

DEPARTMENT OF COMPUTER SCIENCE
MASTER OF COMPUTER APPLICATION

II SEMESTER : M.C.A PROGRAMM STRUCTURE -2023-25(R22)

Course Code	Course Name	Teaching Hours/ Week			TYPE OF THE COURSE	CIA	SEE	No. of Credits
		L	P	T				
22CAL201	Data Structures	4	0	0	Core	30	70	4
22CAP201	Data Structures Lab	0	6	0	Core	30	70	3
22CAL202	Web Technologies	4	0	0	Core	30	70	4
22CAP202	Web Technologies Lab	0	6	0	Core	30	70	3
22CAL203	Computer Networks	4	0	0	Core	30	70	4
22MBSDL201	Research Methodology & IPR	3	1	0	SDC	30	70	3
DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)								
22CADSL201	Software Engineering	4	0	0	DSE	30	70	3
22CADSL202	Mobile Applications	4	0	0	DSE	30	70	3
22CADSL202	Unix Programming	4	0	0	DSE	30	70	3
22CAIP201	Internship in Computer Applications	0	3	0	IP	0	100	4
TOTAL FOR SECOND SEMESTER		19	16	0		210	490	28

IV SEMESTER : M.C.A PROGRAMM STRUCTURE -2022-24(R22)

Course Code	Course Name	Teaching Hours/ Week			TYPE OF THE COURSE	CIA	SEE	No. of Credits
		Lecture	Practical	Tutorial				
22CA4T1	Big Data Analytics	4	0	0		30	70	4

DOMAIN SPECIFIC ELECTIVE COURSES (CHOOSE ANY ONE)

22CA4E1	Artificial Intelligence	4	0	0	DSE	30	70	4
22CA4E2	Cyber Security	4	0	0	DSE	30	70	4
22CA4E3	Cloud Computing	4	0	0	DSE	30	70	4
22CA4E4	Natural Language Processing	4	0	0	DSE	30	70	4

LAB PRACTICALS

22CA4L1	Big Data Analytics Lab	0	6	0	Core	30	70	3
---------	------------------------	---	---	---	------	----	----	---

ENTREPRENURAL & INNOVATION/IT SKILL RELATED TO DOMAIN SPECIFIC ELECTIVE COURSES- CHOOSE ANY ONE

22CA4E5	Deep Learning	3	0	0	SEC	30	70	3
22CA4E6	Dynamic Web Programming using Python	3	0	0	SEC	30	70	3
22CA4E7	Software Testing and Project Management	3	0	0	SEC	30	70	3

* CHOOSE MOOCS FROM SWAYAM/NPTEL SOURCES

22CA4MI	PRIVACY AND SECURITY IN ONLINE SOCIAL MEDIA							4
22CASPWP401	PROJECT WORK EVALUATION AND VIVA-VOCE					50	150	12

TOTAL FOR FOURTH SEMESTER

	170	480	30
--	-----	-----	----



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4T1: BIG DATA AND ANALYTICS

Course Descriptive and Purpose: This course is designed to assist students in comprehending the significance of big data in everyday life. It covers topics such as data storage and processing using Hadoop, gaining knowledge about contemporary database systems, utilizing Tableau for data visualization, and implementing Apache Spark through APIs, including SQL and Data Frames, for efficient data processing and analysis.

Course Objectives: The course helps the students to understand Big data and its role in Daily Life, Data Storage and Processing in Hadoop, Knowledge acquisition on Modern Databases, Visualization of Data with Tableau, Implementation of Apache Spark with API- SQL and Data Frames.

Course Outcomes:

On Successful completion the student will be able to:

CO1: What is Big Data, Big Data Analytics, MongoDB, Underneath an RDD, Changing in the realms of Big Data.

CO2: Infer about Apache Spark, Spark SQL and Data Frames, Operations, Typical Data Warehouse and Hadoop Environment.

CO3: Analyze Hive Architecture, Processing Data with Hadoop, MongoDB Query Language.

CO4: Explain Hadoop Overview, Hadoop Distributed File System, Map Reduce Programming.

CO5: Discuss Top Challenges facing Big Data, Data Types in MongoDB, Anatomy of Pig, Types of NoSQL Databases, Structuring Spark .

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	H		M			
	CO2	H	M				
	CO3	M	L				
	CO4	M	M	H		H	
	CO5	M		L			H

UNIT-I (12 Hours)

Types of Digital Data: Classification of Digital Data.

Introduction to Big Data: Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges with Big Data – What is Big Data? – Other Characteristics of Data – Why Big Data? –Traditional Business Intelligence versus Big Data – Typical Data Warehouse Environment – Typical Hadoop Environment – Coexistence of Big Data and Data Warehouse – What is Changing in the realms of Big Data.

Big Data Analytics: What is Big Data Analytics – What Big Data Analytics is not? – Why this sudden Hype around Big Data Analytics? – Classification of Analytics – Greatest Challenges that Prevent Business from Capitalizing Big Data – Top Challenges facing Big Data – Why Big Data Analytics Important? – What Kind of Technologies are we looking toward to help meet the challenges posed by Big Data? – Data Science – Data Scientist – Terminologies used in Big Data Environments.

UNIT-II (12 Hours)

Hadoop: Features of Hadoop – Key advantages of Hadoop – Versions of Hadoop – Overview of Hadoop Ecosystem – Hadoop Distributions – Why Hadoop? – Why not RDBMS – RDBMS versus Hadoop – Distribution Computing Challenges – History of Hadoop – Hadoop Overview – Hadoop Distributed File System.

Processing Data with Hadoop: Managing Resource and Applications with Hadoop with YARN (Yet Another Recourse Negotiator) – Interacting with Hadoop Ecosystem.

UNIT-III (12 Hours)

Introduction to Map Reduce Programming: Introduction – Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression.

NoSQL: Where it is used? – What is it? – Types of NoSQL Databases – Why NoSQL? – Advantages of NoSQL – What we miss with NoSQL? – Use of NoSQL in Industry – SQL versus NoSQL

MongoDB: What is MongoDB, Why MongoDB, Using JavaScript, Script Object Notation, Generating Unique Key, Support for Dynamic Queries, Storing Binary Data, Replication, Sharding, Updating Information in Place, Terms used in RDBMS and MongoDB, Data Types in MongoDB, MongoDB Query Language?

UNIT-IV (12 Hours)

Hadoop Eco System:

Hive: What is Hive? – Hive Architecture – Hive Data Types – Hive File Format – Hive Query Language (HQL) – RC File Implementation – User Defined Function.

PIG: What is PIG? - Anatomy of Pig – Pig on Hadoop – Pig Philosophy – Use Case for Pig – Pig Latin – Data type in Pig – Running Pig – Execution Mode of Pig – HDFS Commands – Relational Operators – Eval Functions – Complex Data Types – User Defined Functions – Parameter Substitution.

Hbase: Hbasics – Concepts – Clients – Hbase versus RDBMS.

UNIT-V (12 Hours)

Apache Spark:

Introduction to Apache Spark: A Unified Analytics – What Is Apache Spark? Unified Analytics – The Developer’s Experience – Using Scala and PySpark Shell – Understanding Spark Application Concepts – Transformations – Actions and Lazy Evaluation – The Spark UI.

Apache Spark’s API: What’s Underneath an RDD? – Structuring Spark – The Data Frame API – The Dataset API – Data Frames Versus Datasets – When to Use RDDs – Spark SQL and the Underlying Engine.

Spark SQL and Data Frames: Introduction to built in Data Sources – Using Spark SQL in Spark Applications – SQL Tables and Views – Data Sources for Data Frames and SQL Tables : Data Frame Reader – Data Frame Writer – JSON – CSV- Images – Binary Files.

Common Data Frames and Spark SQL Operations: Unions – Joins – Windowing Spark SQL and Datasets: Working with Datasets: Creating Sample Data – Transforming Sample Data.

Prescribed Text Books			
S.No	Author	Title	Publisher
1	Seema Acharya- Subhashini Chellappan	Big Data and Analytics	Wiley Publications – Second Edition (UNIT I, II, III,IV)
2	Karau H, Konwinski A, Wendell P, Zaharia M	Learning Spark : Lightning Fast Data Analytics	O’Reilley Second Edition (UNIT V: 1 to 6 Chapters)

Reference Text Books			
S.No	Author	Title	Publisher
1	Tom White	Hadoop:The Definitive Guide	O’Reilly, Yahoo Press, Third Edition
2	Bill Chambers & Matei Zaharia	SPARK:The Definitive Guide	O’Reilley, 2018 Edition
3	Guller M	Big data Analytics with Spark: A Practitioner’s Guide to using Spark for Large Scale Data Analysis	Apress, 2015



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

M.C.A

Semester :IV

Course Code: 22CA4T1 Course Name: Big Data and Analytics

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions. (5×4 = 20 Marks)

1. (a) Function Big Data. (CO1, L4)
(or)
(b) Classify the analytics. (CO1, L4)
2. (a) Compare RDBMS and Hadoop. (CO5, L2)
(or)
(b) Explain Key Components of Yarn? (CO4, L2)
3. (a) What is Hadoop Map Reduce? (CO5, L1)
(or)
(b) List the types of NoSQL Databases. (CO6, L1)
4. (a) Explain various Data Types for Hive. (CO4, L5)
(or)
(b) Compare HBase versus RDBMS (CO6, L5)
5. (a) What is Apache Spark? (CO2, L1)
(or)
(b) Define JSON. (CO2, L1)

SECTION-A

Answer the following questions. (5 × 10 = 50 Marks)

6. (a) Explain the Digital Data with examples. (CO1, L2)
(b) Summarize the challenges faced by Bigdata. (CO6, L2)
(or)
(c) Explain Brewers Theorem with examples. (CO1, L2)
(d) Explain the In-memory Analytics. (CO1, L2)
7. (a) Explain Hadoop Eco System with neat diagram. (CO5, L2)
(or)
(b) Explain HDFS File Systems with neat diagram. (CO5, L2)
8. (a) Make use of Map Reduce in Hadoop with example. (CO5, L3)
(or)
(b) Make use of File Read and File Write in Hadoop. (CO5, L3)
9. (a) Explain Hive Architecture with neat diagram. (CO4, L5)
(or)
(b) Explain CRUD Operations in MongoDB with examples. (CO4, L5)
(c) Explain MongoDB import and export with examples. (CO4, L5)
10. (a) Explain TDD in Apache Spark with examples. (CO1, L5)
(or)
(b) Explain Common Data Frames and Distinguish between Data Frames Vs Datasets. (CO5, L5)
(c) Explain Spark SQL Operations in spark. (CO2, L5)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E1: ARTIFICIAL INTELLIGENCE

Course Description and Purpose: Artificial Intelligence is a course that illustrates concepts *History, Foundations of AI, Problem Solving, State-Space and Control Strategies, Logic Concepts, Knowledge Representation in Propositional Logic, Expert System and Applications, Fuzzy sets and fuzzy logic.*

Course Objectives: This course will help enable the students to understand and familiar with *History, Foundations of AI, Problem Solving, State-Space and Control Strategies, Logic Concepts, Knowledge Representation in Propositional Logic, Expert System and Applications, Fuzzy Sets and Fuzzy Logic.*

Course Outcomes:

On successful completion the students should be able to

CO1: Recall History, Foundations and Logic Concepts of AI

CO2: Summarize the Basic of Knowledge Representation, Fuzzy Sets and Fuzzy Logic, Strategies for State Space Problem Solving and Uncertainty Measurement.

CO3: Identify the Current Trends, Constraint Satisfaction used in AI.

CO4: Analyze Expert Systems, Uncertainty Measurement, and Fuzzy Logic.

CO5: Perceive Methodologies for representing knowledge in AI Applications.

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	M						M
	CO2	M		M				
	CO3	M				M		
	CO4	M		M		H		
	CO5	H		H				

UNIT-I (12 Hours)

Introduction: Introduction, History, Intelligent Systems, Foundations of AI , Applications ,Tic-Tac-Toe Game Playing , Development of AI Languages, Current trends.

UNIT-II (12 Hours)

Problem Solving State-Space and Control Strategies: Introduction, General Problem Solving, Characteristics of problem, Exhaustive Searches, Heuristic Search Techniques, Iterative Deepening A*, Constraint Satisfaction.

UNIT-III (12 Hours)

Logic Concepts: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Predicate Logic.

UNIT-IV (12 Hours)

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-V (12 Hours)

Expert System and Applications: Introduction Phases in building Expert Systems, Expert System vs Traditional Systems.

Uncertainty Measure: Probability Theory, Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shaffer Theory.

Fuzzy Sets and Fuzzy Logic: Introduction, Fuzzy Sets, Fuzzy Set Operations, Types of Membership Functions.

Prescribed Text Book			
	Author	Title	Publisher
1	Saroj Kaushik	Artificial Intelligence	Cengage Learning, Second Edition, 2022 ISBN: 9789355730428

Reference Text Books			
	Author	Title	Publisher
1	Deepak Khemani	Artificial Intelligence	McGraw Hill Education, 2018, Sixth Reprint, ISBN: 9781259029981
2	Patterson	Introduction to Artificial Intelligence and Expert Systems.	PHI , 2015, ISBN: 978-8120307773
3	George F Lugar	Artificial Intelligence structures strategies for Complex Problem Solving	PEA, Fifth Edition ,2004 ISBN: 978-0321263186
4	Stuart Russel, Peter Norvig	Artificial Intelligence, A Modern Approach	PEA, 4 th Edition,2022 ISBN: 978-9356063570



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

M.C.A

Semester: IV

Course Code: 22CA4E1 Course Name: Artificial Intelligence

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions. (5×4 = 20 Marks)

1. (a) Define Artificial Intelligence. Write in short about Tic_Tac_Toe game. (CO1,L1)
(or)
(b) What are the applications of Artificial Intelligence? (CO3,L1)
2. (a) What is Iterative Deepening A*? (CO2,L2)
(or)
(b) What is Constraint Satisfaction? (CO3,L2)
3. (a) What is Axiomatic System? (CO1,L1)
(or)
(b) Define Propositional Logic and Predicate Logic. (CO1,L1)
4. (a) What are different approaches for Knowledge Representation? (CO2,L1)
(or)
(b) What is Extended Semantic Network KR? (CO2,L1)
5. (a) What is Certainty Factor Theory? (CO2,L1)
(or)
(b) What are the operations of Fuzzy Sets? (CO2,L1)

SECTION-B

Answer the following questions. (5×10=50 Marks)

6. (a) Explain History of Artificial Intelligence briefly. (CO1,L1)
(or)
(b) Explain Current Trends in Artificial Intelligence. (CO1,L1)
7. (a) Explain the different characteristics of a problem. (CO2,L5)
(or)
(c) Explain various Heuristic searches used to find a solution. (CO2,L5)
8. (a) Explain Natural Deduction System to prove the validity of an argument. (CO1,L4)
(or)
(b) Explain Semantic Tableau System in Propositional Logic. (CO3,L4)
9. (a) Elaborate Knowledge Representation using Semantic Networks. (CO6,L6)
(or)
(b) Elaborate Knowledge Representation using Frames. (CO6,L6)
10. (a) How do you use Bayesian Belief Networks to represent probabilistic relations? (CO4,L2)
(or)
(b) Explain the components of an Expert System. (CO4,L2)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E2: CYBER SECURITY

Course Description and Purpose: To understand the field of computer security, threats, hardening systems, securing networks, cryptography and organizational security policies and how to protect computer operating systems, networks, and data from cyber-attacks and how to monitor systems and mitigate threats when they happen.

Course Objective: Course aim is to equip students with the technical knowledge and skills needed to protect and defend computer systems and networks. To develop graduates that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.

Course Outcomes:

On successful completion the students should be able to

CO1: Recall the concepts of Computer and Network Security.

CO2: Demonstrate the Classical Encryption Techniques, application of Public Key Cryptography, RSA, and Message Authentication Codes, AES, Key Management, financial frauds.

CO3: Plan an introduction to Cybercrime and criminals, Cyber offenses .

CO4: Analyze Cyber offenses, mobile and wireless devices, along with tools and methods used in Cybercrime.

CO5: Perceive cybercrime handheld device forensics in Cybercrime, using illustrations, examples, and mini-cases.

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	H	H				
	CO2	H		M			
	CO3	H			L		
	CO4		H				
	CO5	M					L

UNIT-I (12 Hours)

Computer and Network Security Concepts: Computer Security Concepts - The OSI Security Architecture- Security Attacks - Security Services - Security Mechanisms - A Model for Network Security. **Classical Encryption Techniques:** Symmetric Cipher Model - Substitution Techniques - Transposition Techniques - Rotor Machines - Steganography. **Advanced Encryption Standard:** AES Structure - AES Transformation Functions - AES Key Expansion - AnAES Example.

UNIT-II (12 Hours)

Public Key Cryptography and RSA: Principles of Public Key Crypto Systems - The RSA Algorithm. **Key Management:** Other Public Key Crypto Systems: Diffie Hellman Key Exchange, Elgamal Cryptographic System, Elliptic Curve Arithmetic, Elliptic Curve Cryptography. **Message Authentication Codes:** Authentication Requirements - Authentication Functions - MessageAuthentication Codes.

UNIT-III (12 Hours)

Introduction to Cybercrime: Introduction - Cybercrime: Definition and Origins of the Word -Cybercrime and Information Security - Who are Cybercriminals? - Classifications of Cybercrimes - Cybercrime: The Legal Perspectives - Cybercrimes: An Indian Perspective - Cybercrime and the Indian ITA 2000 - A Global Perspective on Cybercrimes - Cybercrime Era: Survival Mantra for the Netizens - Concluding Remarksand Way Forward

to Further Chapters. **Cyber offenses: How Criminals Plan Them:** Introduction - How Criminals Plan the Attacks -Social Engineering - Cyberstalking - Cybercafe and Cybercrimes - Botnets: The Fuel for Cybercrime - Attack Vector - Cloud Computing

UNIT-IV (12 Hours)

Cybercrime: Mobile and Wireless Devices: Introduction - Proliferation of Mobile and Wireless -Devices - Trends in Mobility - Credit Card Frauds in Mobile and Wireless Computing Era - Security Challenges Posed by Mobile Devices - Registry Settings for Mobile Devices - Authentication Service Security - Attacks on Mobile/Cell Phones - Mobile Devices: Security Implications for Organizations - Organizational Measures for Handling Mobile - Organizational Security Policies and Measures in Mobile Computing Era- Laptops.**Tools and Methods Used in Cybercrime:** Introduction - Proxy Servers and Anonymizers - Phishing - Password Cracking - Keyloggers and Spywares - Virus and Worms - Trojan Horses and Backdoors - Steganography - DoS and DDoS Attacks - SQL Injection - Buffer Overflow - Attacks on Wireless Networks.

UNIT-V (12 Hours)

Forensics of Hand Held Devices: Introduction - Understanding Cell Phone Working Characteristics - Hand Held Devices and Digital Forensics - Toolkits for Hand-Held Device Forensics - Hunting threats with Pandas - MFT Analysis - Extracting Feature Vectors From URL Strings For Malicious URL Detection - Monitor Active SSH Sessions With Prometheus and Grafana.

Cybercrime: Illustrations, Examples and Mini Cases: Introduction - Real Life Examples - Mini Cases - Illustrations of Financial Frauds in Cyber Domain - Digital Signature - Related Crime Scenarios - Digital Forensics Case Illustrations - Online Scams.

Prescribed Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Seventh Edition, 2017
2	Nina Godbole, Sunit Belapur	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives	Wiley India Publications, Second Edition April, 2011
Reference Text Book			
	Author	Title	Publisher
1	William Stallings	Network Security Essentials -Applications and Standards	Pearson Education (2007), Third Edition.
2	Chris McNab	Network Security Assessment	OREilly (2007), 2 nd Edition
3	Jon Erickson	Hacking-The Art of Exploitation	Press (2006), SPD
4	Neal Krawety	Introduction to Network Security	Thomson (2007)
5	Ankit Fadia	Network Security-A Hackers Perspective	Macmillan (2008)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

M.C.A

Course Code: 22CA4E2 Course Name: Cyber Security

Semester :IV

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) Explain Security Attacks and its types (CO1,L2)
(or)
(b) Explain Steganography (CO1,L2)
2. (a) What is Encryption and Decryption? (CO2,L1)
(or)
(b) What is Cryptology? (CO2,L1)
3. (a) What are Authentication Requirements?(CO2,L1)
(or)
(b) What phishing and its working? (CO3,L1)
4. (a) Explain Keyloggers and its types (CO4,L2)
(or)
(b) Explain Cybercrime and who are cyber criminals (CO3,L2)
5. (a) What is Botnet? (CO5,L1)
(or)
(b) What is Cyber Terrorism? (CO5,L1)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Explain Model for Network Security in detail with neat Diagram.(CO1,L2)
(b) Explain Transposition and Rotor Machine Technique in detail with example.(CO1,L2)
(or)
(c) Explain AES Cipher Encryption in detail.(CO2,L2)
7. (a) Apply RSA Algorithm for message authentication. (CO2,L3)
(or)
(b) Build Diffie Hellman Key Exchange with example. (CO2,L3)
8. (a) What are different ways of password cracking? (CO4,L1)
(or)
(b) What is SQL injection and what are the preventive measures from attack? (CO4,L1)
9. (a) Explain Monitor Active SSH Sessions With Prometheus and Grafana.(CO4,L2)
(or)
(b) Explain Hunting threats with pandas. (CO5,L2)
- 10 (a) Plan the counter measures to be practiced for possible attacks on mobile/cell phones. (CO5, L5)
(or)
(b) Discuss how Keylogger be used to commit a cybercrime. (CO4,L5)
(c) Discuss DoS and DDoS in detail. (CO4,L5)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E3: CLOUD COMPUTING

Course Description and Purpose: Cloud Computing is a course that illustrates *concepts of Cloud Computing and Virtualization, Services and Deployment Models of Cloud Computing, Developing Cloud Applications using Open Source Cloud Software, AAA Model, Challenges and Benefits of Mobile Cloud Computing.*

Course Objectives: This course will help enable the students to understand and learn various *Concepts of Key Technologies, Strengths, and Limitations of Cloud Computing, core issues of Virtualization, Open Source Architectures, Services of Cloud Computing, Develop and deploy Cloud Applications using Popular Cloud Platform, Risks, Consequences and Costs of Cloud Computing and Mobile Cloud Computing*

Course Outcomes:

On successful completion the students should be able to

CO1: What is Virtualization and its Benefits, Mechanisms, Server Virtualization versus Cloud Computing.

CO2: Infer about Open-Source Cloud Implementations, Application Architecture for Cloud, AAA Administration for Clouds.

CO3: Analyze Stages during the development process of Cloud Application, Cloud Computing Service Delivery Models.

CO4: Explain about Mobile Cloud Computing, Programming Support for Google Apps Engine, Amazon EC2, Elastic Block Store (ESB).

CO5: Discuss Risks, Consequences and Costs for Cloud Computing, Cloud Computing Services.

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	H	H				
	CO2	H	M	H			M
	CO3		H		M		
	CO4		M	H			
	CO5	H			H	H	

UNIT-I (12 Hours)

Era of Cloud Computing: Getting to Know the Cloud, Peer-to-Peer, Client-Server and Grid Computing, Cloud Computing versus Client-Server Architecture, Cloud computing versus Peer-To Peer Architecture, Cloud computing versus Grid Computing, How we got to the Cloud, Server Virtualization versus Cloud Computing, Components of Cloud Computing, Cloud Types, Cloud Computing Service Delivery Models.

Introducing Virtualization: Introducing Virtualization and its Benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanisms, Open Source Virtualization Technology, Binary Translation with Full Virtualization, Virtualization of CPU, Memory and I/O Devices, Hardware support for Virtualization in Intel x86 Processor

UNIT-II (12 Hours)

Cloud Computing Services: Infrastructure as a Service, Platform as a Service, Language and Pass, Software as a Service, Database as a Service.

Open Source Cloud Implementations and Administration: Open-Source Eucalyptus Cloud Architecture, Open-Source Open Stack Cloud Architecture

UNIT-III (12 Hours)

Application Architecture for Cloud: Cloud Application Requirements, Recommendations for Cloud Application Architecture, Fundamental Requirements for Cloud Application Architecture, Relevance and use of Client-Server architecture for Cloud Application, Service Oriented Architecture for Cloud Applications.

Cloud Programming: Programming Support for Google Apps Engine, Big Table as Google's NOSQL System, Chubby as Google Distributed Lock Service, Programming Support for Amazon EC2, Elastic Block Store (ESB).

UNIT-IV (12 Hours)

Risks, Consequences and Costs for Cloud Computing: Introducing Risks in Cloud Computing, Risk Assessment and Management, Risk of Vendor Lock-In, Risk of Loss Control, Risk of Not Meeting Regulatory Compliances, Risk of Resource Scarcity, Risk in Multi Tenant Environment, Risk of Failure, Risk of Failure of Supply Chain, Risk of Malware and Internet Attacks, Risk of Inadequate SLA , Risk of Management of Cloud Resources, Risk of Network Outages, Risks in the Physical Infrastructure, Legal Risk due to Legislation, Risks with Software and Application Licensing, Security and Compliance Requirements in a Public Cloud, Direct and Indirect Cloud Costs, Calculating Total Cost of Ownership for Cloud Computing, Cost Allocations in a Cloud.

AAA Administration for Clouds: The AAA Model, Single Sign-On for Clouds, Industry Implementations for AAA, Authentication Management in the Cloud, Authorization Management in the Cloud.

UNIT-V (12 Hours)

Application Development for Cloud: Developing On-Premise Versus Cloud Applications, Modifying Traditional Applications for Deployment in Cloud, Stages during the development process of Cloud Application, Managing a Cloud Application, Using Agile Software Development for Cloud Application, Cloud Applications: What Not to do, Static Code Analysis for Cloud Applications, Developing Synchronous and Asynchronous Cloud Applications.

Mobile Cloud Computing: Definition of Mobile Cloud Computing, Architecture of Mobile Cloud Computing, Benefits of Mobile Cloud Computing, Mobile Cloud Computing Challenges.

Prescribed Text Books			
	Author	Title	Publisher
1	Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde & Dr. Deven Shah	Cloud Computing, Black Book	DreamTech Press

Reference Text Books			
	Author	Title	Publisher
1	Thomas Erl, Zaigham Mahmood, Ricardo Puttini	Cloud Computing Concepts Technology and Architecture	Pearson
2	Raj Kumar Buyya, Christen Vecctiola, S Tammarai selvi	Mastering Cloud Computing, Foundations and Application Programming	TMH



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

M.C.A

Semester: IV

Course Code: 22CA4E3 Course Name: Cloud Computing

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) Explain SaaS (CO6, L2)

(or)

(b) Explain Virtualization (CO1, L2)

2. (a) What is an Open Source? (CO2, L1)

(or)

(b) What is Eucalyptus? (CO2, L1)

3. (a) What are the advantages of SOA? (CO2, L1)

(or)

(b) What are the drawbacks of GFS? (CO5, L1)

4. (a) Explain the risk of Malware (CO6, L5)

(or)

(b) Explain Authentication (CO2, L5)

5. (a) What not to do in Cloud Application Development? (CO4, L1)

(or)

(b) What are the advantages of MCC? (CO5, L1)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Explain the various Types of Cloud with neat diagrams. (CO4, L2)

(b) Compare and contrast Cloud Computing Architecture with Peer to Peer Architecture. (CO1, L2)

(or)

(c) Explain Virtualization and its benefits and levels. (CO1, L2)

7. (a) Discuss Cloud Computing Services on private cloud. (CO6, L6)

(or)

(b) Design Open-Source Cloud Architecture with example. (CO2, L6)

8. (a) What are the requirements of Cloud Application? (CO2, L1)

(or)

(b) What is Big Table as Google's NoSQL System? Explain EBS. (CO5, L1)

9. (a) Explain Risks in Cloud Computing. (CO6, L5)

(or)

(b) Explain AAA Model for Clouds. (CO2, L5)

10 (a) Explain Stages during the Development Process of Cloud Applications. (CO4, L5)

(or)

(b) Explain Mobile Cloud Computing its Advantages and Disadvantages. (CO5, L5)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E4: NATURAL LANGUAGE PROCESSING

Course Description and Purpose: Natural Language Processing is a course that illustrates concepts of Understanding the Structure of a Sentences, Preprocessing, Feature Engineering and NLP Algorithms, Basic Feature Extraction Methods, Text Classifier, Text Summarization and Text Generation, Vector Representation.

Course Objectives: This course will help enable the students to understand and familiar with Understanding the Structure of a Sentences, Preprocessing, Feature Engineering and NLP Algorithms, Basic Feature Extraction Methods, Text classifier, Text Summarization and Text Generation, Vector Representation.

Course Outcomes: On successful completion students should be able to

CO1: Define Natural Language, NLP techniques, components of NLP to process basic text analytics.

CO2: Illustrate feature engineering strategies, Feature Extraction Methods for text data in Python.

CO3: Develop text summarization and generation models using NLP algorithms.

CO4: Analyze web scraping, data collection, and vector representation for text retrieval.

CO5: Evaluate sentiment analysis techniques and tools for text data interpretation

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	M				M	
	CO2	H		H			
	CO3	H		H			
	CO4	M		M			
	CO5	H				H	

UNIT-I (12 Hours)

Introduction: Understanding natural language processing- What is Natural Language?, What is Natural Language Processing?, Understanding basic applications- Understanding advanced applications, Advantages of togetherness NLP and Python, Text Analytics and NLP - Basic Text Analytics ,Various steps in NLP-Tokenization, PoS Tagging Removal, Normalization, Spelling, Stemming, Lemmatization, NER, Word Sense Disambiguation, Sentence Boundary Detection

UNIT-II (12 Hours)

Understanding the Structure of a Sentences: Understanding the components of NLP-NLU and NLG, Differences of NLU and NLG ,branches of NLP, What is context-free grammar?, Morphological analysis, Lexical analysis, Syntactic analysis, Semantic analysis.

Preprocessing:- Basic preprocessing ,Regular expressions, Basic level regular expression -Basic flags, Advanced level regular expression -Positive look ahead , Positive look behind ,Negative look ahead Negative look behind.

Feature Engineering and NLP Algorithms: What is feature engineering? What is the purpose of feature engineering? Basic feature of NLP -Parsers and parsing, Understanding the basics of parsers ,Understanding the concept of parsing ,Developing a parser from scratch- Types of grammar -Context-free grammar ,Probabilistic context-free grammar - Calculating the probability of a tree, Calculating the probability of a string

UNIT-III (12 Hours)

Basic Feature Extraction Methods: Introduction, Types of Data- Categorizing Data Based on Structure, Categorization of Data Based on Content, Cleaning Text Data-Tokenization, Types of Tokenizers, Issues with Tokenization, Stemming, Regexp Stemmer, The Porter Stemmer, Lemmatization, Language Translation, Stop Word Removal, Feature Extraction from Texts- Extracting General Features from Raw Text, Bag of Words ,TF-IDF, Feature Engineering- Word Clouds, Other Visualizations

UNIT-IV (12 Hours)

Collecting Text Data from the Web: Introduction, Collecting Data by Scraping Web Pages-Extraction of Tag-Based Information from HTML Files, Requesting Content from Web Pages-Collecting Online Text Data, Analyzing the Content of Jupyter Notebooks (in HTML Format), Extracting Information from an Online HTML Page, Dealing with Semi-Structured Data- Dealing with JSON Files, Dealing with a Local XML File

Text Summarization and Text Generation: Introduction, What is Automated Text Summarization?-Benefits of Automated Text Summarization, High-Level View of Text Summarization-Purpose, Input, Output, Extractive Text Summarization, Abstractive Text Summarization, Sequence to Sequence, Encoder Decoder, Summarizing Text Using Word Frequency-Word Frequency Text Summarization,

UNIT-V (12 Hours)

Vector Representation: Introduction, Vector Definition, Why Vector Representations?-Encoding, Character-Level Encoding-Character Encoding Using ASCII Values, Character Encoding with the Help of NumPy Arrays, Positional Character-Level Encoding- Character-Level Encoding Using Positions, One-Hot Encoding-Key Steps in One-Hot Encoding, Character One-Hot Encoding – Manual.

Sentiment Analysis: Why is Sentiment Analysis Required?, Types of Sentiments, Applications of Sentiment Analysis, Tools Used for Sentiment Analysis, TextBlob-Basic Sentiment Analysis Using the TextBlob Library.

Prescribed Text Book			
	Author	Title	Publisher
1	Jalaj Thanaki	Python Natural Language Processing	Packt Publishing Ltd Ist. Edition 2017 UNIT-I,II
2	Sohom Gosh	Natural Language Processing Fundamentals	Packt Publishing Ltd. 1 st Edition 2019 UNIT I ,II -III,IV and V

Reference Text Books			
	Author	Title	Publisher
1	Daniel Jurafsky, James H. Martin	Speech and Language Processing	Pearson 3 rd edition 2021
2	Christopher D. Manning, Hinrich Schütze	Foundations of Statistical Natural Language Processing	The MIT Press, 1 st edition 1999



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

M.C.A

Semester :IV

Course Code: 22CA4E4 Course Name: Natural Language Processing

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) Define Natural Language Processing. What are the advantages of NLP and Python? (CO1,L1)
(or)
(b) What are the basic applications of NLP. (CO1,L1)
2. (a) What are the differences between NLU and NLG? (CO1,L1)
(or)
(b) Define Regular expression. Explain basic regular expressions? (CO1,L1)
3. (a) Explain Types of Data used in Feature Extraction Method. (CO2,L2)
(or)
(b) Explain about porter stemmer. (CO2,L2)
4. (a) Explain Automated Text Summarization and its benefits. (CO3,L2)
(or)
(b) Explain Collecting Data by Scraping Web Pages with example. (CO4,L2)
5. (a) Explain Character Encoding Using ASCII Values. (CO4,L2)
(or)
(b) Explain types of Sentiment Analysis. (CO5,L2)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Define Natural Language. What are the Advanced Applications used in NLP?. (CO1,L1)
(or)
(b) Define Tokenization and PoS Tagging in NLP with example. (CO1,L1)
7. (a) Explain about Advanced Regular Expressions with example. (CO1,L5)
(or)
(b) Explain about CFG and PCFGs with examples. (CO1,L5)
8. (a) Explain about types of Tokenizers and issues with Tokenization. (CO2,L2)
(or)
(b) Explain about Feature Engineering. (CO2,L2)
9. (a) Explain Semi-Structured Data using XML and JSON files. (CO4,L5)
(or)
(b) Explain High-Level View of Text Summarization. (CO3,L5)
10. (a) Elaborate about one hot encoding with example? (CO5,L6)
(or)
(b) Develop Basic Sentiment Analysis using Text Blob library. (CO5,L6)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4L1: BIG DATA AND ANALYTICS LAB

Course Description and Purpose: This laboratory course focuses on hands-on experience with Hadoop installations and commands, implementing word count in Hadoop, Pig installations and commands, MongoDB tasks and operations, including bulk documents, arrays, and MapReduce, as well as Spark installation and operations, including RDDs, data frames, and Spark SQL.

Course Objectives: This laboratory course aimed to implement Hadoop Installations, Hadoop Commands, Word Count in Hadoop, Pig Installation, Pig Commands, MongoDB, MongoDB Commands, Tasks On Mongoddb, Bulk Documents in Mongoddb, Arrays in Mongoddb, Map Reduce in Mongoddb, Aggregate Functions in Mongoddb, Mongo Import & Export and Spark Installation, Operations of Rdd, Working With Data Frames, Spark SQL Operations.

Course Outcomes:

Upon successful completion of the course, the student will be able to:

CO1: Demonstrate foundational Hadoop installations, basic Hadoop commands and implement the Word Count program.

CO2: Illustrating a proficiency in setting up Pig for data processing.

CO3: Understanding of arrays in MongoDB, explaining their basic use and functionality.

CO4: Design and implement advanced tasks in MongoDB

CO5: Apply Spark SQL operations.

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	M				M	
	CO2	M				M	
	CO3	M				M	
	CO4	H		H			
	CO5	H		H			

1. Hadoop Installation Steps. (CO1,L3)
2. Hadoop Commands. (CO1,L3)
3. Word Count Program in Hadoop. (CO2,L1)
4. Pig Installation Steps. (CO2,L3)
5. Pig Commands. (CO3,L3)
6. Introduction To Mongoddb. (CO3,BTL1)
7. Mongoddb Commands. (CO3,BTL3)
8. Tasks on Mongoddb. (CO4,BTL3)
9. Creating Bulk Documents In Mongoddb. (CO4,L6)
10. Arrays in Mongoddb. (CO3,L1)
11. Map Reduce in Mongoddb. (CO4,L3)

12. Aggregate Functions in MongoDB. (CO4,L3)
13. Mongo Import. (CO4,L3)
14. Mongo Export. (CO4,L3)
15. Spark Installation. (CO5,L3)
16. Operations of Rdd. (CO5,L3)
17. Working With Data Frames. (CO5,L3)
18. Spark Sql Operations. (CO5,L3)

Question Paper Pattern for Practical Course

SEE (LAB) Model Question Paper

22CA4L1: BIG DATA AND ANALYTICS LAB

Offered to: M.C.A

Max. Marks: 70

Max. Time: 3Hrs

Pass. Min: 28

(A)	Evaluation Procedure	70 Marks
	I Experiments (Exam & Execution)	50 Marks
	II Viva	10 Marks
	III Record	10 Marks
(B)	CONTINUOUS ASSESSMENT (Internal)	30 MARKS

30 marks for the continuous assessment (Day to day work in the laboratory shall be evaluated for 30 marks by the concerned laboratory teacher based on the regularity/record/viva). Laboratory teachers are mandated to ensure that every student completes 80%-90% of the lab assessments.

TOTAL: (A)+(B) = 100 MARKS



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E5: DEEP LEARNING

Course Descriptive and Purpose: This course is intended to facilitate students' comprehension of several key aspects of deep learning. It covers introduction of Deep Learning and focuses on the practical implementations of Artificial Neural Networks, Tensor Flow and Keras, CNN and RNN.

Course Objectives: The course help the students to understand Basics of Deep Learning, CNN and RNN Neural Networks in Tensor Flow, Applications of Deep Learning.

Course Outcomes:

On successful completion of this course, the students able to:

CO1: Define Deep Learning, Input Output Layers in Neural Networks and Artificial Neural Networks.

CO2: Demonstrate Feed Forward, Back Propagation, Data Representation for Neural Networks.

CO3: Build Models using Tensor Flow and Keras, Artificial Neural Networks, Convolution Neural Networks

CO4: Inspect Loss Functions, Optimizers, Architecture of CNN, LSTM and GRU Layers

CO5: Explain Updating Weights and Biases, Classification and Localization and Recurrent Neural Networks

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	H				H	
	CO2	H		H			
	CO3	H				H	
	CO4	M		M			
	CO5	M		M			

UNIT-I (12 Hours)

Introduction to Deep Learning: Deep Learning Vs Machine Learning, Inspiration of Neural Networks from Brain, The Perceptron: The Simple Idea Behind Neural Networks, Artificial Neuron and its Architecture, Input and Output Layers in Neural Networks, Activation Functions, Loss Functions, Optimizers, Data Representation for Neural Networks, The Gears of Neural Networks.

UNIT-II (12 Hours)

Artificial Neural Networks: Architecture, Input and Output Layers in Neural Networks, Activation Functions, Loss Functions, Optimizers, Training a Neural Net. Feed Forward Mechanism, Back Propagation in Neural Networks, Gradient Descent Algorithm, Updating Weights and Biases, Vanishing/Exploding Gradients Problems, Reusing Pre Trained Layers, Faster Optimizers.

UNIT-III (12 Hours)

Introduction to Tensorflow and Keras: Building ANN with Keras, Problems of Vanishing Gradient and Exploding Gradient, Modifications to Neural Networks, Regularization, Normalization, Dropouts. Hand Digit Recognition in Keras, Regression with Neural Networks, Classification with Neural Networks, Building Image Classifier Using Sequential API, Building Regression MLP using Sequential API, Building Complex Models using Sequential API, Building Dynamic Models using Sequential API, Virtualizing using Tensor Board.

UNIT-IV (12 Hours)

Convolution Neural Networks (CNN): Meaning of Convolution. Architecture of CNN. Filters, Padding, Data Preprocessing in CNN, Alexnet, Googlenet, LeNet-5,VGGNet, ResNet, Xception, SENet, Image Classification with CNN using Keras, Transfer Learning in CNN, Using Pre Trained Models from Keras, Pre Trained Models for Transfer Learning, Classification and Localization.

UNIT-V (12 Hours)

Recurrent Neural Networks (RNN): A Recurrent layer in Keras, Understanding the LSTM and GRU Layers, A LSTM example in Keras, A Temperature Forecasting Problem, Preparing The Data, First Recurrent Baseline, Using Recurrent Dropout to Fight Over Fitting, Stacking Recurrent layers, Using Bidirectional RNN's.

Prescribed Text Book			
	Author	Title	Publisher
1	François Chollet	Deep Learning with Python	Second Edition Paperback-Manning,2017
2	AurelienGeron	Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems	O'Reilly, 2 nd Edition, 2019

Reference Text Book			
	Author	Title	Publisher
1	Peter Bruce	Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python	O'Reilly



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

M.C.A

Semester: IV

Course Code: 22CA4E5 Course Name: Deep Learning

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) What are the differences between Deep Learning and Machine Learning? (CO1,L1)
(or)
(b) Write short notes idea behind Neural Networks. (CO1,L1)
2. (a) What are input and output layers? (CO1,L1)
(or)
(b) What is Loss Function? (CO4,L1)
3. (a) What is Vanishing Gradient? (CO4,L1)
(or)
(b) What are modifications to Neural Networks? (CO3,L1)
4. (a) State and explain Convolution. (CO3,L1)
(or)
(b) What is padding? (CO3,L1)
5. (a) What is Recurrent Layer? (CO5,L1)
(or)
(b) How Preparing Data is to be done? (CO5,L1)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Explain Artificial Neuron and its Architecture. (CO1,L2)
(or)
(b) Explain Data Representation for Neural Networks. (CO2,L2)
7. (a) Explain Gradient Descent Algorithm. (CO4,L2)
(or)
(b) Illustrate Faster Optimizers. (CO4,L2)
8. (a) Explain Building Image Classifier using Sequential API. (CO3, L3)
(or)
(b) Explain Back propagation in Neural Networks. (CO2,L3)
9. (a) Explain Image Classification with CNN using KERAS (CO3, L2)
(or)
(b) Explain the need of Classification and Localization. (CO5, L2)
10. (a) Discuss Temperature Forecasting Problem. (CO5,L6)
(or)
(b) Discuss using Recurrent Dropout to Fight Over Fitting. (CO5,L6)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E6: DYNAMIC WEB PROGRAMMING USING PYTHON

Course Description and Purpose: Dynamic Web Programming Using Python is a course that illustrates *concepts of Dynamic Web Programming, Basic Concepts of Server-Side Development, Advanced JavaScript and DOM Manipulation, Frontend Frameworks, Server-Side Frameworks, Database Integration, Building RESTful APIs, Security in Web Development and Emerging Trends in Dynamic Web Development*

Course Objectives: This course will help enable the students to understand and learn various *Concepts of Dynamic Web Programming, Basic Concepts of Server-Side Development, Advanced JavaScript and DOM Manipulation, Frontend Frameworks, Server-Side Frameworks, Database Integration, Building RESTful APIs, Security in Web Development and Emerging Trends in Dynamic Web Development.*

Course Outcomes:

On successful completion of course, students should be able to

CO1: Recall Evolution of Web Development, Basics of HTML, CSS, and JavaScript, Server-Side Development Basics

CO2: Demonstrate advanced JavaScript and Frontend Frameworks, Database Integration

CO3: Apply and integrate server-side frameworks, Security in Web Development.

CO4: Analyze Security in Web Development, showcasing synthesis and evaluation in web development.

CO5: Evaluate RESTful APIs, emerging trends in dynamic web development and DOM manipulation.

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	M				M	
	CO2	H				H	
	CO3	H		H			
	CO4	H			H		
	CO5	M				M	

UNIT-I (12 Hours)

Introduction to Dynamic Web Programming: Evolution of Web Development- Static vs. Dynamic Websites, Emergence of Dynamic Content, Client-Side vs. Server-Side Programming-Roles and Responsibilities, Communication between Client and Server, Basics of HTML, CSS, and JavaScript- HTML Structure and Tags, CSS Styling and Layout, JavaScript Fundamentals ,Setting up a Development Environment - Code Editors (e.g., Visual Studio Code) ,Local Web Servers (e.g., Node.js).

Server-Side Development Basics: Server-Side Scripting Languages-Overview of PHP, Python, Node.js- Choosing the Right Language for the Task, Handling Form Submissions- Form Elements and Attributes , Processing Form Data on the Server, Introduction to Databases and Server-Side Data Handling- Basics of Database Design, Connecting to Databases from Server-Side. Code- Server Virtualization and its Relevance- Virtual Machines vs. Containers, Benefits of Server Virtualization.

UNIT-II (12 Hours)

Advanced JavaScript and DOM Manipulation

Advanced JavaScript Concepts-Closures, Promises, Async/Await, Manipulating the Document Object Model (DOM)- Selecting and Modifying DOM Elements, Creating and Appending Elements, Event Handling and Delegation-Responding

to User Interactions, Delegating Events for Efficiency, Asynchronous Programming and AJAX-Making Asynchronous Requests, Handling Responses with Callbacks and Promises

Introduction to Frontend Frameworks: Overview of Frontend Frameworks- React, Angular, Vue.js
 Component-Based Architecture-Building Reusable Components, Managing State in Components
 State Management in Frontend Applications- Local State vs. Global State, Tools for State Management (e.g., Redux, Context API), Building a Simple Frontend Application using a Framework- Creating a Project Structure ,Implementing Basic Functionality

UNIT-III (12 Hours)

Server-Side Frameworks: Introduction to Server-Side Frameworks-Express.js, Django, Flask, Routing and Middleware in Server-Side Frameworks-Defining Routes and Handling HTTP Methods ,Implementing Middleware for Request Processing-Handling Requests and Responses-Processing Client Requests, Constructing Server Responses, Building a Basic Server-Side Application- Structuring the Project, Implementing CRUD Operations.

Database Integration: Connecting to Databases-MySQL, MongoDB, SQLite, Establishing Database Connections, CRUD Operations (Create, Read, Update, Delete)- Writing SQL Queries and Commands .Handling Database Transactions,Data Modeling and Schema Design-Entity-Relationship Diagrams
 ,Normalization and Denormalization, Database Security Considerations- SQL Injection Prevention
 ,Authentication and Authorization

UNIT-IV (12 Hours)

Building RESTful APIs: Introduction to RESTful Architecture-Principles and Constraints, RESTful API Design Best Practices, Creating APIs with Server-Side Frameworks-Defining Endpoints and Methods
 ,Handling API Requests and Responses, Consuming APIs on the Client Side-Making API Requests from Frontend Applications, Handling API Responses and Errors, Authentication and Authorization in APIs-
 Token-Based Authentication, Role-Based Authorization

Security in Web Development: Common Web Vulnerabilities-Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF),Securing Web Applications-Input Validation and Sanitization, Secure Communication (HTTPS),Best Practices for Web Security- Content Security Policy (CSP), Two-Factor Authentication (2FA)

UNIT-V (12 Hours)

Emerging Trends in Dynamic Web Development: Progressive Web Apps (PWAs)- Offline Capabilities, Push Notifications, Web Assembly and its Applications-Running Native Code in Browsers,
 Serverless Architecture-Functions as a Service (FaaS),Benefits and Use Cases,Future Trends in Dynamic Web Development- Voice Interfaces, Artificial Intelligence in Web Development

Prescribed Text Books			
	Author	Title	Publisher
1	Steve Holden	Python Web Programming"	New Riders,2022

Reference Text Books			
	Author	Title	Publisher
1	Miguel Grinberg,	Flask Web Development/; Developing Web Applications with Python	O'Reilly Media.2020
2	William S. Vincent,	Django for Beginners: Build websites with Python and Django"	William S. Vincent.2022



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

M.C.A

Semester: IV

Course Code: 22CA4E6 Course Name: Dynamic Web Programming Using Python

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) Explain the basics of CSS styling and layout in web development, emphasizing their role (CO1,L2)
(or)
(b) Explain the fundamentals of JavaScript and their importance in dynamic web content creation (CO1,L2)
2. (a) How do three advanced concepts in JavaScript contribute to enhancing web interfaces?(CO2,L1)
(or)
(b) How does JavaScript manipulate the Document Object Model (DOM)? (CO2,L1)
3. (a) Define routing in the context of server-side frameworks.?(CO3,L1)
(or)
(b) Define authentication and authorization in the context of server-side applications.?(CO3,L1)
4. (a) Explain the concept of Cross-Site Request Forgery (CO3,L2)
(or)
(b) Explain *the* concept of token-based authentication in the context of RESTful APIs.(CO5,L2)
5. (a) Discuss the significance of push notifications in PWAs and how they enhance user engagement. (CO5,L6)
(or)
(b) Discuss the emerging trend of voice interfaces in dynamic web development. (CO5,L6)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Explain the evolution of web development, highlighting the differences between static and dynamic websites.. (CO1,L2)
(or)
(b) Explain the importance of a development environment in dynamic web programming. (CO1,L2)
7. (a) Compare and contrast Callbacks and Promises in asynchronous JavaScript. (CO2,L2)
(or)
(b) Compare and contrast local state and global state in the context of frontend applications. (CO2,L2)
8. (a) Explain the implementation of CRUD operations with examples (CO2,L5)
(or)
(b) Explain the importance of handling database transactions in server-side applications.
Give one example (CO3,L5)
9. (a) Explain in detail the key principles and constraints of the RESTful architecture. (CO5,L2)
(or)
(b) Explain the principles of role-based authorization and its implementation in the context of RESTful APIs (CO5,L2)
- 10 (a) Explain the concept of server less architecture and highlight its key distinctions from traditional server-based models.(CO5,L5)
(or)
(b) Explain specific applications where leveraging Web Assembly is advantageous for web developers. (CO5,L5)



PARVATHANENI BRAHMAMMA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

22CA4E7: SOFTWARE TESTING & PROJECT MANAGEMENT

Course Description and Purpose: Software Testing & Project Management (22CA4E9) is a course that illustrates Introduction of Software Testing, Software Testing Activities, Software Verification, Metrics and Models in Software Testing, Functional Testing, Structural Testing and Object Oriented Testing.

Course Objectives: This course will help enable the students to understand and learn fundamentals of Software Testing, Software Testing Activities, Software Verification, Metrics and Models in Software Testing, Functional Testing, Structural Testing and Object Oriented Testing.

Course Outcomes:

On successful completion the students should be able to

CO1: Remember Object Oriented Testing Methodologies.

CO2: Understand Fundamentals of Software Testing and Testing Activities.

CO3: Apply various Functional Testing Strategies.

CO4: Analyze Software Verification Methods and Metrics and Models in Software Testing.

CO5: Create Structural Testing Methods.

CO-PO MATRIX							
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6
	CO1	M				M	
	CO2	M				M	
	CO3	M		M			
	CO4	M	M				
	CO6	M		M			

UNIT-I (12 Hours)

Introduction: Some Software Failures, Testing Process, Terminologies, Limitations of Testing, The V Shaped Software Life Cycle Model.

Software Testing Activities: Levels of Testing (Unit Testing, Integration Testing, System Testing, Acceptance Testing), Debugging, Software Testing Tools, Software Test Plan.

UNIT-II (12 Hours)

Software Verification: Verification Methods, SRS Document Verification, SDD Document Verification, Source Code Reviews, User Documentation Verification.

Metrics and Models in Software Testing: Software Metrics, Categories of Metrics, Object Oriented Metrics used in Testing, What should we measure during Testing?

UNIT-III (12 Hours)

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause-Effect Graphing Technique.

UNIT-IV (12 Hours)

Structural Testing: Control Flow Testing, Data Flow Testing, Slice Based Testing, Mutation Testing.

UNIT-V (12 Hours)

Object Oriented Testing: What is Object Orientation? , What is Object Oriented Testing? , Path Testing, State based Testing, Class Testing.

Prescribed Text Book			
S.No	Author	Title	Publisher
1	Yogesh Singh	Software Testing	Cambridge University Press, 2012 ISBN: 978-1-107-01296-7

Reference Text Book			
S.No	Author	Title	Publisher
1	Aditya P.Mathur	Foundations of Software Testing	2 nd Edition, Pearson Education, 2013 ISBN: 978-8131794760



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

M.C.A

Semester: IV

Course Code: 22CA4E7 Course Name: Software Testing & Project Management
Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. (a) Explain YK2 Failure. (CO2, L2)
(or)
(b) Explain Acceptance Testing (CO3, L2)
2. (a) Explain issues related to Acceptance Testing. (CO2, L1)
(or)
(b) Explain the Quality of Software Code. (CO4, L2)
3. (a) Summarize Do-Not-Care condition of Rule Count. (CO6, L2)
(or)
(b) Explain procedure to create Equivalence Classes. (CO3, L2)
4. (a) How do u create Program Slices. (CO4, L1)
(or)
(b) Write about Control Flow Testing. (CO4, L1)
5. (a) List Various Levels of Testing. (CO4, L4)
(or)
(b) List various issues related to Class Testing (CO4, L4)

SECTION-B

Answer the following questions.

(5×10=50Marks)

6. (a) Explain Why, Who & What is Testing? (CO1, L2)
(or)
(c) Discuss (i) Unit Testing (ii) Integration Testing. (CO3, L2)
7. (a) Discuss significance of SRS Document. (CO4, L6)
(or)
(b) Build various Object Oriented Metrics used in Testing. (CO1, L6)
8. (a) Explain Cause Effect Graphing Techniques. (CO6, L5)
(or)
(b) Evaluate Boundary Value Analysis. (CO3, L5)
9. (a) Explain Data Flow Testing. (CO6, L5)
(or)
(b) Explain Mutation Testing. (CO2, L5)
- 10 (a) Explain various aspects of Object Oriented Testing. (CO1, L5)
(or)
(b) Explain the significance of Statebased Testing. (CO6, L5)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS &
SCIENCE**

Autonomous

Siddhartha Nagar, Vijayawada-520010

Re-accredited at 'A+' by the NAAC

Offered to: M.C.A

Course Name	Privacy And Security In Online Social Media	L	T	P	C	CIA	SEE	TM
Course Code	22CA4M1	4	0	0	4	30	70	100
Year of Introduction: 2022	Year of Offering: 2022-23	Year of Revision: Nil			Percentage of Revision: Nil			
L-Lecture, T-Tutorial, P-Practical, C-Credits, CIA-Internal Marks, SEE-External Marks, TM-Total Marks								

Course Description and Purpose: Privacy and Security in Online Social Media is a course that illustrates concepts of incidents, Trust and credibility, Misinformation, Pictures in online Social Media, policing and e-crimes, link Farming, Semantic attacks, Privacy in Location based Networks, Dynamics of username change.

Course Objective: To understand the importance of Privacy and Security in Online Social Media incidents, Trust and credibility, Misinformation, Pictures in online Social Media, policing and e-crimes, link Farming, Semantic attacks, Privacy in Location based Networks, Dynamics of username change.

Course Outcomes:

CO1: Recall Key Incidents, Data Collection Techniques.

CO2: Understand Dynamics of Social Media, Privacy Concerns.

CO3: Apply Policing Strategies, Detection of eCrime.

CO4: Analyze Misinformation Spread, Trustworthiness of Information.

CO5: Evaluate Effectiveness of Tools and APIs, Credibility of Sources.

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H	H	H	M	M	M	H
	CO2	H		H		M	H	M
	CO3		H		H		H	M
	CO4		H	H			H	
	CO5	H	H			M		M

UNIT-I (12 Hours)

Introduction-Incidents-OSM APIs and tools for data collection-Trust and Credibility on OSM.

UNIT-II (12 Hours)

Misinformation on Social Media-Privacy and Social Media-Privacy and Pictures on Online Social Media.

UNIT-III (12 Hours)

Policing and Online Social Media Part-I-Policing and Online Social Media Part-II-Policing and Online Social Media Part-III-eCrime on Online Social Media Part-I-eCrime on Online Social Media Part-II.

UNIT-IV (12 Hours)

Link Farming in Online Social Media-Nudges-Semantic attacks: Spear phishing-Profile Linking on Online Social Media-Anonymous Networks.

UNIT-V (12 Hours)

Privacy in Location Based Social Networks Part-I-Privacy in Location Based Social Networks Part-II-Beware of What You Share Inferring Home Location in Social Networks-On the dynamics of username change behavior on Twitter.

PrescribedTextBook			
	Author	Title	Publisher
1	Prof.Ponnurangam Kumara Guru	Privacy and Security in Online Social Media	e-Book



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

MOOCS

M.C.A

Semester :IV

Course Code: 22CA4M1

Course Name: Privacy and Security in Online Social Media

Time: 3 Hours

Max Marks: 70

SECTION-A

Answer the following questions.

(5×4 = 20 Marks)

1. a) What is an *API*? (CO1,L1)
(OR)
b) Explain *Data*. (CO4,L1)
2. a) Write about *Privacy*. (CO2,L1)
(OR)
b) What is impact of misinformation? (CO2,L1)
3. a) What is *Policy*? (CO3,L1)
(OR)
b) What is *eCrime*? (CO3,L1)
4. a) What is *Nudge*? (CO4,L1)
(OR)
b) Explain *Farming in Social Media*. (CO4,L1)
5. a) Write about *Privacy Preserving*. (CO5,L1)
(OR)
b) What is *Inferring Home Location*? (CO5,L1)

SECTION-B

Answer the following questions.

(5×10=50 Marks)

6. a) Categorize various incidents in *Online Social Media*. (CO1,L4)
(OR)
b) Compare and contrast *Trust* and *Credibility* on OSM. (CO1,L4)
7. a) Explain misinformation in *Social Media and its disadvantages*. (CO2,L2)
(OR)
b) Explain *Privacy and Pictures on Online Social Media*. (CO2 ,L2)
8. a) Summarize *Policing* in Social Media. (CO3, L2)
(OR)
b) Explain various *e-crimes in Social Media*. (CO3,L2)
9. a) Explain the *Link farming in Online Social Media*. (CO4, L5)
(OR)
b) Explain *Anonymous Networks*. (CO4, L5) 10 M
10. a) Elaborate *dynamics of username change behavior on Twitter* (CO5, L6)
(OR)
b) Elaborate *Location Based Social Networks Impacts Privacy* (CO5,L6)



**PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE**
Autonomous
Siddhartha Nagar, Vijayawada-520010
Re-accredited at 'A+' by the NAAC

Course Code	22CA4P1	I A Marks	50
No. of Lecture Hours / Week	3	End Exam Marks	150
Total Number of Lecture Hours	3	Total Marks	200

Project: PROJECT WORK 22CA4P1		
S.No.	COURSE OUTCOMES	PO'S
	After completion of the course student will be able to	
1	Recall advanced theoretical and practical knowledge to develop data-driven applications.	PO1
2	Demonstrate proficiency in programming, data analysis, and machine learning techniques.	PO3
3	Solve complex technical problems using critical thinking and data insights	PO3
4	Analyze project requirements to manage projects efficiently while ensuring ethical standards and best practices.	PO2,PO4
5	Combine effectively and communicate technical findings to diverse audiences.	PO6

CO-PO MATRIX								
COURSE CODE	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1	H	M		L		M	
	CO2	H		H		H		M
	CO3	H	M					
	CO4		H	H				
	CO5			M				H

The project will be assigned in the final semester. The project will be performed at the established industry (or) in the department under the supervision of the faculty or research institutes. It may involve experimental and/or theoretical work as well as critical review of the literature. Each of the students has to carry out original research in a topic in accordance with the work chosen under the guidance and supervision of a teacher in the concerned Department of the college.

Dissertation must be submitted at the end of the semester which will be assessed by the external examiners. Dissertation must be prepared with introduction, Review of the literature, Experimental Session, Results and Discussion, Conclusion and References.

The final dissertation should have at least 40 – 60 pages typed in Times New Roman 12 font except Headings and side headings with 1.5 line spacing.

PROJECT WORK

- All the candidates shall undertake a Project Work of **three months duration** in the fourth semester. The project should have industry orientation and the work should be certified by the concerned organization where the student has undertaken the project work. The project work shall be guided and certified by the teacher-guide.
- The purpose of the project work is primarily to demonstrate the application of knowledge of skills acquired in the MCA programme, by studying and analyzing a selected problem in the work situation in a systematic manner while suggesting solution. Each student is required to study the problem under the guidance of a faculty member of the department.
- The completed project should be submitted to the College as per the guidelines prescribed by the Examination Section from time to time.
- Internal assessment of project work will be done by the concerned project internal guide and HOD for 50 marks. External evaluation will be carried out by a committee consisting of project internal guide, HOD and the external examiner appointed by the Controller of Examinations for 150 Marks.

Evaluation Schema for Continuous Internal / External Assessment of Project Work		
Review-I	Submission of Abstract	10/25 Marks
Review-II	Submission of Data Dictionary & UML/ER Diagrams	10/25 Marks
Review-III	Project Execution	15/50 Marks
Thesis Submission		15/50 Marks
Total		50/150 Marks

- The Candidate should have to secure minimum 50% marks in Project work.
