23/01/26		TLM1,2	
24.	Taxonomy of virtualization techniques	1	02/02/26		TLM1,2	
25.	Virtualization and cloud Computing	1	03/02/26		TLM1,2	
26.	Pros and cons of virtualization technology examples (XEN, VMware)	1	05/02/26		TLM1,2	
27.	building blocks of containers,	1	09/02/26		TLM1,2	
28.	Container platforms (LXC, Docker)	1	10/02/26		TLM1,2	
29.	container orchestration,	1	12/02/26		TLM1,2	
30.	Docker Swarm and Kubernetes	1	13/02/26		TLM1,2	
31.	Public cloud VM (e.g. Amazon EC2)	1	16/02/26		TLM1,2	
32.	Container (e.g. Amazon Elastic Container Service) offerings.	1	17/02/26		TLM1,2	
33.	Tutorial/ Activity / Assignment	1	19/02/26		TLM 3/7	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Cloud computing challenges

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Economics of the cloud	1	20/02/26		TLM1,2	
35.	Cloud interoperability and standards.	1	23/02/26		TLM1,2	
36.	Scalability and fault tolerance	1	24/02/26		TLM1,2	
37.	Energy efficiency in clouds	1	26/02/26		TLM1,2	

38.	federated clouds	1	27/02/26		TLM1,2	
39.	Cloud computing security	1	02/03/26		TLM1,2	
40.	Fundamentals of computer security	1	05/03/26		TLM1,2	
41.	Cloud security architecture,	1	06/03/26		TLM1,2	
42.	Cloud shared responsibility model	1	09/03/26		TLM1,2	
43.	Security in cloud deployment models.	1	10/03/26		TLM1,2	
44.	Tutorial /Activity / Assignment	1	12/03/26		TLM 3/7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Advanced concepts in cloud computing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Server less computing	1	13/03/26		TLM1,2	
46.	Function-as-a Service	1	16/03/26		TLM1,2	
47.	Server less computing architecture	1	17/03/26		TLM1,2	
48.	Public cloud (e.g. AWS Lambda) and open source (e.g. Open FaaS) server less platforms	2	20/03/26 23/03/26		TLM1,2	
49.	Internet of Things (IoT) applications,	1	24/03/26		TLM1,2	
50.	Cloud centric IoT and layers	1	26/03/26		TLM1,2	
51.	Edge and fog computing, DevOps,	1	30/03/26		TLM1,2	
52.	Infrastructure-as-code	1	31/03/26		TLM1,2	
53.	Quantum cloud computing	1	02/04/26		TLM1,2	
54.	Tutorial / Activity / Assignment	1	03/04/26		TLM3/7	
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	HOD Sign Weekly
1.					**TLM 3**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Mrs. M. Gayathri**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : **Mr P.Narasimha Rao**
Course Name & Code : CRYPTOGRAPHY & NETWORK SECURITY-**23CS13**
L-**T-P Structure** : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., CSE, VI-Sem., Section – B A. Y: 2025 -2026
PRE-REQUISITE : Computer Networks, Number theory and programming language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objectives of this course are to explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, public key algorithms, design issues and working principles of various authentication protocols and various secure communication standards including Kerberos, IPsec, and SSL/TLS.SSL/TLS.

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

CO1	Understand the basic concepts of security, cryptographic attacks, and the Euclidean algorithm. **(L2 – Understand)**
CO2	Summarize the principles and operations of symmetric key algorithms such as DES and AES. **(L2 – Understand)**
CO3	Apply asymmetric key cryptographic concepts to design simple public-key cryptosystems. **(L3 – Apply)**
CO4	Understand message integrity, authentication mechanisms, digital signatures, and key management techniques. **(L2 – Understand)**
CO5	Apply security protocols such as PGP, S/MIME, SSL/TLS, and IPSec in network protection scenarios. **(L3 – Apply)**

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

TEXTBOOKS:

T1 Cryptography and Network Security, 3rd Edition Behrouz A Forouzan, Deb deep
T2 Mukhopadhyay, McGraw Hill,2015
2. Cryptography and Network Security,4th Edition, William Stallings, (6e) Pearson,2006
3. Everyday Cryptography, 1st Edition, Keith M.Martin, Oxford,2016

REFERENCE BOOKS:
R1 Network Security and Cryptography, 1st Edition, Bernard Meneges, Cengage.

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.	**Basic Principles :** Introduction to CNS	1	01/12/25			
2.	Security Attacks	1	03/12/25			
3.	Security Services, Mechanisms	1	05/12/25			
4.	Integrity, Authentication Confidentiality & &Non-Repudiation	1	06/12/25			
5.	Classical encryption techniques: Substitution Techniques,	1	08/12/25			
6.	Transposition Techniques	1	10/12/25			
7.	steganography Mathematics of Cryptography:integer arithmetic	2	12/12/25 15/12/25			
8.	Euclidean Algorithm	2	17/12/25 19/12/25			
9.	Assignment-1	1	20/12/25			
No. of classes required to complete UNIT-I		11				

UNIT-II: Symmetric Encryption

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	**Symmetric Encryption:** Mathematics of Symmetric Key Cryptography-algebraic structures	2	22/12/25 26/12/25			
11.	Introduction to Modern Symmetric Key Ciphers-modern block ciphers	1	27/12/25			
12.	modern stream ciphers	1	02/01/26			
13.	Data Encryption Standard-DES structure	1	03/01/26			
14.	DES analysis	1	05/01/26			
15.	Security of DES	1	07/01/26			
16.	Multiple DES	1	09/01/26			
17.	Advanced Encryption Standard-transformations	1	10/01/26			
18.	key expansions	1	12/01/26			
19.	AES ciphers	1	16/01/26			
20	Analysis of AES	1	17/01/26			
21.	Assignment-2/Activity Based Learning	1	19/01/26			
sNo. of classes required to complete UNIT-II		13		No. of classes taken:		

UNIT-III: Asymmetric Encryption:

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.	Mathematics of Asymmetric Key Cryptography-primes	1	21/01/26 24/01/26			
23.	primality testing	1	28/01/26 31/01/26			
24.	Factorization	1	02/02/26			
25.	CRT	1	04/02/26			
26.	Asymmetric Key Cryptography-	1	06/02/26 07/02/26			

27.	RSA crypto system	1	09/02/26			
28.	Rabin cryptosystem	1	11/02/26			
29	Elgamal Crypto system	2	13/02/26 16/02/26			
30.	ECC	1	18/02/26			
31.	Assignment - 3	1	20/02/26			
No. of classes required to complete UNIT-III		11		No. of classes taken:		

UNIT-IV: Data Integrity, Digital Signature Schemes & Key Management

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Message Integrity and Message Authentication-message integrity	1	21/02/26 25/02/26			
33.	Message authentication	2	27/02/26 28/02/26			
34.	SHA-512	1	02/03/26			
35.	Digital Signature- process,	1	04/03/26			
36.	Services, Attacks	1	06/03/26			
37.	Schemes	1	07/03/26			
38.	Applications	1	09/03/26			
39.	Key Management-symmetric key distribution,	1	11/03/26 13/03/26			
40	Kerberos	2	14/03/26 16/03/26			
No. of classes required to complete UNIT-IV		11		No. of classes taken:		

UNIT-V: Network Security-I

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Security at application layer: PGP and S/MIME	1	18/03/26			
42.	Security at the Transport Layer : SSL and TLS	1	20/03/26			
43.	**Network Security-II**	1	21/03/26			
44.	Security at the Network Layer: IPSec-two modes	1	23/03/26			
45.	Two security protocols	1	25/03/26			
46.	Security association	1	27/03/26			
47.	IKE	1	28/03/26			
48.	ISAKMP	1	30/03/26			
49.	System Security-users	1	01/04/26			
50.	Trust, trusted systems	1	02/04/26			
51.	Malicious software	1	03/04/26			
52.	Worms,Virus	1	04/04/26			
53.	IDS, Firewalls	1	04/04/26			
54.	Content Beyond the Syllabus	1	04/04/26			
No. of classes required to complete UNIT-V		14		No. of classes taken:		

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

PART C

EVALUATION PROCESS (R23 Regulations):

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

PART D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**P. Narasimha Rao**	**Mr.T.NVS Praveen**	**Dr.D.V Subbaiah**	**Dr.S.Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

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

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr.K DeviPriya
Course Name & Code :MACHINE LEARNING-23AM01
L-T-P Structure : **3-0-0** **Credits:**3
Program/Sem/Sec : B.Tech/VI SEM /A **A.Y.:**2025-26
Regulations : R23

PREREQUISITE: Probability and Statistics, Data Warehousing and Data Mining

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- Apply supervised learning algorithms including decision trees and k-nearest neighbours (k-NN).
- Implement unsupervised learning techniques, such as K-means clustering.

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

CO1	Understand development steps of model building and evaluation approaches.**(Understand - L2)**
CO2	Apply Nearest Neighbor-based models to solve real-time regression and classification problems **(Apply-L3)**
CO3	Make use of supervised learning algorithms to solve classification problems **(ApplyL3)**
CO4	Apply linear discriminants and perceptron classifiers to classify datasets **(Apply-L3)**
CO5	Apply various clustering techniques to solve complex problems **(Apply-L3)**

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

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

TEXTBOOKS:

T1	"Machine Learning Theoryand Practice", M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

REFERENCE BOOKS:

R1	"Machine Learning", Tom M. Mitchell, McGraw-Hill Publication, 2017
R2	"Machine Learning in Action",Peter Harrington, DreamTech
R3	"Introduction to Data Mining", Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

Web Resources:
https://nptel.ac.in/courses/106106139

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Machine Learning

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- Course Objective & Outcomes	1	01-12-2025		TLM1, 2	
2.	Introduction to Machine Learning	1	02-12-2025		TLM1, 2	
3.	Evolution of Machine Learning,Paradigms for ML	1	06-12-2025		TLM1, 2	
4.	Learning by Rote, Learning by Induction	1	08-12-2025		TLM1, 2	
5.	Reinforcement Learning, Types of Data	1	09-12-2025		TLM1, 2	
6.	Matching, Stages in Machine Learning	1	13-12-2025		TLM1, 2	
7.	Data Acquisition, Feature Engineering	1	15-12-2025		TLM1, 2	
8.	Data Representation, Model Selection, Model Learning	1	16-12-2025		TLM1, 2	
9.	Model Evaluation, Model Prediction	1	20-12-2025		TLM1, 2	
10.	Search and Learning, Data Sets.	1	22-12-2025		TLM1, 2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: Nearest Neighbor-Based Models:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Introduction to Proximity Measures.	1	23-12-2025		TLM1,2	
12.	Distance Measures, Non-Metric Similarity Functions	1	27-12-2025		TLM1,2	
13.	Proximity Between Binary Patterns,	1	29-12-2025			
14.	Different Classification Algorithms Based on the Distance Measures	1	30-12-2025		TLM1,2	
15.	K-Nearest Neighbor Classifier	1	03-01-2026 05-01-2026		TLM1,2	
16.	Radius Distance Nearest Neighbor Algorithm	1	06-01-2026		TLM1,2	
17.	KNN Regression	1	10-01-2026		TLM1,2	
18.	Performance of Classifiers	1	22-01-2026		TLM1,2	
19.	Performance of Regression Algorithms.	1	23-01-2026			
20.	Performance of Regression	1	27-01-2026		TLM1,2	

	Algorithms					
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Models Based on Decision Trees:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Decision Trees for Classification	1	02-02-2026		TLM1,2	
22.	Impurity Measures, Properties	1	03-02-2026		TLM1,2	
23.	Regression Based on Decision Trees,	1	07-02-2026		TLM1,2	
24.	Bias–Variance Trade-off	1	09-02-2026		TLM1,2	
25.	Random Forests for Classification and Regression.	1	10-02-2026		TLM1,2	
26.	The Bayes Classifier: Introduction to the Bayes Classifier	1	14-02-2026		TLM1,2	
27.	Bayes' Rule and Inference, The Bayes Classifier and its Optimality.	1	16-02-2026		TLM1,2	
28.	Multi-Class Classification	1	17-02-2026		TLM1,2	
29.	Class Conditional Independence and Naive Bayes Classifier (NBC)	1	21-02-2026		TLM1,2	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: Linear Discriminants for Machine Learning:

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 to Linear Discriminants	1	23-02-2026		TLM1,2	
31.	Linear Discriminants for Classification	1	24-02-2026		TLM1,2	
32.	Perceptron Classifier,	1	28-02-2026		TLM1,2	
33.	Perceptron Learning Algorithm	1	02-03-2026		TLM1,2	
34.	Support Vector Machines,	1	03-03-2026		TLM1,2	
35.	Linearly Non-Separable Case	1	07-03-2026		TLM1,2	
36.	Non-linear SVM, Kernel Trick	1	09-03-2026		TLM1,2	
37.	Logistic Regression,Linear Regression	1	10-03-2026		TLM1,2	
38.	Multi-Layer Perceptrons (MLPs),	1	14-03-2026		TLM1,2	
39.	Backpropagation for Training an MLP	1	16-03-2026		TLM1,2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Clustering:

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

40.	Introduction to Clustering, Partitioning of Data	1	17-03-2026		TLM1,2	
41.	Matrix Factorization Clustering of Patterns	1	19-03-2026		TLM1,2	
42.	Divisive Clustering, Agglomerative Clustering	1	21-03-2026		TLM1,2	
43.	Partitional Clustering, K-Means Clustering	1	23-03-2026		TLM1,2	
44.	Soft Partitioning, Soft Clustering	1	24-03-2026		TLM1,2	
45.	Fuzzy C-Means Clustering, Rough Clustering	1	28-03-2026		TLM1,2	
46.	Rough K-Means Clustering Algorithm	1	30-04-2026		TLM3	
47.	Expectation Maximization-Based Clustering	1	31-04-2026		TLM1,2	
48.	Spectral Clustering.	1	04-04-2026		TLM1,2	
No. of classes required to complete UNIT-V: 09				**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
1.	Generative AI and Large Language Models (LLMs)	1	04-04-2026		**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. K. Devi Priya**	**Dr. D. Venkata Subbaiah**	**Dr. K. Devi Priya**	**Dr. S. Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: N. V. PADMAVATHI	
Course Name & Code	: Software Project Management & 23IT07	
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech., CSE., VI-Sem., Sec-B	A.Y: 2025-26

PRE-REQUISITE: Software Engineering, Software Testing Methodologies, Object oriented Analysis and Design.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course is centered on the unique aspects of Software Project Management at three levels:

To describe and determine the purpose and importance of project management from the perspectives of effective planning, continuous tracking, and successful completion of projects.

To compare and differentiate various organizational structures and project structures, enabling learners to understand how organizational design influences project execution and outcomes.

To implement a project by managing schedules, expenses, and resources using appropriate project management tools and techniques for effective project delivery.

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

CO 1	Understand conventional and modern software management practices and describe their impact on software economics. **(Understand-L2)**
CO 2	Apply software life cycle phases and associated artifacts to structure and document a complete software development process. **(Apply – L3)**
CO 3	Develop iterative project plans by utilizing model-based architectures, process workflows, and milestone checkpoints. **(Apply-L3)**
CO 4	Apply basic concepts of project organization, automation, and software metrics to interpret project monitoring information. **(Apply-L3)**
CO5	Understand the fundamental concepts of Agile and DevOps and their role in improving software development and delivery. **(Understand-L2)**

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

COs	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	1	-	-	-	-	-	1	-	-	2	-	-
CO2	2	2	1	1	1	-	-	-	-	1	-	-	3	-	1
CO3	2	2	2	2	1	-	-	-	1	2	-	1	3	-	-
CO4	2	2	1	2	1	-	-	-	-	2	-	1	3	-	-
CO5	1	1	1	1	2	-	-	-	-	1	-	1	2	1	-

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

TEXT BOOKS:

T1 Software Project Management, Walker Royce, PEA, 2005.

T2 Succeeding with Agile: Software Development Using Scrum, Mike Cohn, Addison Wesley.

T3 The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.

REFERENCE BOOKS:

R1 Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH

R2 Software Project Management, Joel Henry, PEA

R3 Software Project Management in practice, Pankaj Jalote, PEA, 2005.

R4 Effective Software Project Management, Robert K.Wysocki, Wiley,2006.

R5 Project Management in IT, Kathy Schwalbe, Cengage

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Conventional Software Management

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.	**Conventional Software a Management :** The waterfall model	2	01-12-2025 02-12-2025		TLM2	
2.	Conventional software management performance	2	06-12-2025 08-12-2025		TLM2	
3.	**Evolution of Software Economics:**	1	09-12-2025		TLM2	

	Software Economics					
4.	Software cost estimation, pragmatic software cost estimation.	1	13-12-2025		TLM2	
5.	**Improving Software Economics:** Reducing Software product size, Improving software processes	1	15-12-2025		TLM2	
6.	Improving team effiectiveness, improving automation, Achieving required quality, peer inspections.	1	16-12-2025		TLM2	
7.	The principles of conventional software Engineering	1	20-12-2025		TLM2	
8.	Principles of modern software management	1	22-12-2025		TLM2	
9.	Transitioning to an iterative process.	1	23-12-2025		TLM2	
No. of classes required to complete UNIT-I:11				No. of classes taken:		

UNIT-II: Life cycle phases

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.	Engineering and production stages	2	27-12-2025 29-12-2025		TLM2	
2.	Inception	1	30-12-2025		TLM2	
3.	Elaboration	1	03-01-2026		TLM2	
4.	Construction	1	05-01-2026		TLM2	
5.	Transition phases	1	06-01-2026		TLM2	
6.	**Artifacts of the process:** The	1	10-01-2026		TLM2	

	artifact sets					
7.	Management artifacts	1	19-01-2026		TLM2	
8.	Engineering artifacts	1	20-01-2026		TLM2	
9.	Programmatic artifacts	1	24-01-2026		TLM2	
10.	Activity	1			TLM2	
No. of classes required to complete UNIT-II:11				No. of classes taken:		
I MID EXAMINATIONS 26-01-2026 TO 31-01-2026						

UNIT-III: Workflows of the process

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Model based software architectures:** A management perspective and technical perspective.	1	02-02-2026			
2.	Software process workflows	1	03-02-2026		TLM2	
3.	Iteration workflows	1	09-02-2026		TLM2	
4.	**Check points of the process:** Major milestones	1	10-02-2026		TLM2	
5.	Minor Milestones	1	14-02-2026		TLM2	
6.	Periodic status assessments	1	16-02-2026		TLM2	
7.	**Iterative Process Planning:** Work break down structures	1	17-02-2026		TLM2	
8.	Planning guidelines	1	21-02-2026		TLM2	
9.	Cost and schedule estimating	2	23-02-2026		TLM2	
10.	Iteration planning process	1	24-02-2026		TLM2	
11.	Pragmatic planning	1	28-02-2026		TLM2	
No. of classes required to complete UNIT-III:12				No. of classes taken:		

UNIT-IV : Project Organization sand Responsibilities

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.	Line-of-Business Organizations	1	02-03-2026		TLM2	
2.	Project Organizations	1	03-03-2026		TLM2	
3.	Evolution of Organizations	1	07-03-2026		TLM2	
4.	**Process Automation:** Automation Building blocks	2	09-03-2026		TLM2	
5.	The Project Environment	1	10-03-2026		TLM2	
6.	**Project Control and Process instrumentation:** The seven core Metrics	1	14-03-2026		TLM2	
7.	Management indicators	1	16-03-2026		TLM2	
8.	Quality indicators	1	17-03-2026		TLM2	
9.	Life cycle expectations	1	21-03-2026		TLM2	
10.	Pragmatic Software Metrics, Metrics automation.	1	23-03-2026		TLM2	
No. of classes required to complete UNIT-IV:11				No. of classes taken:		

UNIT-V: Agile Methodology and DevOps

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.	Agile Methodology,	1	24-03-2026		TLM2	
2.	ADAPTing to Scrum	1	28-03-2026		TLM2	
3.	Patterns for Adopting Scrum, Iterating towards Agility.	1	30-03-2026		TLM2	
4.	**Fundamentals of DevOps:** Architecture, Deployments, Orchestrarion, Need, Instance of applications	1	31-03-2026		TLM2	

5.	DevOps delivery pipeline, DevOps eco system	1	31-03-2026		TLM2	
6.	DevOps adoption in projects: Technology aspects, Agiling capabilities, Tool stack implementation, people aspect, processes.	1	04-04-2026		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		
II MID EXAMINATIONS 06-04-2026 TO 11-04-2026						

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

PART-C

EVALUATION PROCESS (R23 Regulations):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Mrs. N. V. Padmavathi	**Dr. S. Jayaprada**	**Dr. Y.V. B Reddy**	**Dr. S. Nagarjuna Reddy**

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Eeshwar Ram J
Course Name & Code : Disaster Management & 23CE81
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech, VI SEM, CSE – B section **A.Y.:** 2025-26

PREREQUISITE: NILL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

CO1	Identify the usefulness of integrating management principles in disaster mitigation work (Understand – L2)
CO2	Illustrate the different approaches needed to manage pre- during and post- disaster periods (Understand-L2)
CO3	Identify and explain the process of risk management (Understand – L2)
CO4	Evaluate the risk transfer Relate to importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

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

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

TEXTBOOKS:

T1 An Introduction of Disaster Management- Natural Disasters & Vulnerable Hazards– S.Vaidyanathan: CBS Punblishers& Distributors Pvt.Ltd

T2 Natural Hazards & Disaster Management, Vulnerability and Mitigation by RB SinghRawat Publications

T3 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., NewDelhi.

T4 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt.Ltd.

REFERENCE BOOKS:

R1 'Disaster Management' edited by H K Gupta (2003), Universitiespress.

R2 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009), Universitiespress.R. Nishith, Singh AK,

R3 "Disaster Management in India: Perspectives, Issues and strategies" New Royal BookCompany."

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Natural Hazards and Disaster Management

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 CO's & PO's, Subject	1	01-12-2025		**TLM2**	
2.	Introduction of DM	1	03-12-2025		**TLM2**	
3.	Inter disciplinary nature of the subject	1	06-12-2025		**TLM2**	
4.	Disaster Management cycle	1	08-12-2025		**TLM2**	
5.	Five priorities for action.	1	10-12-2025		**TLM2**	
6.	Case study methods of the following: Vegetal Cover floods, droughts	1	13-12-2025		**TLM2**	
7.	Earthquake and landslides.	1	15-12-2025		**TLM2**	
8.	global warming, cyclones & Tsunamis	1	17-12-2025		**TLM2**	
9.	Post Tsunami hazards along the Indian coast	1	20-12-2025		**TLM2**	
10.	Tutorial– 1/ Quick revision	1	22-12-2025		**TLM2**	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II: Man Made Disaster and Their Management Along With Case Study Methods

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.	Fire hazards	1	24-12-2025		**TLM2**	
2.	transport hazard dynamics	1	27-12-2025		**TLM2**	
3.	solid waste management	1	29-12-2025		**TLM2**	
4.	post disaster	1	31-12-2025		**TLM2**	
5.	bio terrorism -threat in mega cities	1	03-01-2026		**TLM2**	
6.	rail and aircraft accidents	1	05-01-2026		**TLM2**	
7.	ground water, industries	1	07-01-2026		**TLM2**	
8.	Emerging infectious diseases and Aids and their management	1	10-01-2026		**TLM2**	
9.	Tutorial– 2/ Quick revision	1	12-01-2026		**TLM2**	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Risk and Vulnerability

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.	Building codes and land use planning	1	17-01-2026		**TLM2**	
2.	Social Vulnerability	1	19-01-2026		**TLM2**	
3.	Environmental vulnerability	1	21-01-2026		**TLM2**	
4.	Macro-economic management and sustainable development	1	24-01-2026		**TLM2**	
5.	Climate change risk rendition	1	02-02-2026		**TLM2**	

6.	Financial management of disaster – related losses	1	04-02-2026		**TLM2**	
7.	Tutorial– 3/ Quick revision	1	07-02-2026		**TLM3**	
No. of classes required to complete UNIT-III: 06				**No. of classes taken:**		

UNIT-IV: Multi-sectional Issues, Education and Community Preparedness

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.	Disaster management for infra structures	1	09-02-2026		**TLM2**	
2.	taxonomy of infra structure	1	11-02-2026		**TLM2**	
3.	treatment plants and process facilities	1	14-02-2026		**TLM2**	
4.	electrical substations	1	16-02-2026		**TLM2**	
5.	roads and bridges	1	18-02-2026		**TLM2**	
6.	mitigation programme for earth quakes	1	21-02-2026		**TLM2**	
7.	flowchart, geospatial information in agriculture drought assessment	1	23-02-2026		**TLM2**	
8.	Multimedia technology in disaster risk management and training	1	25-02-2026		**TLM2**	
9.	Transformable indigenous knowledge in disaster reduction.	1	28-02-2026		**TLM2**	
10.	Role of RS & GIS	1	02-03-2026		**TLM2**	
11.	Tutorial– 4/ Quick revision	1	07-03-2026		**TLM3**	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Multi-sectional Issues, Education and Community Preparedness

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.	Impact of disaster on poverty and deprivation	1	09-03-2026		**TLM2**	
2.	Climate change adaptation and human health - Exposure	1	11-03-2026		**TLM2**	
3.	health hazards and environmental risk	1	14-03-2026		**TLM2**	
4.	Forest management and disaster risk reduction	1	16-03-2026		**TLM2**	
5.	The Red cross and red crescent movement	1	18-03-2026		**TLM2**	
6.	Corporate sector and disaster risk reduction	1	23-03-2026		**TLM2**	
7.	Education in disaster risk reduction, Essentials of school disaster education	1	25-03-2026		**TLM2**	
8.	Community capacity and disaster resilience	1	28-03-2026		**TLM2**	
9.	Community based disaster recovery	1	30-03-2026		**TLM2**	
10.	Community based disaster management and social capital	1	01-04-2026		**TLM2**	
11.	Designing resilience- building community capacity for action	1	04-04-2026		**TLM2**	
No. of classes required to complete UNIT-V: 11				**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Eeshwar Ram.J**	**J. Rangaiah**	**Dr. K. V. Ramana**
Signature			

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: M. Gayathri
Course Name & Code : CLOUD COMPUTING LAB 23CS11
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/VI SEM /B **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To introduce the various levels of services offered by cloud.
- To give practical knowledge about working with virtualization and containers.
- To introduce the advanced concepts such as serverless computing and cloud simulation.

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

CO1	Implement cloud service models, deployment models, virtualization, and containerization using open-source cloud platforms. **(Apply–L3)**
CO2	Analyze the security, performance, and operational challenges in cloud environments through hands-on experiments. **(Analyze–L4)**
CO3	Develop solutions using advanced cloud paradigms such as serverless computing, fog computing, and edge computing to address real-world problems. **(Apply–L3)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018
R2	Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011
R3	Online documentation and tutorials from cloud service providers (e.g. AWS, Google App Engine)
R4	Docker, Reference documentation, https://docs.docker.com/reference/
R5	OpenFaaS, Serverless Functions Made Simple, https://docs.openfaas.com/

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign Weekly
1.	Lab on web services	03	05/12/25		
2.	Lab on IPC, messaging, publish/subscribe	03	12/12/25		
3.	Install Virtual Box/VMware Workstation with different flavours of Linux or windows OS on top of windows8 or above	03	19/12/25		
4.	Install a C compiler in the virtual machine created using Virtual Box and execute Simple Programs.	03	26/12/25		
5.	Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance. In the process, create a security group allowing access to port 80 on the instance.	06	02/01/26 09/01/26		
6.	Install Google App Engine. Create a Hello World app and other simple web applications using python/java.	06	23/01/26 06/02/26		
7.	Start a Docker container and set up a webserver (e.g. apache2 or Python based Flask micro web framework) on the instance. Map the host directory as a data volume for the container.	03	13/02/26		
8.	Find a procedure to transfer the files from one virtual machine to another virtual machine. Similarly, from one container to another container.	03	20/02/26		
9.	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	03	27/02/26		
10.	Install Hadoop single node cluster and run simple applications like word count.	03	06/03/26		
11.	Utilize OpenFaaS – Serverless computing framework and demonstrate basic event driven function invocation.	03	13/03/26		
12.	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.	06	20/03/26 27/03/26		
13.	Internal Exam	03	03/04/26		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Mrs. M. Gayathri**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. VI-Sem., CSE B Sec

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : CRYPTOGRAPHY & NETWORK SECURITY-**23CS13**

L-T-P STRUCTURE : 0-0-3 **COURSE CREDITS** : 1.5

COURSE INSTRUCTOR : **Mr P. Narasimha Rao**

Pre-requisites: : Computer Programming, Mathematics, Computer Networks.

Course Objectives (COs):

- To learn basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
- To understand and implement encryption and decryption using Ceaser Cipher,substitution Cipher, Hill Cipher.

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

CO 1	Apply basic encryption and decryption techniques such as Caesar Cipher, Substitution Cipher, and Hill Cipher to demonstrate fundamental cryptographic operations. (L3 – Apply)
CO 2	Implement modern symmetric and asymmetric key algorithms such as DES, Blowfish, AES, and RSA using C/Java. (L3 – Apply)
CO 3	Perform key management, hashing, and secure communication mechanisms using Diffie–Hellman key exchange and SHA algorithms. (L3 – Apply)
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

1. **Course Articulation Matrix:**

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

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

REFERENCE BOOK(S):

1. William Stallings, "Cryptography and Network security", Pearson Education, Fourth Edition.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language UserGuide", Pearson Education, 2nd Edition, ISBN: 0- 201-57168-4, 1998.
2. https://www.snort.org/documents/snort-3-1-0-0-on-ubuntu-18-202007.
3. https://www.wireshark.org/download/docs/user-guide.pdf

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
	Lab Cycle-1	3 3	04-12-25 11-12-25		**DM5**	
2.	Lab Cycle -2	3 3	18-12-25 25-12-25		**DM5**	
3.	Lab Cycle-3	3 3	01-01-26 08-01-26		**DM5**	
4.	Lab Cycle-4	3	15-01-26 22-01-26		**DM5**	
5.	Lab Cycle-5	3	29-01-26 05-02-26		**DM5**	
6.	Lab Cycle-6	3	12-02-26 19-02-26		**DM5**	
7.	Lab Cycle-7	3	26-02-26		**DM5**	
8.	Lab Cycle-8	3 3	05-03-26		**DM5**	
9.	Lab Cycle-9	3 3	12-03-26		**DM5**	
10.	Lab Cycle-10	3	19-03-26		**DM5**	
11.	Internal Exam	3	26-03-26			

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. P. Narasimha Rao**	**Mr.T N V S Praveen**	**Dr.D.V Subbaiah**	**Dr.S.Nagarjuna Reddy**
Signature				

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Phone: 08659-222933, Fax: 08659-222931

COURSE HANDOUT

PART-A

Name of Course Instructor : **Ms. K. SRIDEVI**
Course Name & Code : Soft Skills & 23HSS1
L-T-P Structure : **0**-1-2 **Credits:** 02
Program/Sem/Sec : B. Tech- VI SEM -CSE-B
Academic Year : 2025-26

PREREQUISITE : NIL

Course Objectives:

• To equip the students with the skills to effectively communicate in English

• To train the students in interview skills, group discussions and presentation skills

• To motivate the students to develop confidence

• To enhance the students' interpersonal skills

• To improve the students' writing skills

COURSE ARTICULATION MATRIX
(Correlation between COs & POs)

Course Outcomes / PO's	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.				1		1		3	3	3		2
CO2.				1				3	3	3		3
CO3.								3	3	3		3
CO4.				2		2		3	3	3		3
CO5.								3	3	3		3

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

UNIT – I

Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

Communication Skills: Verbal Communication; Non Verbal Communication (Body Language)

UNIT – II

Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

Etiquette: Social Etiquette, Business Etiquette, Telephone Etiquette, Dining Etiquette

UNIT – III

Standard Operation Methods : Basic Grammars, Tenses, Prepositions, Pronunciation, Letter Writing; Note Making, Note Taking, Minutes Preparation, Email & Letter Writing.

UNIT-IV

Job-Oriented Skills: Group Discussion, Mock Group Discussions, Resume Preparation, Interview Skills, Mock Interviews

UNIT-V

Interpersonal relationships: Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships, Accommodating different styles, Consequences of interpersonal relationships

Text books:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.

2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.

References:

1. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand& Company Ltd., 2018.

2. Raman, Meenakshi& Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-resources:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

COURSE DELIVERY PLAN (LESSON PLAN)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	***Analytical Thinking & Listening Skills:*** Self-Introduction	1+2	02/12/2025		
2.	Self – Analysis, Developing Positive Attitude, Perception	1+2	09/12/2025		
3.	Verbal Communication; Non Verbal Communication (Body Language)	1+2	16/12/2025		
4.	***Self-Management Skills:*** Anger Management, Stress Management	1+2	23/12/2025		
5.	Time Management, Six Thinking Hats	1+2	30/12/2025		
6.	Team Building and Leadership Qualities	1+2	06/01/2026		
7.	***Standard Operation Methods :*** Basic Grammars, Tenses, and Prepositions	1+2	20/01/2026		
8.	Pronunciation, Letter Writing	1+2	03/02/2026		
9.	Note Making, Note Taking, Minutes Preparation, Email	1+2	10/02/2026		
10.	***Job-Oriented Skills:*** Group Discussion, Mock Group Discussions	1+2	17/02/2026		
11.	Mock Group Discussions	1+2	24/02/2026		
12.	Resume Preparation	1+2	03/03/2026		
13.	Interview Skills, Mock Interviews	1+2	10/03/2026		
14.	Interview Skills, Mock Interviews	1+2	17/03/2026		
15.	***Interpersonal relationships:*** Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships	1+2	24/03/2026		
16.	Accommodating different styles, Consequences of interpersonal relationships	1+2	31/03/2026		
No. of classes required to complete Syllabus :48					

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

Laboratory Examination:

Evaluation Task	Marks
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

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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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Signature				
Name of the Faculty	**Ms. K. Sridevi**	**Dr B. Samrajya Lakshmi**	**Dr B. Samrajya Lakshmi**	**Dr. T Satyanarayana**

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COURSE HANDOUT

PART-A

Name of Course Instructor : **Mr. K. RAJU**
Course Name & Code : Soft Skills & 23HSS1
L-T-P Structure : **0**-1-2 **Credits:** 02
Program/Sem/Sec : B. Tech- VI SEM -CSE-C
Academic Year : 2025-26

PREREQUISITE : NIL

Course Objectives:

• To equip the students with the skills to effectively communicate in English

• To train the students in interview skills, group discussions and presentation skills

• To motivate the students to develop confidence

• To enhance the students' interpersonal skills

• To improve the students' writing skills

COURSE ARTICULATION MATRIX
(Correlation between COs & POs)

Course Outcomes / PO's	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.				1		1		3	3	3		2
CO2.				1				3	3	3		3
CO3.								3	3	3		3
CO4.				2		2		3	3	3		3
CO5.								3	3	3		3

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

UNIT – I

Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

Communication Skills: Verbal Communication; Non Verbal Communication (Body Language)

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Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

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E-resources:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

COURSE DELIVERY PLAN (LESSON PLAN)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	***Analytical Thinking & Listening Skills:*** Self-Introduction	1+2	02/12/2025		
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5.	Time Management, Six Thinking Hats	1+2	30/12/2025		
6.	Team Building and Leadership Qualities	1+2	06/01/2026		
7.	***Standard Operation Methods :*** Basic Grammars, Tenses, and Prepositions	1+2	20/01/2026		
8.	Pronunciation, Letter Writing	1+2	03/02/2026		
9.	Note Making, Note Taking, Minutes Preparation, Email	1+2	10/02/2026		
10.	***Job-Oriented Skills:*** Group Discussion, Mock Group Discussions	1+2	17/02/2026		
11.	Mock Group Discussions	1+2	24/02/2026		
12.	Resume Preparation	1+2	03/03/2026		
13.	Interview Skills, Mock Interviews	1+2	10/03/2026		
14.	Interview Skills, Mock Interviews	1+2	17/03/2026		
15.	***Interpersonal relationships:*** Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships	1+2	24/03/2026		
16.	Accommodating different styles, Consequences of interpersonal relationships	1+2	31/03/2026		
No. of classes required to complete Syllabus :48					

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

Laboratory Examination:

Evaluation Task	Marks
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
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Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

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Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Signature				
Name of the Faculty	**Mr. K. Raju**	**Dr B. Samrajya Lakshmi**	**Dr B. Samrajya Lakshmi**	**Dr. T Satyanarayana**

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.N.Srikanth
Course Name & Code : CLOUD COMPUTING 23CS11
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI SEM /C **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To explain the evolving utility computing model called cloud computing.
- To introduce the various levels of services offered by cloud.
- To discuss the fundamentals of cloud enabling technologies such as distributed computing, service-oriented architecture and virtualization.
- To emphasize the security and other challenges in cloud computing.
- To introduce the advanced concepts such as containers, serverless computing and cloud-centric Internet of Things.

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

CO1	Understand the concept of cloud computing reference models, Services, Deployment models and cloud service providers. **(Understand-L2)**
CO2	Understand the cloud enabling technologies for Parallel and distributed computing, Service-Oriented Architecture and Web services. **(Understand-L2)**
CO3	Implement the levels of virtualization tools and containers for resource provisioning and the orchestration tools. **(Apply-L3)**
CO4	Understand the challenges of cloud computing and know the security issues in cloud computing. **(Understand-L2)**
CO5	Analyze the advanced concepts of cloud computing for server-less-computing, fog, edge and quantum computing. (**Analyze-L4)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
R2	Essentials of cloud Computing, K. Chandrasekhran, CRC press, 2014.
R3	https://www.ibm.com/cloud/learn/cloud-computing
R4	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J NPTEL Cloud Computing
R5	https://www.youtube.com/watch?v=10jm7Waan8M&list=PLdpzxOOAlwvIcxgCUyBHVOcWs0Krjx9xR Azure Course Videos
R6	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos
R7	https://www.youtube.com/watch?v=GkKNxyLp_V0&list=PLdpzxOOAlwvLNOxX0RfndiYSt1Le9azze Aws Course Videos
R8	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos https://www.youtube.com/watch?v=jVE7qKWg8mc GCP Course Videos

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Cloud Computing Fundamentals

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 CO's & PO'S	1	01/12/25		TLM1, 2	
2.	Cloud computing at a glance, defining a cloud	1	02/12/25		TLM1, 2	
3.	cloud computing reference model	1	03/12/25		TLM1, 2	
4.	Types of services (IaaS, PaaS, SaaS)	1	06/12/25		TLM1, 2	
5.	Cloud Deployment models (Public, private, hybrid)	1	08/12/25 09/12/25		TLM1, 2	
6.	utility computing	1	10/12/25		TLM1, 2	
7.	cloud computing characteristics and benefits	1	15/12/25		TLM1, 2	
8.	Cloud service providers Amazon Web Services	1	16/12/25 17/12/25		TLM1, 2	
9.	Microsoft Azure	1	20/12/25		TLM1, 2	
10.	Google App Engine	1	22/12/25 23/12/25		TLM 1, 2	
11.	Tutorial / Activity	1	24/12/25		TLM 3/7	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Cloud Enabling Technologies

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.	Ubiquitous Internet	1	27/12/25		TLM1,2	
13.	parallel and distributed computing	1	29/12/25 30/12/25		TLM1,2	
14.	elements of parallel computing,	1	31/12/25		TLM1,2	
15.	hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD),	2	03/01/26 05/01/26		TLM1,2	
16.	elements of distributed computing	1	06/01/26		TLM1,2	
17.	Inter-process communication	1	07/01/26		TLM1,2	
18.	technologies for distributed computing	1	10/01/26		TLM1,2	
19.	remote procedure calls (RPC), service-oriented architecture (SOA),	1	19/01/26		TLM1,2	
20.	Web services	1	20/01/26		TLM1,2	
21.	virtualization.	1	21/01/26		TLM1,2	
22.	Tutorial / Activity/ Assignment	1	24/01/26		TLM 3/7	
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: Virtualization and Containers

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Characteristics of virtualized environments	1	02/02/26		TLM1,2	
24.	Taxonomy of virtualization techniques	1	03/02/26		TLM1,2	
25.	Virtualization and cloud Computing	1	04/02/26		TLM1,2	
26.	Pros and cons of virtualization technology examples (XEN, VMware)	1	07/02/26		TLM1,2	
27.	building blocks of containers,	1	09/02/26		TLM1,2	
28.	Container platforms (LXC, Docker)	1	10/02/26		TLM1,2	
29.	container orchestration,	1	11/02/26		TLM1,2	
30.	Docker Swarm and Kubernetes	1	16/02/26		TLM1,2	
31.	Public cloud VM (e.g. Amazon EC2)	1	17/02/26		TLM1,2	
32.	Container (e.g. Amazon Elastic Container Service) offerings.	1	18/02/26		TLM1,2	
33.	Tutorial/ Activity / Assignment	1	21/02/26		TLM 3/7	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Cloud computing challenges

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Economics of the cloud	1	23/02/26		TLM1,2	
35.	Cloud interoperability and standards.	1	24/02/26		TLM1,2	
36.	Scalability and fault tolerance	1	25/02/26		TLM1,2	

37.	Energy efficiency in clouds	1	28/02/26		TLM1,2	
38.	federated clouds	1	02/03/26		TLM1,2	
39.	Cloud computing security	1	03/03/26		TLM1,2	
40.	Fundamentals of computer security	1	04/03/26		TLM1,2	
41.	Cloud security architecture,	1	07/03/26		TLM1,2	
42.	Cloud shared responsibility model	1	09/03/26		TLM1,2	
43.	Security in cloud deployment models.	1	10/03/26		TLM1,2	
44.	Tutorial /Activity / Assignment	1	11/03/26		TLM 3/7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Advanced concepts in cloud computing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Server less computing	1	14/03/26		TLM1,2	
46.	Function-as-a Service	1	16/03/26		TLM1,2	
47.	Server less computing architecture	1	17/03/26		TLM1,2	
48.	Public cloud (e.g. AWS Lambda) and open source (e.g. Open FaaS) server less platforms	2	18/03/26 21/03/26		TLM1,2	
49.	Internet of Things (IoT) applications,	1	23/03/26		TLM1,2	
50.	Cloud centric IoT and layers	1	24/03/26		TLM1,2	
51.	Edge and fog computing, DevOps,	2	25/03/26 28/03/26		TLM1,2	
52.	Infrastructure-as-code	1	30/03/26		TLM1,2	
53.	Quantum cloud computing	1	01/04/26		TLM1,2	
54.	Tutorial / Activity / Assignment	1	04/04/26		TLM3/7	
No. of classes required to complete UNIT-V: 12				**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
1.					**TLM6**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr.N.Srikanth**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: N.Srikanth
Course Name & Code : CLOUD COMPUTING LAB 23CS11
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/VI SEM /C **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To introduce the various levels of services offered by cloud.
- To give practical knowledge about working with virtualization and containers.
- To introduce the advanced concepts such as serverless computing and cloud simulation.

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

CO1	Implement cloud service models, deployment models, virtualization, and containerization using open-source cloud platforms. **(Apply–L3)**
CO2	Analyze the security, performance, and operational challenges in cloud environments through hands-on experiments. **(Analyze–L4)**
CO3	Develop solutions using advanced cloud paradigms such as serverless computing, fog computing, and edge computing to address real-world problems. **(Apply–L3)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018
R2	Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011

R3	Online documentation and tutorials from cloud service providers (e.g. AWS, Google App Engine)
R4	Docker, Reference documentation, https://docs.docker.com/reference/
R5	OpenFaaS, Serverless Functions Made Simple, https://docs.openfaas.com/

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign Weekly
1.	Lab on web services	03	04/12/25		
2.	Lab on IPC, messaging, publish/subscribe	03	11/12/25		
3.	Install Virtual Box/VMware Workstation with different flavours of Linux or windows OS on top of windows8 or above	03	18/12/25		
4.	Install a C compiler in the virtual machine created using Virtual Box and execute Simple Programs.	03	08/01/26		
5.	Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance. In the process, create a security group allowing access to port 80 on the instance.	03	22/01/26		
6.	Install Google App Engine. Create a Hello World app and other simple web applications using python/java.	03	05/02/26		
7.	Start a Docker container and set up a webserver (e.g. apache2 or Python based Flask micro web framework) on the instance. Map the host directory as a data volume for the container.	03	12/02/26		
8.	Find a procedure to transfer the files from one virtual machine to another virtual machine. Similarly, from one container to another container.	03	19/02/26		
9.	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	03	26/02/26		
10.	Install Hadoop single node cluster and run simple applications like word count.	03	05/03/26		

11.	Utilize OpenFaaS – Serverless computing framework and demonstrate basic event driven function invocation.	03	12/03/26		
12.	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.	6	19/03/26 26/03/26		
13.	Internal Exam	03	02/04/26		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**N.Srikanth**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. Ch. Srinivasa Rao

Course Name & Code : CRYPTOGRAPHY & NETWORK SECURITY (23CS13)

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

Program/Sem/Sec : B.Tech., CSE, VI-Sem., Section – C A.Y: 2025-26

PRE-REQUISITE : Computer Networks, Number theory and programming language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objectives of this course are to explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, public key algorithms, design issues and working principles of various authentication protocols and various secure communication standards including Kerberos, IPsec, and SSL/TLS.

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

CO1	Summarize the fundamental concepts of security, cryptographic attacks, and Euclidean Algorithm **(Understand-L2)**
CO2	Summarize symmetric key cryptographic algorithms such as DES and AES, including their mathematical foundations, structures, and security aspects. **(Understand-L2)**
CO3	Apply the concepts of asymmetric key cryptography and related mathematical principles to design and evaluate public-key cryptosystems. **(Apply-L3)**
CO4	Demonstrate knowledge of message integrity, authentication mechanisms, digital signature schemes, and key management techniques. **(Understand- L2)**
CO5	Evaluate and implement various network security mechanisms and protocols such as PGP, S/MIME, SSL/TLS, and IPSec. **(Apply-L3)**

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

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

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

1- Low **2 –**Medium **3** High

TEXTBOOKS:

T1 William Stallings, "Network Security Essentials (Applications and Standards)", Pearson
T2 Education, 1999.
William Stallings, "Cryptography and Network Security", PHI/Pearson, fourth edition, 2000.

REFERENCE BOOKS:

R1 Whitman, "Principles of Information Security", Thomson, PHI, 2000.
R2 Robert Bragg, Mark Rhodes, Network Security: The complete reference, TMH
R3 Buchmann, Introduction to Cryptography, Springer,2010.
R4 Jeetendra pande, Ajay, "Digital Foresnsics', ISBN: 978-93-84813-94-9.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: BASIC PRICIPLES

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.	Basic Principles	1	01-12-2025			
2.	Security Goals	1	02-12-2025			
3.	Cryptographic Attacks	1	03-12-2025			
4.	Services & Mechanisms	1	06-12-2025			
5.	Classical Encryption Techniques	1	08-12-2025			
6.	Substitution Techniques	1	09-12-2025			
7.	Transposition techniques	1	10-12-2025			
8.	Stenography	1	13-12-2025			
9.	Mathematics of Cryptography	1	15-12-2025			
10.	Examples on mathematical cryptography	1	16-12-2025			
11.	Integer Arithmetic	1	17-12-2025			
12.	Euclidean Algorithm	1	20-12-2025			
13.	Assignment-1	1	22-12-2025			
No. of classes required to complete UNIT-I		13		No. of classes taken:		

UNIT-II: SYMMETRIC ENCRYPTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Mathematics of Symmetric Key Cryptography	1	23-12-2025			
15	Introduction to Modern Symmetric key Ciphers	1	24-12-2025			
16	Modern block ciphers	1	27-12-2025			
17	Stream Ciphers	1	29-12-2025			
18	DES, DES structure, DES Analysis	1	31-12-2025			
19	Multiple DES	1	03-01-2026			
20	Advanced Encryption standard	1	05-01-2026			
21	AES-Transformations	1	07-01-2026			
22	Key Expansions	1	10-01-2026			
23	AES Ciphers, Analysis of AES	1	12-01-2026			
24	Assignment-2	1	19-01-2026			
S.No. of classes required to complete UNIT-II		10		No. of classes taken:		

UNIT-III: ASSYMETRIC ENCRYPTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25	Mathematics of Assymetric Key Cryptography	1	20-01-2026			
26	Primes, Primality Testing	1	24-01-2026			
27	Factorization, CRT	1	02-02-2026			
28	Asymmetric Key Cryptography	1	03-02-2026			
29	RSA crypto system	1	04-02-2026			
30	Rabin Cryptosystem	1	07-02-2026			
31	Elgamal Crypto system	1	09-02-2026 10-02-2026			
32	ECC	1	14-02-2026			
33	Unit Overview and Discussion	1	16-02-2026			
34	Assignment - 3	1	18-02-2026			
No. of classes required to complete UNIT-III		10		No. of classes taken:		

UNIT-IV: DATA INTEGRITY, DSS SCHEMES & KEY MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
35	Message Integrity & Message Authentication	1	21-02-2026			
36	SHA-512	1	23-02-2026			
37	Digital Signature Process	1	25-02-2026			
38	Services, Attacks, Schemes	1	28-02-2026			
39	Applications-key management	1	02-03-2026			
40	Symmetric key distribution	1	07-03-2026			
41	Kerberos	1	09-03-2026			
42	Unit Overview and Discussion	1	11-03-2026			
No. of classes required to complete UNIT-IV		08		No. of classes taken:		

UNIT-V: NS-I AND NS-II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43	Security at Application Layer	1	14-03-2026			
44	PGP & S/MIME	1	16-03-2026			
45	Security at the Transport Layer	1	18-03-2026			
46	SSL and TLS	1	21-03-2026			
47	Security at the Network Layer	1	23-03-2026			
48	IPSEC- Two Modes	1	24-03-2026			
49	Security associations	1	25-03-2026			
50	IKE, ISAKMP	1	28-03-2026			
51	System Security-users, Trust, trust systems, malicious software	1	30-03-2026			
52	Worms, viruses, IDS, Firewalls.	1	31-03-2026			
53	Assignment-5	1	01-04-2026			
No. of classes required to complete UNIT-V		12		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
1.					**TLM6**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
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PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ch.Srinivas Rao**	**T N V S Praveen**	**Dr.D.V. Subbaiah**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT
PART-A

PROGRAM : B.Tech. VI-Sem., CSE C Sec

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : **CRYPTOGRPAHY & NETWORK SECURITY LAB & 23CS60**

L-T-P STRUCTURE : 0-0-3 **COURSE CREDITS :** 1.5

COURSE INSTRUCTOR : **Ch. Srinivasa Rao**

Pre-requisites Computer Programming, Mathematics, Computer Networks.

Course Educational Objectives (CEOs):

The Objective of the course is to provide practical level training that enables the usage of security algorithms for handling security projects. It also provides foundation level training for network analysis to find out the intruders in network traffic.

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

CO1	Summarize basic encryption and decryption techniques such as Caesar Cipher, Substitution Cipher, and Hill Cipher to understand the fundamental principles of cryptography. **(Understand-L2)**
CO2	Apply and analyze modern symmetric and asymmetric key cryptographic algorithms including DES, Blowfish, Rijndael (AES), and RSA using C/Java. **(Apply-L3)**
CO3	Apply key management, hashing, and secure communication mechanisms through Diffie–Hellman key exchange and message digest generation using SHA algorithms. **(Apply-L3)**
CO4	Improve individual / teamwork skills, communication & report writing skills with ethical values

1. Course Articulation Matrix:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	-	-	-	-	-	-	1	3	3	3
CO2	3	3	3	2	2	-	-	-	-	-	-	1	3	3	3
CO3	2	3	2	2	3	-	-	-	-	-	-	2	-	3	-
CO4	-	-	-	-	-	-	-	2	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	William Stallings, "Network Security Essentials (Applications and tandards)", Pearson Education, 1999.
T2	Snort 2.1 Intrusion Detection by Jay Beale, Andrew R.Baker , Second Editio

REFERENCE BOOKS:

R1	William Stallings, "Cryptography and Network security", Pearson Education, Fourth Edition.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education, 2nd Edition, ISBN: 0- 201-57168-4, 1998.
R2	https://www.snort.org/documents/snort-3-1-0-0-on-ubuntu-18-202007.
R3	https://www.wireshark.org/download/docs/user-guide.pdf

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Lab Cycle-1	3 3	04-12-2025		**DM5**	
2.	Lab Cycle -2	3 3	18-12-2025		**DM5**	
3.	Lab Cycle-3	3 3	08-01-2026		**DM5**	
4.	Lab Cycle-4	3	22-01-2026		**DM5**	
5.	Lab Cycle-5	3	05-02-2026		**DM5**	
6.	Lab Cycle-6	3	19-02-2026		**DM5**	
7.	Lab Cycle-7	3	26-02-2026		**DM5**	
8.	Lab Cycle-8	3	12-03-2026		**DM5**	
9.	Lab Cycle-9	3	26-03-2026		**DM5**	
10.	Lab Cycle-9	3	02-04-2026		**DM5**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Ch.Srinivasa Rao**	**T N V S Praveen**	**Dr.D.V. Subbaiah**	**Dr. S. Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Eeshwar Ram J
Course Name & Code : Disaster Management & 23CE81
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech, VI SEM, CSE – D **A.Y.:** 2025-26

PREREQUISITE: NILL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

CO1	Identify the usefulness of integrating management principles in disaster mitigation work (Understand – L2)
CO2	Illustrate the different approaches needed to manage pre- during and post- disaster periods (Understand-L2)
CO3	Identify and explain the process of risk management (Understand – L2)
CO4	Evaluate the risk transfer Relate to importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

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

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

TEXTBOOKS:

T1 An Introduction of Disaster Management- Natural Disasters & Vulnerable Hazards– S.Vaidyanathan: CBS Punblishers& Distributors Pvt.Ltd

T2 Natural Hazards & Disaster Management, Vulnerability and Mitigation by RB SinghRawat Publications

T3 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., NewDelhi.

T4 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt.Ltd.

REFERENCE BOOKS:

R1 'Disaster Management' edited by H K Gupta (2003), Universitiespress.

R2 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009), Universitiespress.R. Nishith, Singh AK,

R3 "Disaster Management in India: Perspectives, Issues and strategies" New Royal BookCompany."

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Natural Hazards and Disaster Management

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 CO's & PO's, Subject	1	01-12-2025		TLM2	
2.	Introduction of DM	1	03-12-2025		TLM2	
3.	Inter disciplinary nature of the subject	1	06-12-2025		TLM2	
4.	Disaster Management cycle	1	08-12-2025		TLM2	
5.	Five priorities for action.	1	10-12-2025		TLM2	
6.	Case study methods of the following: Vegetal Cover floods, droughts	1	13-12-2025		TLM2	
7.	Earthquake and landslides.	1	15-12-2025		TLM2	
8.	global warming, cyclones & Tsunamis	1	17-12-2025		TLM2	
9.	Post Tsunami hazards along the Indian coast	1	20-12-2025		TLM2	
10.	Tutorial– 1/ Quick revision	1	22-12-2025		TLM2	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II: Man Made Disaster and Their Management Along With Case Study Methods

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.	Fire hazards	1	24-12-2025		TLM2	
2.	transport hazard dynamics	1	27-12-2025		TLM2	
3.	solid waste management	1	29-12-2025		TLM2	
4.	post disaster	1	31-12-2025		TLM2	
5.	bio terrorism -threat in mega cities	1	03-01-2026		TLM2	
6.	rail and aircraft accidents	1	05-01-2026		TLM2	
7.	ground water, industries	1	07-01-2026		TLM2	
8.	Emerging infectious diseases and Aids and their management	1	10-01-2026		TLM2	
9.	Tutorial– 2/ Quick revision	1	12-01-2026		TLM2	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Risk and Vulnerability

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.	Building codes and land use planning	1	17-01-2026		TLM2	
2.	Social Vulnerability	1	19-01-2026		TLM2	
3.	Environmental vulnerability	1	21-01-2026		TLM2	
4.	Macro-economic management and sustainable development	1	24-01-2026		TLM2	
5.	Climate change risk rendition	1	02-02-2026		TLM2	

6.	Financial management of disaster – related losses	1	04-02-2026		**TLM2**	
7.	Tutorial– 3/ Quick revision	1	07-02-2026		**TLM3**	
No. of classes required to complete UNIT-III: 06				**No. of classes taken:**		

UNIT-IV: Multi-sectional Issues, Education and Community Preparedness

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.	Disaster management for infra structures	1	09-02-2026		**TLM2**	
2.	taxonomy of infra structure	1	11-02-2026		**TLM2**	
3.	treatment plants and process facilities	1	14-02-2026		**TLM2**	
4.	electrical substations	1	16-02-2026		**TLM2**	
5.	roads and bridges	1	18-02-2026		**TLM2**	
6.	mitigation programme for earth quakes	1	21-02-2026		**TLM2**	
7.	flowchart, geospatial information in agriculture drought assessment	1	23-02-2026		**TLM2**	
8.	Multimedia technology in disaster risk management and training	1	25-02-2026		**TLM2**	
9.	Transformable indigenous knowledge in disaster reduction.	1	28-02-2026		**TLM2**	
10.	Role of RS & GIS	1	02-03-2026		**TLM2**	
11.	Tutorial– 4/ Quick revision	1	07-03-2026		**TLM3**	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Multi-sectional Issues, Education and Community Preparedness

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.	Impact of disaster on poverty and deprivation	1	09-03-2026		**TLM2**	
2.	Climate change adaptation and human health - Exposure	1	11-03-2026		**TLM2**	
3.	health hazards and environmental risk	1	14-03-2026		**TLM2**	
4.	Forest management and disaster risk reduction	1	16-03-2026		**TLM2**	
5.	The Red cross and red crescent movement	1	18-03-2026		**TLM2**	
6.	Corporate sector and disaster risk reduction	1	23-03-2026		**TLM2**	
7.	Education in disaster risk reduction, Essentials of school disaster education	1	25-03-2026		**TLM2**	
8.	Community capacity and disaster resilience	1	28-03-2026		**TLM2**	
9.	Community based disaster recovery	1	30-03-2026		**TLM2**	
10.	Community based disaster management and social capital	1	01-04-2026		**TLM2**	
11.	Designing resilience- building community capacity for action	1	04-04-2026		**TLM2**	
No. of classes required to complete UNIT-V: 11				**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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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	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Eeshwar Ram.J**	**J. Rangaiah**	**Dr. K. V. Ramana**
Signature			

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Eeshwar Ram J
Course Name & Code : Disaster Management & 23CE81
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech, VI SEM, CSE – D **A.Y.:** 2025-26

PREREQUISITE: NILL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

CO1	Identify the usefulness of integrating management principles in disaster mitigation work (Understand – L2)
CO2	Illustrate the different approaches needed to manage pre- during and post- disaster periods (Understand-L2)
CO3	Identify and explain the process of risk management (Understand – L2)
CO4	Evaluate the risk transfer Relate to importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

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

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

TEXTBOOKS:

T1 An Introduction of Disaster Management- Natural Disasters & Vulnerable Hazards– S.Vaidyanathan: CBS Punblishers& Distributors Pvt.Ltd

T2 Natural Hazards & Disaster Management, Vulnerability and Mitigation by RB SinghRawat Publications

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T4 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt.Ltd.

REFERENCE BOOKS:

R1 'Disaster Management' edited by H K Gupta (2003), Universitiespress.

R2 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009), Universitiespress.R. Nishith, Singh AK,

R3 "Disaster Management in India: Perspectives, Issues and strategies" New Royal BookCompany."

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Natural Hazards and Disaster Management

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 CO's & PO's, Subject	1	01-12-2025		TLM2	
2.	Introduction of DM	1	03-12-2025		TLM2	
3.	Inter disciplinary nature of the subject	1	06-12-2025		TLM2	
4.	Disaster Management cycle	1	08-12-2025		TLM2	
5.	Five priorities for action.	1	10-12-2025		TLM2	
6.	Case study methods of the following: Vegetal Cover floods, droughts	1	13-12-2025		TLM2	
7.	Earthquake and landslides.	1	15-12-2025		TLM2	
8.	global warming, cyclones & Tsunamis	1	17-12-2025		TLM2	
9.	Post Tsunami hazards along the Indian coast	1	20-12-2025		TLM2	
10.	Tutorial– 1/ Quick revision	1	22-12-2025		TLM2	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II: Man Made Disaster and Their Management Along With Case Study Methods

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.	Fire hazards	1	24-12-2025		TLM2	
2.	transport hazard dynamics	1	27-12-2025		TLM2	
3.	solid waste management	1	29-12-2025		TLM2	
4.	post disaster	1	31-12-2025		TLM2	
5.	bio terrorism -threat in mega cities	1	03-01-2026		TLM2	
6.	rail and aircraft accidents	1	05-01-2026		TLM2	
7.	ground water, industries	1	07-01-2026		TLM2	
8.	Emerging infectious diseases and Aids and their management	1	10-01-2026		TLM2	
9.	Tutorial– 2/ Quick revision	1	12-01-2026		TLM2	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Risk and Vulnerability

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.	Building codes and land use planning	1	17-01-2026		TLM2	
2.	Social Vulnerability	1	19-01-2026		TLM2	
3.	Environmental vulnerability	1	21-01-2026		TLM2	
4.	Macro-economic management and sustainable development	1	24-01-2026		TLM2	
5.	Climate change risk rendition	1	02-02-2026		TLM2	

6.	Financial management of disaster – related losses	1	04-02-2026		**TLM2**	
7.	Tutorial– 3/ Quick revision	1	07-02-2026		**TLM3**	
No. of classes required to complete UNIT-III: 06				**No. of classes taken:**		

UNIT-IV: Multi-sectional Issues, Education and Community Preparedness

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.	Disaster management for infra structures	1	09-02-2026		**TLM2**	
2.	taxonomy of infra structure	1	11-02-2026		**TLM2**	
3.	treatment plants and process facilities	1	14-02-2026		**TLM2**	
4.	electrical substations	1	16-02-2026		**TLM2**	
5.	roads and bridges	1	18-02-2026		**TLM2**	
6.	mitigation programme for earth quakes	1	21-02-2026		**TLM2**	
7.	flowchart, geospatial information in agriculture drought assessment	1	23-02-2026		**TLM2**	
8.	Multimedia technology in disaster risk management and training	1	25-02-2026		**TLM2**	
9.	Transformable indigenous knowledge in disaster reduction.	1	28-02-2026		**TLM2**	
10.	Role of RS & GIS	1	02-03-2026		**TLM2**	
11.	Tutorial– 4/ Quick revision	1	07-03-2026		**TLM3**	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Multi-sectional Issues, Education and Community Preparedness

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.	Impact of disaster on poverty and deprivation	1	09-03-2026		**TLM2**	
2.	Climate change adaptation and human health - Exposure	1	11-03-2026		**TLM2**	
3.	health hazards and environmental risk	1	14-03-2026		**TLM2**	
4.	Forest management and disaster risk reduction	1	16-03-2026		**TLM2**	
5.	The Red cross and red crescent movement	1	18-03-2026		**TLM2**	
6.	Corporate sector and disaster risk reduction	1	23-03-2026		**TLM2**	
7.	Education in disaster risk reduction, Essentials of school disaster education	1	25-03-2026		**TLM2**	
8.	Community capacity and disaster resilience	1	28-03-2026		**TLM2**	
9.	Community based disaster recovery	1	30-03-2026		**TLM2**	
10.	Community based disaster management and social capital	1	01-04-2026		**TLM2**	
11.	Designing resilience- building community capacity for action	1	04-04-2026		**TLM2**	
No. of classes required to complete UNIT-V: 11				**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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PO 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	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Eeshwar Ram.J**	**J. Rangaiah**	**Dr. K. V. Ramana**
Signature			

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DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Ms. T. VINEETHA
Course Name & Code : MACHINE LEARNING-23AM01
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI SEM /C **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Probability and Statistics, Data Warehousing and Data Mining

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- Apply supervised learning algorithms including decision trees and k-nearest neighbours (k-NN).
- Implement unsupervised learning techniques, such as K-means clustering.

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

CO1	Understand development steps of model building and evaluation approaches. **(Understand - L2)**
CO2	Apply Nearest Neighbor-based models to solve real-time regression and classification problems **(Apply-L3)**
CO3	Make use of supervised learning algorithms to solve classification problems **(ApplyL3)**
CO4	Apply linear discriminants and perceptron classifiers to classify datasets **(Apply-L3)**
CO5	Apply various clustering techniques to solve complex problems **(Apply-L3)**

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

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

TEXTBOOKS:

T1	"Machine Learning Theoryand Practice", M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

REFERENCE BOOKS:

R1	"Machine Learning", Tom M. Mitchell, McGraw-Hill Publication, 2017
R2	"Machine Learning in Action",Peter Harrington, DreamTech
R3	"Introduction to Data Mining", Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

Web Resources:
https://nptel.ac.in/courses/106106139

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Machine Learning

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- Course Objective & Outcomes	1	01-12-2025		TLM1, 2	
2.	Introduction to Machine Learning	1	04-12-2025		TLM1, 2	
3.	Evolution of Machine Learning, Paradigms for ML	1	05-12-2025		TLM1, 2	
4.	Learning by Rote, Learning by Induction	1	08-12-2025		TLM1, 2	
5.	Reinforcement Learning, Types of Data	1	11-12-2025		TLM1, 2	
6.	Matching, Stages in Machine Learning	1	12-12-2025		TLM1, 2	
7.	Data Acquisition, Feature Engineering	1	15-12-2025		TLM1, 2	
8.	Data Representation, Model Selection, Model Learning	1	18-12-2025		TLM1, 2	
9.	Model Evaluation, Model Prediction	1	19-12-2025		TLM1, 2	
10.	Search and Learning, Data Sets.	1	22-12-2025		TLM1, 2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: Nearest Neighbor-Based Models:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Introduction to Proximity Measures.	1	26-12-2025		TLM1,2	
12.	Distance Measures, Non-Metric Similarity Functions	1	29-12-2025		TLM1,2	
13.	Proximity Between Binary Patterns,	1	02-01-2026		TLM1,2	
14.	Different Classification Algorithms Based on the Distance Measures	2	05-01-2026 08-01-2026		TLM1,2	
15.	K-Nearest Neighbor Classifier	1	09-01-2026		TLM1,2	
16.	Radius Distance Nearest Neighbor Algorithm	1	19-01-2026		TLM1,2	
17.	KNN Regression	1	22-01-2026		TLM1,2	
18.	Performance of Classifiers	1	22-01-2026			
19.	Performance of Regression Algorithms.	1	23-01-2026		TLM1,2	
No. of classes required to complete UNIT-II: 10				**No. of classes taken:**		

UNIT-III: Models Based on Decision Trees:

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.	Decision Trees for Classification	1	02-02-2026		TLM1,2	
21.	Impurity Measures, Properties	1	05-02-2026		TLM1,2	
22.	Regression Based on Decision Trees,	1	06-02-2026		TLM1,2	
23.	Bias–Variance Trade-off	1	09-02-2026		TLM1,2	
24.	Random Forests for Classification and Regression.	1	12-02-2026		TLM1,2	
25.	The Bayes Classifier: Introduction to the Bayes Classifier	1	13-02-2026		TLM1,2	
26.	Bayes' Rule and Inference, The Bayes Classifier and its Optimality.	1	16-02-2026		TLM1,2	
27.	Multi-Class Classification	1	19-02-2026		TLM1,2	
28.	Class Conditional Independence and Naive Bayes Classifier (NBC)	1	20-02-2026		TLM1,2	
No. of classes required to complete UNIT-III: 09				**No. of classes taken:**		

UNIT-IV: Linear Discriminants for Machine Learning:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Introduction to Linear Discriminants	1	23-02-2026		TLM1,2	
30.	Linear Discriminants for Classification	1	26-02-2026		TLM1,2	
31.	Perceptron Classifier,	1	26-02-2026		TLM1,2	
32.	Perceptron Learning Algorithm	1	27-02-2026		TLM1,2	
33.	Support Vector Machines,	1	02-03-2026		TLM1,2	
34.	Linearly Non-Separable Case	1	05-03-2026		TLM1,2	
35.	Non-linear SVM, Kernel Trick	1	05-03-2026		TLM1,2	
36.	Logistic Regression, Linear Regression	1	06-03-2026		TLM1,2	
37.	Multi-Layer Perceptrons (MLPs),	1	09-03-2026		TLM1,2	
38.	Backpropagation for Training an MLP	1	12-03-2026		TLM1,2	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Clustering:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	Introduction to Clustering, Partitioning of Data	1	16-03-2026		TLM1,2	
40.	Matrix Factorization Clustering of Patterns	1	19-03-2026		TLM1,2	
41.	Divisive Clustering,	1	20-03-2026		TLM1,2	

	Agglomerative Clustering					
42.	Partitional Clustering, K-Means Clustering	1	23-03-2026		TLM1,2	
43.	Soft Partitioning, Soft Clustering	1	26-03-2026		TLM1,2	
44.	Fuzzy C-Means Clustering, Rough Clustering	1	27-03-2026		TLM1,2	
45.	Rough K-Means Clustering Algorithm	1	02-04-2026		TLM3	
46.	Expectation Maximization-Based Clustering	1	02-04-2026		TLM1,2	
47.	Spectral Clustering.	1	03-04-2026		TLM1,2	
No. of classes required to complete UNIT-V: 09				**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
1.	Generative AI and Large Language Models (LLMs)	1	03-04-2026		**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Ms. T. Vineetha**	**Dr. D. Venkata Subbaiah**	**Dr. K. Devi Priya**	**Dr. S. Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Ms. Md. Sajeena	
Course Name & Code	: Software Project Management & 23IT07	
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech., CSE., VI-Sem., Sec-C	A.Y: 2025-26

PRE-REQUISITE: Software Engineering, Software Testing Methodologies, Object oriented Analysis and Design.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course is centered on the unique aspects of Software Project Management at three levels:

To describe and determine the purpose and importance of project management from the perspectives of effective planning, continuous tracking, and successful completion of projects.

To compare and differentiate various organizational structures and project structures, enabling learners to understand how organizational design influences project execution and outcomes.

To implement a project by managing schedules, expenses, and resources using appropriate project management tools and techniques for effective project delivery.

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

CO 1	Understand conventional and modern software management practices and describe their impact on software economics. **(Understand-L2)**
CO 2	Apply software life cycle phases and associated artifacts to structure and document a complete software development process. **(Apply – L3)**
CO 3	Develop iterative project plans by utilizing model-based architectures, process workflows, and milestone checkpoints. **(Apply-L3)**
CO 4	Apply basic concepts of project organization, automation, and software metrics to interpret project monitoring information. **(Apply-L3)**
CO5	Understand the fundamental concepts of Agile and DevOps and their role in improving software development and delivery. **(Understand-L2)**

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

COs	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	1	-	-	-	-	-	1	-	-	2	-	-
CO2	2	2	1	1	1	-	-	-	-	1	-	-	3	-	1
CO3	2	2	2	2	1	-	-	-	1	2	-	1	3	-	-
CO4	2	2	1	2	1	-	-	-	-	2	-	1	3	-	-
CO5	1	1	1	1	2	-	-	-	-	1	-	1	2	1	-

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

TEXT BOOKS:

T1 Software Project Management, Walker Royce, PEA, 2005.

T2 Succeeding with Agile: Software Development Using Scrum, Mike Cohn, Addison Wesley.

T3 The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.

REFERENCE BOOKS:

R1 Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH

R2 Software Project Management, Joel Henry, PEA

R3 Software Project Management in practice, Pankaj Jalote, PEA, 2005,

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Conventional Software Management

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.	UNIT - I: The waterfall model	1	01-12-2025		TLM2	
2.	Conventional software management performance	1	01-12-2025		TLM2	
3.	**Evolution of Software Economics:** Software Economics	1	04-12-2025		TLM2	

4.	Software cost estimation	1	06-12-2025		TLM2	
5.	**Improving Software Economics:** Reducing Software product size	1	08-12-2025		TLM2	
6.	Improving software processes	1	11-12-2025		TLM2	
7.	The principles of conventional software Engineering	1	13-12-2025		TLM2	
8.	Principles of modern software management	1	15-12-2025		TLM2	
9.	Transitioning to an iterative process.	1	18-12-2025		TLM2	
No. of classes required to complete UNIT-I:09				No. of classes taken:		

UNIT-II: Life cycle phases

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.	Engineering and production stages	1	20-12-2025		TLM2	
2.	Inception	1	22-12-2025		TLM2	
3.	Elaboration	1	27-12-2025		TLM2	
4.	Construction	1	29-12-2025		TLM2	
5.	Transition phases	1	05-01-2026		TLM2	
6.	**Artifacts of the process:** The artifact sets	1	08-01-2026		TLM2	
7.	Management artifacts	1	10-01-2026		TLM2	
8.	Engineering artifacts	1	19-01-2026		TLM2	

9.	Programmatic artifacts	1	22-01-2026		TLM2	
10.	Activity	1	24-01-2026		TLM2	
No. of classes required to complete UNIT-II:10				No. of classes taken:		
I MID EXAMINATIONS 26-01-2026 TO 31-01-2026						

UNIT-III: Workflows of the process

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Model based software architectures**	1	02-02-2026			
2.	Software process workflows	1	05-02-2026		TLM2	
3.	Iteration workflows	1	09-02-2026		TLM2	
4.	**Check points of the process:** Major milestones	1	12-02-2026		TLM2	
5.	Minor Milestones	1	14-02-2026		TLM2	
6.	Periodic status assessments	1	16-02-2026		TLM2	
7.	**Iterative Process Planning:** Work break down structures	1	19-02-2026		TLM2	
8.	Planning guidelines	1	21-02-2026		TLM2	
9.	Cost and schedule estimating	1	23-02-2026		TLM2	
10.	Iteration planning process	1	26-02-2026		TLM2	
11.	Pragmatic planning	1	28-02-2026		TLM2	
No. of classes required to complete UNIT-III:11				No. of classes taken:		

UNIT-IV : Project Organization sand Responsibilities

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.	Line-of-Business Organizations	1	02-03-2026		TLM2	

2.	Project Organizations	1	05-03-2026		TLM2	
3.	Evolution of Organizations	1	07-03-2026		TLM2	
4.	**Process Automation:** Automation Building blocks	1	09-03-2026		TLM2	
5.	The Project Environment	1	12-03-2026		TLM2	
6.	**Project Control and Process instrumentation:** The seven core Metrics	1	14-03-2026		TLM2	
7.	Management indicators	1	16-03-2026		TLM2	
8.	Quality indicators	1	23-03-2026		TLM2	
9.	Life cycle expectations	1	28-03-2026		TLM2	
10.	Pragmatic Software Metrics, Metrics metrics	1	28-03-2026		TLM2	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V: Agile Methodology and DevOps

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.	Agile Methodology,	1	30-03-2026		TLM2	
2.	ADAPTing to Scrum	1	30-03-2026		TLM2	
3.	Patterns for Adopting Scrum, Iterating towards Agility.	1	02-04-2026		TLM2	
4.	**Fundamentals of DevOps**	1	02-04-2026		TLM2	
5.	DevOps delivery pipeline, DevOps eco system	1	04-04-2026		TLM2	
6.	DevOps adoption in projects	1	04-04-2026		TLM2	
No. of classes required to complete UNIT-V:06				No. of classes taken:		

II MID EXAMINATIONS 06-04-2026 TO 11-04-2026

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

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

PART-C

EVALUATION PROCESS (R23 Regulations):

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Ms. Md. Sajeena	**Dr. S. Jayaprada**	**Dr. Y.V. B Reddy**	**Dr. S. Nagarjuna Reddy**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. D. Veeraiah
Course Name & Code : Compiler Design 23CS15
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI/C **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Fundamental knowledge of **C programming, and Formal Languages & Automata theory.**

COURSE EDUCATIONAL OBJECTIVES (CEOs):
Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

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

CO1	Design and implement a lexical analyzer using LEX & regular expressions and illustrate the ambiguity in context-free grammar. **(Apply-L3)**
CO2	Design parsers using top-down (recursive-descent / LL) and bottom-up (LR / shift-reduce) parsing techniques; construct parse tables and detect conflicts. **(Apply-L3)**
CO3	Design syntax-directed translation schemes and implement intermediate code generation using syntax trees & three-address code. **(Apply-L3)**
CO4	Describe the principles of code optimization, including flow analysis, loop optimization, and structure-preserving transformations. **(Understand-L2)**
CO5	Describe the design issues of the code generator and run-time environment of the program **(Understand-L2)**

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

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

TEXTBOOKS:

T1 Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson, 2007.

REFERENCE BOOKS:

R1 Compiler Construction, Principles and Practice, Kenneth C Louden, Cengage Learning, 2006.

R2 Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.

R3 Optimizing Compilers for Modern Architectures, Randy Allen, Ken Kennedy, Morgan Kauffmann, 2001.

R4 Levine, J.R., T. Mason and D. Brown, Lex and Yacc, edition, O'Reilly & Associates, 1990

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: 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	HOD Sign Weekly
1.	Introduction to Compiler Design, Course Objectives and Course Outcome's Discussion	1	01/12/2025		TLM2	
2.	Language Processors	1	02/12/2025		TLM2	
3.	Structure of a Compiler	1	03/12/2025		TLM2	
4.	Bootstrapping	1	06/12/2025		TLM1,3	
5.	Lexical Analysis, The Role of the Lexical Analyzer, Input Buffering,	1	08/12/2025		TLM2	
6.	Specification of Tokens, Recognition of Tokens,	1	09/12/2025		TLM2	
7.	Lexical Analyzer Generator-LEX	1	10/12/2025		TLM2	
8.	Tutorial-Finite Automata, Regular Expressions	1	15/12/2025		TLM1	
9.	Design of a Lexical Analyzer Generator.	1	16/12/2025		TLM1	
10.	Syntax Analysis: The Role of the Parser,	1	17/12/2025		TLM1	
11.	Context-Free Grammars, Derivations, Parse Trees	1	20/12/2025		TLM3	
12.	Activity Based Learning- Lexical Analysis& Syntax Analysis		20/12/2025		TLM3	
13.	Ambiguity, Left Recursion, Left Factoring,	1	22/12/2025		TLM1	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: TOP DOWN PARSING &BOTTOM UP PARSING:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Pre Processing Steps of Top-Down Parsing, Backtracking	1	23/12/2025		TLM2	
15.	Recursive Descent Parsing				TLM1 TLM 3	
16.	LL (1) Grammars,	2	24/12/2025 27/12/2025		TLM1	
17.	Non-recursive Predictive Parsing,	1	29/12/2025		TLM1	
18.	Error Recovery in Predictive Parsing, Tutorial,	1	30/12/2025		TLM1,3	

19.	**BOTTOM-UP PARSING**: Introduction, Difference between LR and LL Parsers, Types of LR Parsers,	1	31/12/2025		TLM2	
20.	SLR Parsers, Construction of SLR Parsing Tables	2	03/01/2026 05/01/2026		TLM1	
21.	More Powerful LR Parses, Construction of CLR (1) parsing Tables	1	06/01/2026		TLM1	
22.	LALR Parsing Tables	1	07/01/2026		TLM1	
23.	Dangling Else Ambiguity, Error Recovery in LR Parsing,	1	19/01/2026		TLM1	
24.	Handling Ambiguity Grammar with LR Parsers	1	20/01/2026		TLM2 TLM3	
25.	Tutorial & Activity Based Learning- Top-Down Parsing	1	21/01/2026		TLM7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Syntax-Directed Definitions	1	02/02/2026		TLM1	
27.	Tutorial, Evaluation Orders for SDD's,		03/02/2026		TLM1 TLM3	
28.	Applications of Syntax Directed Translation	1	04/02/2026		TLM1	
29.	Syntax-Directed Translation Schemes	1	07/02/2026		TLM1	
30.	Implementing L-Attributed SDD's	1	09/02/2026		TLM1	
31.	Activity Based Learning- Syntax Directed translation, Type Checker	1	10/02/2026		TLM1,7	
32.	Intermediate Code Generation: Variants of Syntax Trees,	1	11/02/2026		TLM1	
33.	Three Address Code	1	14/02/2026		TLM1	
34.	Tutorial & Types and Declarations,	1	16/02/2026		TLM1	
35.	Translation of Expressions	1	17/02/2026		TLM1,3	
36.	Type Checking, Control Flow	1	18/02/2026		TLM1	
37.	Activity Based Learning- Intermediate Code generation	1	21/02/2026		TLM 7	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: CODE OPTIMIZATION

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.	The Principle Sources of Optimization	1	23/02/2026		TLM2	
39.	Basic Blocks, Optimization of Basic Blocks	1	24/02/2026		TLM1	
40.	DAG representation of Basic Blocks	1	25/02/2026		TLM1	
41.	Tutorial & Activity Based learning	1	28/02/2026		TLM3,7	
42.	Structure Preserving Transformations	1	02/03/2026		TLM1	
43.	Flow Graphs	1	03/03/2026		TLM1	
44.	Tutorial	1	07/03/2026		TLM3	
45.	Loop Optimization	1	09/03/2026		TLM1	
46.	Data-Flow Analysis,	1	10/03/2026		TLM1	
47.	Peephole Optimization	1	11/03/2026		TLM1	
48.	Activity Based Learning	1	16/03/2026		TLM7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: RUN TIME ENVIRONMENTS& CODE GENERATION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	Storage Organization	1	17/03/2026		TLM2	
50.	Run Time Storage Allocation	1	18/03/2026		TLM2	
51.	Activation Records	1	21/03/2026		TLM2	
52.	Tutorial	1	23/03/2026		TLM3	
53.	Procedure Calls	1	24/03/2026		TLM2	
54.	Displays	1	25/03/2026		TLM2	
55.	Code Generation: Issues in the Design of a Code Generator,	1	28/03/2026		TLM3	
56.	Object Code Forms	1	30/03/2026		TLM1	
57.	Code Generation Algorithm	1	31/03/2026		TLM2	
58.	Register Allocation and Assignment	1	01/04/2026		TLM1	
59.	Activity Based Learning	1	04/04/2026		TLM7	
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	HOD Sign Weekly
1.						

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
TLM7	Activity Based learning		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. D. Veeraiah**	**Dr. D. Veeraiah**	**Dr. D. Venkata Subbaiah**	**Dr. S. Nagurjuna Reddy**
Signature				

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, NTR DIST., A.P.-521 230.
hodcse@lbrce.ac.in, cseoffice@lbrce.ac.in, Phone: 08659-222 933, Fax: 08659-222931

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr. D. Veeraiah
Course Name & Code : Compiler Design 23CS15
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI/D **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Fundamental knowledge of **C programming, and Formal Languages & Automata theory.**

COURSE EDUCATIONAL OBJECTIVES (CEOs):
Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.

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

CO1	Design and implement a lexical analyzer using LEX & regular expressions and illustrate the ambiguity in context-free grammar. **(Apply-L3)**
CO2	Design parsers using top-down (recursive-descent / LL) and bottom-up (LR / shift-reduce) parsing techniques; construct parse tables and detect conflicts. **(Apply-L3)**
CO3	Design syntax-directed translation schemes and implement intermediate code generation using syntax trees & three-address code. **(Apply-L3)**
CO4	Describe the principles of code optimization, including flow analysis, loop optimization, and structure-preserving transformations. **(Understand-L2)**
CO5	Describe the design issues of the code generator and run-time environment of the program **(Understand-L2)**

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

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

TEXTBOOKS:

T1 Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson, 2007.

REFERENCE BOOKS:

R1 Compiler Construction, Principles and Practice, Kenneth C Louden, Cengage Learning, 2006.

R2 Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.

R3 Optimizing Compilers for Modern Architectures, Randy Allen, Ken Kennedy, Morgan Kauffmann, 2001.

R4 Levine, J.R., T. Mason and D. Brown, Lex and Yacc, edition, O'Reilly & Associates, 1990

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: 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	HOD Sign Weekly
1.	Introduction to Compiler Design, Course Objectives and Course Outcome's Discussion	1	01/12/2025		TLM2	
2.	Language Processors	1	04/12/2025		TLM2	
3.	Structure of a Compiler	1	05/12/2025		TLM2	
4.	Bootstrapping	1	06/12/2025		TLM1,3	
5.	Lexical Analysis, The Role of the Lexical Analyzer, Input Buffering,	1	08/12/2025		TLM2	
6.	Specification of Tokens, Recognition of Tokens,	1	11/12/2025		TLM2	
7.	Lexical Analyzer Generator-LEX	1	12/12/2025		TLM2	
8.	Tutorial-Finite Automata, Regular Expressions	1	15/12/2025		TLM1	
9.	Design of a Lexical Analyzer Generator.	1	18/12/2025		TLM1	
10.	Syntax Analysis: The Role of the Parser,	1	19/12/2025		TLM1	
11.	Context-Free Grammars, Derivations, Parse Trees	1	20/12/2025		TLM3	
12.	Activity Based Learning- Lexical Analysis& Syntax Analysis		20/12/2025		TLM3	
13.	Ambiguity, Left Recursion, Left Factoring,	1	22/12/2025		TLM1	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: TOP DOWN PARSING &BOTTOM UP PARSING:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Pre Processing Steps of Top-Down Parsing, Backtracking	1	26/12/2025		TLM2	
15.	Recursive Descent Parsing				TLM1 TLM 3	
16.	LL (1) Grammars,	2	27/12/2025 29/12/2025		TLM1	
17.	Non-recursive Predictive Parsing,	1	02/01/2026		TLM1	
18.	Error Recovery in Predictive Parsing, Tutorial,	1	03/01/2026		TLM1,3	

19.	**BOTTOM UP PARSING**: Introduction, Difference between LR and LL Parsers, Types of LR Parsers,	1	05/01/2026		TLM2	
20.	SLR Parsers, Construction of SLR Parsing Tables	2	08/01/2026 09/01/2026		TLM1	
21.	More Powerful LR Parses, Construction of CLR (1) parsing Tables	1	10/01/2026		TLM1	
22.	LALR Parsing Tables	1	19/01/2026		TLM1	
23.	Dangling Else Ambiguity, Error Recovery in LR Parsing,	1	22/01/2026		TLM1	
24.	Handling Ambiguity Grammar with LR Parsers	1	23/01/2026		TLM2 TLM3	
25.	Tutorial & Activity Based Learning- Top-Down Parsing	1	24/01/2026		TLM7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION:

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Syntax-Directed Definitions	1	02/02/2026		TLM1	
27.	Tutorial, Evaluation Orders for SDD's,		05/02/2026		TLM1 TLM3	
28.	Applications of Syntax Directed Translation	1	06/02/2026		TLM1	
29.	Syntax-Directed Translation Schemes	1	07/02/2026		TLM1	
30.	Implementing L-Attributed SDD's	1	09/02/2026		TLM1	
31.	Activity Based Learning- Syntax Directed translation, Type Checker	1	12/02/2026		TLM1,7	
32.	Intermediate Code Generation: Variants of Syntax Trees,	1	13/02/2026		TLM1	
33.	Three Address Code	1	14/02/2026		TLM1	
34.	Tutorial & Types and Declarations,	1	16/02/2026		TLM1	
35.	Translation of Expressions	1	19/02/2026		TLM1,3	
36.	Type Checking, Control Flow	1	20/02/2026		TLM1	
37.	Activity Based Learning- Intermediate Code generation	1	21/02/2026		TLM 7	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: CODE OPTIMIZATION

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.	The Principle Sources of Optimization	1	23/02/2026		TLM2	
39.	Basic Blocks, Optimization of Basic Blocks	1	26/02/2026		TLM1	
40.	DAG representation of Basic Blocks	1	27/02/2026		TLM1	
41.	Tutorial & Activity Based learning	1	28/02/2026		TLM3,7	
42.	Structure Preserving Transformations	1	02/03/2026		TLM1	
43.	Flow Graphs	1	05/03/2026		TLM1	
44.	Tutorial	1	06/03/2026		TLM3	
45.	Loop Optimization	1	07/03/2026		TLM1	
46.	Data-Flow Analysis,	1	09/03/2026		TLM1	
47.	Peephole Optimization	1	12/03/2026		TLM1	
48.	Activity Based Learning	1	13/03/2026		TLM7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: RUN TIME ENVIRONMENTS& CODE GENERATION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	Storage Organization	1	16/03/2026		TLM2	
50.	Run Time Storage Allocation	1	20/03/2026		TLM2	
51.	Activation Records	1	21/03/2026		TLM2	
52.	Tutorial	1	23/03/2026		TLM3	
53.	Procedure Calls	1	27/03/2026		TLM2	
54.	Displays	1	28/03/2026		TLM2	
55.	Code Generation: Issues in the Design of a Code Generator,	1	30/03/2026		TLM3	
56.	Object Code Forms	1	02/04/2026		TLM1	
57.	Code Generation Algorithm	1	03/04/2026		TLM2	
58.	Register Allocation and Assignment	1	04/04/2026		TLM1	
59.	Activity Based Learning	1	04/04/2026		TLM7	
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	HOD Sign Weekly
1.						

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
TLM7	Activity Based learning		

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. D. Veeraiah**	**Dr. D. Veeraiah**	**Dr. D. Venkata Subbaiah**	**Dr. S. Nagurjuna Reddy**
Signature				

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

COURSE HANDOUT

PART-A

Name of Course Instructor : **BATTULA MOHAN TEJA**
Course Name & Code : Soft Skills & 23HSS1
L-T-P Structure : **0**-1-2 **Credits:** 02
Program/Sem/Sec : B. Tech- VI SEM -
Academic Year : 2025-26

PREREQUISITE : NIL

Course Objectives:

• To equip the students with the skills to effectively communicate in English

• To train the students in interview skills, group discussions and presentation skills

• To motivate the students to develop confidence

• To enhance the students' interpersonal skills

• To improve the students' writing skills

COURSE ARTICULATION MATRIX
(Correlation between COs & POs)

Course Outcomes / PO's	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1.				1		1		3	3	3		2
CO2.				1				3	3	3		3
CO3.								3	3	3		3
CO4.				2		2		3	3	3		3
CO5.								3	3	3		3

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

UNIT – I

Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.

Communication Skills: Verbal Communication; Non-Verbal Communication (Body Language)

UNIT – II

Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities

Etiquette: Social Etiquette, Business Etiquette, Telephone Etiquette, Dining Etiquette

UNIT – III

Standard Operation Methods: Basic Grammars, Tenses, Prepositions, Pronunciation, Letter Writing; Note Making, Note Taking, Minutes Preparation, Email & Letter Writing.

UNIT-IV

Job-Oriented Skills: Group Discussion, Mock Group Discussions, Resume Preparation, Interview Skills, Mock Interviews

UNIT-V

Interpersonal relationships: Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships, Accommodating different styles, Consequences of interpersonal relationships

Text books:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.

2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.

References:

1. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand& Company Ltd., 2018.

2. Raman, Meenakshi& Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-resources:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

COURSE DELIVERY PLAN (LESSON PLAN)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	***Analytical Thinking & Listening Skills:*** Self-Introduction	1+2	04/12/2025		
2.	Self – Analysis, Developing Positive Attitude, Perception	1+2	11/12/2025		
3.	Verbal Communication; Non-Verbal Communication (Body Language)	1+2	18/12/2025		
4.	***Self-Management Skills:*** Anger Management, Stress Management	1+2	01/01/2026		
5.	Time Management, Six Thinking Hats	1+2	08/01/2026		
6.	Team Building and Leadership Qualities	1+2	22/01/2026		
7.	***Standard Operation Methods:*** Basic Grammars, Tenses, and Prepositions	1+2	05/02/2026		
8.	Pronunciation, Letter Writing	1+2	12/02/2026		
9.	Note Making, Note Taking, Minutes Preparation, Email	1+2	19/02/2026		
10.	***Job-Oriented Skills:*** Group Discussion, Mock Group Discussions	1+2	26/02/2026		
11.	Mock Group Discussions	1+2	05/03/2026		
12.	Resume Preparation	1+2	12/03/2026		
13.	Interview Skills, Mock Interviews	1+2	02/04/2026		
14.	***Interpersonal relationships:*** Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships	1+2	16/04/2026		
15.	Accommodating different styles, Consequences of interpersonal relationships				
No. of classes required to complete Syllabus :48					

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

Laboratory Examination:

Evaluation Task	Marks
Day-to-Day Work	A1 = 10
Record & Observation	B1 = 5
Internal Exam	C1 = 15
Cumulative Internal Examination (CIE): (A1+B1+C1)	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Mr. B. Mohan Teja**	**Dr Padma Venkat**	**Dr Padma Venkat**	**Dr. T Satyanarayana**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr G V SURESH
Course Name & Code : CLOUD COMPUTING LAB 23CS11
L-T-P Structure : **0-0-3** **Credits:** 1.5
Program/Sem/Sec : B.Tech/VI SEM /D **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To introduce the various levels of services offered by cloud.
- To give practical knowledge about working with virtualization and containers.
- To introduce the advanced concepts such as serverless computing and cloud simulation.

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

CO1	Implement cloud service models, deployment models, virtualization, and containerization using open-source cloud platforms. **(Apply–L3)**
CO2	Analyze the security, performance, and operational challenges in cloud environments through hands-on experiments. **(Analyze–L4)**
CO3	Develop solutions using advanced cloud paradigms such as serverless computing, fog computing, and edge computing to address real-world problems. **(Apply–L3)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018
R2	Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011
R3	Online documentation and tutorials from cloud service providers (e.g. AWS, Google App Engine)
R4	Docker, Reference documentation, https://docs.docker.com/reference/
R5	OpenFaaS, Serverless Functions Made Simple, https://docs.openfaas.com/

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign Weekly
1.	Lab on web services	06	02-12-2025 09-12-2025		
2.	Lab on IPC, messaging, publish/subscribe	06	16-12-2025 23-12-2025		
3.	Install Virtual Box/VMware Workstation with different flavours of Linux or windows OS on top of windows8 or above	03	30-12-2025		
4.	Install a C compiler in the virtual machine created using Virtual Box and execute Simple Programs.	03	06-01-2026		
5.	Create an Amazon EC2 instance and set up a web server on the instance and associate an IP address with the instance. In the process, create a security group allowing access to port 80 on the instance.	03	13-01-2026		
6.	Install Google App Engine. Create a Hello World app and other simple web applications using python/java.	03	20-01-2026		
7.	Start a Docker container and set up a webserver (e.g. apache2 or Python based Flask micro web framework) on the instance. Map the host directory as a data volume for the container.	03	03-02-2026 10-02-2026		
8.	Find a procedure to transfer the files from one virtual machine to another virtual machine. Similarly, from one container to another container.	03	17-02-2026 24-02-2026		
9.	Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)	03	03-03-2026		
10.	Install Hadoop single node cluster and run simple applications like word count.	03	10-03-2026		
11.	Utilize OpenFaaS – Serverless computing framework and demonstrate basic event driven function invocation.	03	17-03-2026		
12.	Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.	03	24-03-2026		
13.	Internal Exam	03	31-03-2026		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test11	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. G. V. Suresh**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiya**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr G.V.Suresh
Course Name & Code : CLOUD COMPUTING 23CS11
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech/VI SEM /D **A.Y.:** 2025-26
Regulations : R23

PREREQUISITE: Computer Networks, Operating System, Parallel and Distributed Computing.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

- To explain the evolving utility computing model called cloud computing.
- To introduce the various levels of services offered by cloud.
- To discuss the fundamentals of cloud enabling technologies such as distributed computing, service-oriented architecture and virtualization.
- To emphasize the security and other challenges in cloud computing.
- To introduce the advanced concepts such as containers, serverless computing and cloud-centric Internet of Things.

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

CO1	Understand the concept of cloud computing reference models, Services, Deployment models and cloud service providers. **(Understand-L2)**
CO2	Understand the cloud enabling technologies for Parallel and distributed computing, Service-Oriented Architecture and Web services. **(Understand-L2)**
CO3	Implement the levels of virtualization tools and containers for resource provisioning and the orchestration tools. **(Apply-L3)**
CO4	Understand the challenges of cloud computing and know the security issues in cloud computing. **(Understand-L2)**
CO5	Analyze the advanced concepts of cloud computing for server-less-computing, fog, edge and quantum computing. (**Analyze-L4)**

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

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

TEXTBOOKS:

T1	Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
T2	Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

R1	Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
R2	Essentials of cloud Computing, K. Chandrasekhran, CRC press, 2014.
R3	https://www.ibm.com/cloud/learn/cloud-computing
R4	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J NPTEL Cloud Computing
R5	https://www.youtube.com/watch?v=10jm7Waan8M&list=PLdpzxOOAlwvIcxgCUyBHVOcWs0Krjx9xR Azure Course Videos
R6	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos
R7	https://www.youtube.com/watch?v=GkKNxyLp_V0&list=PLdpzxOOAlwvLNOxX0RfndiYSt1Le9azze Aws Course Videos
R8	https://www.youtube.com/watch?v=Rzzi_CGMIHc Cloud Computing Videos https://www.youtube.com/watch?v=jVE7qKWg8mc GCP Course Videos

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Cloud Computing Fundamentals

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 CO's & PO'S	1	01-12-2025		TLM1, 2	
2.	Cloud computing at a glance, defining a cloud	1	03-12-2025		TLM1, 2	
3.	cloud computing reference model	1	05-12-2025		TLM1, 2	
4.	Types of services (IaaS, PaaS, SaaS)	1	06-12-2025		TLM1, 2	
5.	Cloud Deployment models (Public, private, hybrid)	1	08-12-2025		TLM1, 2	
6.	utility computing	1	10-12-2025		TLM1, 2	
7.	cloud computing characteristics and benefits	1	12-12-2025		TLM1, 2	
8.	Cloud service providers Amazon Web Services	1	13-12-2025		TLM1, 2	
9.	Microsoft Azure	1	15-12-2025		TLM1, 2	
10.	Google App Engine	1	17-12-2025		TLM 1, 2	
11.	Tutorial / Activity	1	19-12-2025		TLM 3/7	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Cloud Enabling Technologies

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.	Ubiquitous Internet	1	20-12-2025		TLM1,2	
13.	parallel and distributed computing	1	22-12-2025		TLM1,2	
14.	elements of parallel computing,	1	24-12-2025		TLM1,2	
15.	hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD),	3	26-12-2025 27-12-2025 29-12-2025		TLM1,2	
16.	elements of distributed computing	1	31-12-2025		TLM1,2	
17.	Inter-process communication	1	02-01-2026		TLM1,2	
18.	technologies for distributed computing	1	03-01-2026		TLM1,2	
19.	remote procedure calls (RPC), service-oriented architecture (SOA),	1	05-01-2026		TLM1,2	
20.	Web services, virtualization.	1	07-01-2026		TLM1,2	
21.	Tutorial / Activity/ Assignment	1	09-01-2026		TLM 3/7	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Virtualization and Containers

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.	Characteristics of virtualized environments	1	19-01-2026		TLM1,2	
23.	Taxonomy of virtualization techniques	1	21-01-2026		TLM1,2	
24.	Virtualization and cloud Computing	1	23-01-2026		TLM1,2	
25.	Pros and cons of virtualization technology examples (XEN, VMware)	1	02-02-2026		TLM1,2	
26.	building blocks of containers,	1	04-02-2026		TLM1,2	
27.	Container platforms (LXC, Docker)	1	06-02-2026		TLM1,2	
28.	container orchestration,	1	07-02-2026		TLM1,2	
29.	Docker Swarm and Kubernetes	1	09-02-2026		TLM1,2	
30.	Public cloud VM (e.g. Amazon EC2)	1	11-02-2026		TLM1,2	
31.	Container (e.g. Amazon Elastic Container Service) offerings.	1	13-02-2026		TLM1,2	
32.	Tutorial/ Activity / Assignment	1	14-02-2026		TLM 3/7	
No. of classes required to complete UNIT-III: 11				**No. of classes taken:**		

UNIT-IV: Cloud computing challenges

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	Economics of the cloud	1	16-02-2026		TLM1,2	
34.	Cloud interoperability and standards.	1	18-02-2026		TLM1,2	
35.	Scalability and fault tolerance	1	20-02-2026		TLM1,2	
36.	Energy efficiency in clouds	1	21-02-2026		TLM1,2	
37.	federated clouds	1	23-02-2026		TLM1,2	
38.	Cloud computing security	1	25-02-2026		TLM1,2	

39.	Fundamentals of computer security	1	27-02-2026		TLM1,2	
40.	Cloud security architecture,	1	28-02-2026		TLM1,2	
41.	Cloud shared responsibility model	1	02-03-2026		TLM1,2	
42.	Security in cloud deployment models.	1	06-03-2026		TLM1,2	
43.	Tutorial /Activity / Assignment	1	07-03-2026		TLM 3/7	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Advanced concepts in cloud computing

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
44.	Server less computing	1	16-03-2026		TLM1,2	
45.	Function-as-a Service	1	18-03-2026		TLM1,2	
46.	Server less computing architecture	1	20-03-2026		TLM1,2	
47.	Public cloud (e.g. AWS Lambda) and open source (e.g. Open FaaS) server less platforms	2	23-03-2026 25-03-2026		TLM1,2	
48.	Internet of Things (IoT) applications,	1	27-03-2026		TLM1,2	
49.	Cloud centric IoT and layers	1	28-03-2026		TLM1,2	
50.	Edge and fog computing, DevOps,	1	30-03-2026		TLM1,2	
51.	Infrastructure-as-code	1	01-04-2026		TLM1,2	
52.	Quantum cloud computing	1	04-04-2026		TLM1,2	
53.	Tutorial / Activity / Assignment	1	04-04-2026		TLM3/7	
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	HOD Sign Weekly
1.					**TLM6**	

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

PART-C

EVALUATION PROCESS (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Dr. G. V. Suresh**	**Dr. G. V. Suresh**	**Dr. D. Venkata Subbaiah**	**Dr. S. Nagarjuna Reddy**
Signature				

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : **Ms.M.Swathi**
Course Name & Code **:** CRYPTOGRAPHY & NETWORK SECURITY-**23CS13**
L-**T-P Structure** **:** 3-0-0 Credits : 3
Program/Sem/Sec **:** B.Tech., CSE, VI-Sem., Section – D A. Y: 2025 -2026
PRE-REQUISITE **:** Computer Networks, Number theory and programming language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objectives of this course are to explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, public key algorithms, design issues and working principles of various authentication protocols and various secure communication standards including Kerberos, IPsec, and SSL/TLS.SSL/TLS.

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

CO1	Understand the basic concepts of security, cryptographic attacks, and the Euclidean algorithm. **(L2 – Understand)**
CO2	Summarize the principles and operations of symmetric key algorithms such as DES and AES. **(L2 – Understand)**
CO3	Apply asymmetric key cryptographic concepts to design simple public-key cryptosystems. **(L3 – Apply)**
CO4	Understand message integrity, authentication mechanisms, digital signatures, and key management techniques. **(L2 – Understand)**
CO5	Apply security protocols such as PGP, S/MIME, SSL/TLS, and IPSec in network protection scenarios. **(L3 – Apply)**

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

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

1- Low **2** –Medium **3** High

TEXTBOOKS:

T1 Cryptography and Network Security, 3rd Edition Behrouz A Forouzan, Deb deep
T2 Mukhopadhyay, McGraw Hill,2015
2. Cryptography and Network Security,4th Edition, William Stallings, (6e) Pearson,2006
3. Everyday Cryptography, 1st Edition, Keith M.Martin, Oxford,2016

REFERENCE BOOKS:

R1 Network Security and Cryptography, 1st Edition, Bernard Meneges, Cengage

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.	**Basic Principles :** Introduction to CNS	1	02-12-2024			
2.	Security Attacks	1	04-12-2024			
3.	Security Services, Mechanisms	1	05-12-2024			
4.	Integrity, Authentication Confidentiality & &Non-Repudiation	1	06-12-2024			
5.	Classical encryption techniques: Substitution Techniques,	1	09-12-2024			
6.	Transposition Techniques	1	11-12-2024			
7.	steganography Mathematics of Cryptography:integer arithmetic	2	12-12-2024 16-12-2024			
8.	Euclidean Algorithm	2	18-12-2024 19-12-2024			
9.	Assignment-1	1	20-12-2024			
No. of classes required to complete UNIT-I		11				

UNIT-II: Symmetric Encryption

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	**Symmetric Encryption:** Mathematics of Symmetric Key Cryptography-algebraic structures	1	23-12-2025			
11.	Introduction to Modern Symmetric Key Ciphers-modern block ciphers	1	26-12-2025			
12.	modern stream ciphers	1	27-12-2025			
13.	Data Encryption Standard-DES structure	1	30-12-2025			
14.	DES analysis	1	02-01-2026			
15.	Security of DES	1	03-01-2026			
16.	Multiple DES	1	06-01-2026			
17.	Advanced Encryption Standard-transformations	1	08-01-2026			
18.	key expansions	1	09-01-2026			
19.	AES ciphers	1	13-01-2026			
20	Analysis of AES	1	20-01-2026			
21.	Assignment-2/Activity Based Learning	1	22-01-2026			
sNo. of classes required to complete UNIT-II		12		No. of classes taken:		

UNIT-III: Asymmetric Encryption:

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.	Mathematics of Asymmetric Key Cryptography-primes	1	23-01-2026			
23.	primality testing	1	24-01-2026			
24.	Factorization	1	02-02-2026			
25.	CRT	1	05-02-2026			
26.	Asymmetric Key Cryptography-	1	06-02-2026			
27.	RSA crypto system	1	07-02-2026			

28.	Rabin cryptosystem	1	10-02-2026			
29	Elgamal Crypto system	1	12-02-2026			
30.	ECC	1	13-02-2026			
31.	Assignment - 3	1	17-02-2026			
No. of classes required to complete UNIT-III		10		No. of classes taken:		

UNIT-IV: Data Integrity, Digital Signature Schemes & Key Management

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Message Integrity and Message Authentication-message integrity	1	19-02-2026			
33.	Message authentication	1	20-02-2026			
34.	SHA-512	1	21-02-2026			
35.	Digital Signature- process,	1	24-02-2026			
36.	Services, Attacks	1	26-02-2026			
37.	Schemes	1	27-02-2026			
38.	Applications	1	28-02-2026			
39.	Key Management-symmetric key distribution,	1	03-03-2026			
40	Kerberos	1	03-03-2026			
No. of classes required to complete UNIT-IV		09		No. of classes taken:		

UNIT-V: Network Security-I

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Security at application layer: PGP and S/MIME	1	05-03-2026			
42.	Security at the Transport Layer : SSL and TLS	1	06-03-2026			
43.	**Network Security-II**	1	07-03-2026			
44.	Security at the Network Layer: IPSec-two modes	1	10-03-2026			
45.	Two security protocols	1	12-03-2026			
46.	Security association	1	13-03-2026			
47.	IKE	1	17-03-2026			

48.	ISAKMP	1	20-03-2026		
49.	System Security-users	1	21-03-2026		
50.	Trust, trusted systems	2	24-03-2026 26-03-2026		
51.	Malicious software	1	28-03-2026		
52.	Worms,Virus	1	31-03-2026		
53.	IDS, Firewalls	1	02-04-2026		
54.	Content Beyond the Syllabus	1	04-04-2026		
No. of classes required to complete UNIT-V		15		No. of classes taken:	

PART C

EVALUATION PROCESS (R23 Regulations):

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

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

II- Descriptive Examination (Unit-III, IV & V)	M2=15
II-Quiz Examination (Unit-III, IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**M.Swathi**	**Mr.T.NVS Praveen**	**Dr.D.V Subbaiah**	**Dr.S.Nagarjuna Reddy**
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PROGRAM : B.Tech. VI-Sem., CSE D Sec

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : CRYPTOGRAPHY & NETWORK SECURITY-**23CS13**

L-T-P STRUCTURE : 0-0-3 **COURSE CREDITS** : 1.5

COURSE INSTRUCTOR : **Ms.M.Swathi**

Pre-requisites: : Computer Programming, Mathematics, Computer Networks.

Course Objectives (COs):

- To learn basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.

To understand and implement encryption and decryption using Ceaser Cipher,substitution Cipher, Hill Cipher.

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

CO 1	Apply basic encryption and decryption techniques such as Caesar Cipher, Substitution Cipher, and Hill Cipher to demonstrate fundamental cryptographic operations. (L3 – Apply)
CO 2	Implement modern symmetric and asymmetric key algorithms such as DES, Blowfish, AES, and RSA using C/Java. (L3 – Apply)
CO 3	Perform key management, hashing, and secure communication mechanisms using Diffie–Hellman key exchange and SHA algorithms. (L3 – Apply)
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values.

1. Course Articulation Matrix:

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

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

TEXTBOOKS:

T1 William Stallings, "Network Security Essentials (Applications and Standards)", Pearson Education, 1999.

T2 Snort 2.1 Intrusion Detection by Jay Beale, Andrew R.Baker , Second Editio

REFERENCE BOOK(S):

1. William Stallings, "Cryptography and Network security", Pearson Education, Fourth Edition.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language UserGuide", Pearson Education, 2nd Edition, ISBN: 0- 201-57168-4, 1998.
2. https://www.snort.org/documents/snort-3-1-0-0-on-ubuntu-18-202007.
3. https://www.wireshark.org/download/docs/user-guide.pdf

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
	Lab Cycle-1	3 3	01-12-2025 08-12-2025		**DM5**	
2.	Lab Cycle -2	3 3	15-12-2025 22-12-2025		**DM5**	
3.	Lab Cycle-3	3 3	29-12-2025 08-01-2026		**DM5**	
4.	Lab Cycle-4	3	22-01-2026		**DM5**	
5.	Lab Cycle-5	3	02-02-2026		**DM5**	
6.	Lab Cycle-6	3	09-02-2026		**DM5**	
7.	Lab Cycle-7	3	16-02-2026		**DM5**	
8.	Lab Cycle-8	3 3	23-02-2026 02-03-2026		**DM5**	
9.	Lab Cycle-9	3 3	09-03-2026 16-03-2026		**DM5**	
10.	Lab Cycle-10	3	23-03-2026		**DM5**	
11.	Internal Exam	3	30-03-2026			

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

PART-D

PROGRAMME OUTCOMES (POs):

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	**Ms.M.Swathi**	**Mr.T N V S Praveen**	**Dr.D.V Subbaiah**	**Dr.S.Nagarjuna Reddy**
Signature				

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: P. Mohanaganga Raju
Course Name & Code : Disaster Management & 23CE81
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech, VI SEM, CSE – D **A.Y.:** 2025-26

PREREQUISITE: NILL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

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

CO1	Identify the usefulness of integrating management principles in disaster mitigation work (Understand – L2)
CO2	Illustrate the different approaches needed to manage pre- during and post- disaster periods (Understand-L2)
CO3	Identify and explain the process of risk management (Understand – L2)
CO4	Evaluate the risk transfer Relate to importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

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

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

TEXTBOOKS:

T1 An Introduction of Disaster Management- Natural Disasters & Vulnerable Hazards– S.Vaidyanathan: CBS Punblishers& Distributors Pvt.Ltd

T2 Natural Hazards & Disaster Management, Vulnerability and Mitigation by RB SinghRawat Publications

T3 'Disaster Science & Management' by Tushar Bhattacharya, Tata McGraw Hill Education Pvt. Ltd., NewDelhi.

T4 'Disaster Management – Future Challenges and Opportunities' by Jagbir Singh (2007), I K International Publishing House Pvt.Ltd.

REFERENCE BOOKS:

R1 'Disaster Management' edited by H K Gupta (2003), Universitiespress.

R2 'Disaster Management – Global Challenges and Local Solutions' by Rajib shah & R R Krishnamurthy (2009), Universitiespress.R. Nishith, Singh AK,

R3 "Disaster Management in India: Perspectives, Issues and strategies" New Royal BookCompany."

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Natural Hazards and Disaster Management

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 CO's & PO's, Subject	1	01-12-2025		TLM2	
2.	Introduction of DM	1	03-12-2025		TLM2	
3.	Inter disciplinary nature of the subject	1	06-12-2025		TLM2	
4.	Disaster Management cycle	1	08-12-2025		TLM2	
5.	Five priorities for action.	1	10-12-2025		TLM2	
6.	Case study methods of the following: Vegetal Cover floods, droughts	1	13-12-2025		TLM2	
7.	Earthquake and landslides.	1	15-12-2025		TLM2	
8.	global warming, cyclones & Tsunamis	1	17-12-2025		TLM2	
9.	Post Tsunami hazards along the Indian coast	1	20-12-2025		TLM2	
10.	Tutorial– 1/ Quick revision	1	22-12-2025		TLM2	
No. of classes required to complete UNIT-I: 09				**No. of classes taken:**		

UNIT-II: Man Made Disaster and Their Management Along With Case Study Methods

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.	Fire hazards	1	24-12-2025		TLM2	
2.	transport hazard dynamics	1	27-12-2025		TLM2	
3.	solid waste management	1	29-12-2025		TLM2	
4.	post disaster	1	31-12-2025		TLM2	
5.	bio terrorism -threat in mega cities	1	03-01-2026		TLM2	
6.	rail and aircraft accidents	1	05-01-2026		TLM2	
7.	ground water, industries	1	07-01-2026		TLM2	
8.	Emerging infectious diseases and Aids and their management	1	10-01-2026		TLM2	
9.	Tutorial– 2/ Quick revision	1	12-01-2026		TLM2	
No. of classes required to complete UNIT-II: 08				**No. of classes taken:**		

UNIT-III: Risk and Vulnerability

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.	Building codes and land use planning	1	17-01-2026		TLM2	
2.	Social Vulnerability	1	19-01-2026		TLM2	
3.	Environmental vulnerability	1	21-01-2026		TLM2	
4.	Macro-economic management and sustainable development	1	24-01-2026		TLM2	
5.	Climate change risk rendition	1	02-02-2026		TLM2	

6.	Financial management of disaster – related losses	1	04-02-2026		**TLM2**	
7.	Tutorial– 3/ Quick revision	1	07-02-2026		**TLM3**	
No. of classes required to complete UNIT-III: 06				**No. of classes taken:**		

UNIT-IV: Multi-sectional Issues, Education and Community Preparedness

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.	Disaster management for infra structures	1	09-02-2026		**TLM2**	
2.	taxonomy of infra structure	1	11-02-2026		**TLM2**	
3.	treatment plants and process facilities	1	14-02-2026		**TLM2**	
4.	electrical substations	1	16-02-2026		**TLM2**	
5.	roads and bridges	1	18-02-2026		**TLM2**	
6.	mitigation programme for earth quakes	1	21-02-2026		**TLM2**	
7.	flowchart, geospatial information in agriculture drought assessment	1	23-02-2026		**TLM2**	
8.	Multimedia technology in disaster risk management and training	1	25-02-2026		**TLM2**	
9.	Transformable indigenous knowledge in disaster reduction.	1	28-02-2026		**TLM2**	
10.	Role of RS & GIS	1	02-03-2026		**TLM2**	
11.	Tutorial– 4/ Quick revision	1	07-03-2026		**TLM3**	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: Multi-sectional Issues, Education and Community Preparedness

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.	Impact of disaster on poverty and deprivation	1	09-03-2026		**TLM2**	
2.	Climate change adaptation and human health - Exposure	1	11-03-2026		**TLM2**	
3.	health hazards and environmental risk	1	14-03-2026		**TLM2**	
4.	Forest management and disaster risk reduction	1	16-03-2026		**TLM2**	
5.	The Red cross and red crescent movement	1	18-03-2026		**TLM2**	
6.	Corporate sector and disaster risk reduction	1	23-03-2026		**TLM2**	
7.	Education in disaster risk reduction, Essentials of school disaster education	1	25-03-2026		**TLM2**	
8.	Community capacity and disaster resilience	1	28-03-2026		**TLM2**	
9.	Community based disaster recovery	1	30-03-2026		**TLM2**	
10.	Community based disaster management and social capital	1	01-04-2026		**TLM2**	
11.	Designing resilience- building community capacity for action	1	04-04-2026		**TLM2**	
No. of classes required to complete UNIT-V: 11				**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 (R23 Regulation):

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

PART-D

PROGRAMME OUTCOMES (POs):

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

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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**P. Mohanaganga Raju**	**J. Rangaiah**	**Dr. K. V. Ramana**
Signature			

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor	: Dr. SunilKumar Ketineni	
Course Name & Code	: Software Project Management & 23IT07	
L-T-P Structure	: 3-0-0	Credits : 3
Program/Sem/Sec	: B.Tech., CSE., VI-Sem., Sec-D	A.Y: 2025-26

PRE-REQUISITE: Software Engineering, Software Testing Methodologies, Object oriented Analysis and Design.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course is centered on the unique aspects of Software Project Management at three levels:

To describe and determine the purpose and importance of project management from the perspectives of effective planning, continuous tracking, and successful completion of projects.

To compare and differentiate various organizational structures and project structures, enabling learners to understand how organizational design influences project execution and outcomes.

To implement a project by managing schedules, expenses, and resources using appropriate project management tools and techniques for effective project delivery.

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

CO 1	Understand conventional and modern software management practices and describe their impact on software economics. **(Understand-L2)**
CO 2	Apply software life cycle phases and associated artifacts to structure and document a complete software development process. **(Apply – L3)**
CO 3	Develop iterative project plans by utilizing model-based architectures, process workflows, and milestone checkpoints. **(Apply-L3)**
CO 4	Apply basic concepts of project organization, automation, and software metrics to interpret project monitoring information. **(Apply-L3)**
CO5	Understand the fundamental concepts of Agile and DevOps and their role in improving software development and delivery. **(Understand-L2)**

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

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

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

TEXT BOOKS:

T1 Software Project Management, Walker Royce, PEA, 2005.
T2 Succeeding with Agile: Software Development Using Scrum, Mike Cohn, Addison Wesley.
T3 The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Edition, O'Reilly publications, 2016.

REFERENCE BOOKS:

R1 Software Project Management, Bob Hughes,3/e, Mike Cotterell, TMH
R2 Software Project Management, Joel Henry, PEA
R3 Software Project Management in practice, Pankaj Jalote, PEA, 2005,

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Conventional Software Management

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.	UNIT - I: The waterfall model	1	02-12-2025		TLM2	
2.	Conventional software management performance	1	03-12-2025		TLM2	
3.	**Evolution of Software economics:** Software Economics	1	05-12-2025		TLM2	
4.	Pragmatic Software cost estimation	1	09-12-2025		TLM2	

5.	**Improving Software Economics:**Reducing Software product size, Improving software processes	1	10-12-2025		TLM2	
6.	Improving team effectiveness, automation, achieving required quality & peer inspection	1	12-12-2025		TLM2	
7.	The principles of conventional software Engineering modern software management	1	16-12-2025		TLM2	
8.	Transitioning to an iterative process	1	17-12-2025		TLM2	
9.	Modern software management.	1	19-12-2025		TLM 7	
No. of classes required to complete UNIT-I:09				No. of classes taken:		

UNIT-II: Life cycle phases

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.	Engineering and production stages	1	23-12-2025		TLM2	
2.	Inception	1	24-12-2025		TLM2	
3.	Elaboration	1	26-12-2025		TLM2	
4.	Construction	1	30-12-2025		TLM2	
5.	Transition phases	1	02-01-2026		TLM2	
6.	**Artifacts of the process:** The artifact sets	1	06-01-2026		TLM2	
7.	Management artifacts	1	07-01-2026		TLM2	
8.	Engineering artifacts	1	09-01-2026		TLM2	
9.	Programmatic artifacts	1	20-01-2026		TLM2	
10.	Engineering artifacts	1	21-01-2026		TLM7	

No. of classes required to complete UNIT-II:10	No. of classes taken:
I MID EXAMINATIONS 26-01-2026 TO 31-01-2026	

UNIT-III: Model based Architectures

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.	A management perceptive and technical perceptive	1	23-01-2026			
2.	**Work flows of the process**: Software process workflows	1	03-02-2026		TLM2	
3.	Iteration workflows	1	04-02-2026		TLM2	
4.	**Check points of the process:** Major milestones, Minor milestones	1	06-02-2026		TLM2	
5.	Periodic status assessments	1	10-02-2026		TLM2	
6.	**Iterative Process Planning:** Work break down structures	1	11-02-2026		TLM2	
7.	Planning guidelines, cost and schedule estimating	1	13-02-2026		TLM2	
8.	Iteration planning process, Pragmatic planning	1	17-02-2026		TLM2	
9.		1	18-02-2026		TLM7	
No. of classes required to complete UNIT-III:09				No. of classes taken:		

UNIT-IV : Project Organization sand Responsibilities

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.	Line-of-Business Organizations	1	20-02-2026		TLM2	
2.	Project Organizations, Evolution of Organizations	1	24-02-2026		TLM2	
3.	**Process Automation:** Automation Building blocks	1	25-02-2026		TLM2	

4.	The Project Environment	1	27-02-2026		TLM2	
5.	**Project Control and Process instrumentation:** The seven core Metrics	1	03-03-2026		TLM2	
6.	Management indicators,Quality indicators	1	04-03-2026		TLM2	
7.	Life cycle expectations	1	06-03-2026		TLM2	
8.	Pragmatic Software Metrics, Metrics metrics	1	10-03-2026		TLM2	
9.	Pragmatic Software Metrics, Metrics metrics	1	11-03-2026		TLM2	
10.		1	17-03-2026		TLM2	
No. of classes required to complete UNIT-IV:10				No. of classes taken:		

UNIT-V: Agile Methodology and DevOps

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.	Agile Methodology, ADAPTing to Scrum	1	18-03-2026		TLM2	
2.	Patterns for Adopting Scrum, Iterating towards Agility	1	20-03-2026 24-03-2026		TLM2	
3.	**Fundamentals of DevOps:** Architecture, deployment	1	25-03-2026		TLM2	
4.	orchestration Need, instance of application	1	27-04-2026		TLM2	
5.	DevOps delivery pipepeline, DevOps eco system	1	31-03-2026		TLM2	
6.	DevOps adoption in projects: Technology aspects, Agiling capabilities	1	01-04-2026		TLM2	
7.	Tool stack implementation, people aspect ,process	1	03-04-2026		TLM2	
No. of classes required to complete UNIT-V:07				No. of classes taken:		
II MID EXAMINATIONS 06-04-2026 TO 11-04-2026						

PART-C

Evaluation Task	Marks
Assignment-I (Units-I,II)	A1=5
I-Descriptive Examination (Units-I, II)	M1=15
I-Quiz Examination (Units-I, II)	Q1=10
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Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

EVALUATION PROCESS (R23 Regulations):

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
TLM 7	Activity based learning		

PART-D

PROGRAMME OUTCOMES (POs):

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PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

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

Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Dr. SunilKumar Ketineni	**Dr. S. Jayaprada**	**Dr. Y.V. B Reddy**	**Dr. S. Nagarjuna Reddy**