

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (November 2024 – April 2025)

Department : Computer Science
Name/s of the Faculty : Ms. A R Charulatha
Course Title : Formal Languages and Finite Automata
Course Code : 23CS/PC/FF44
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	define and explain the fundamental concepts of Formal Languages and Automata Theory	K1, K2
CO2	apply the knowledge of automata theory, regular expressions and grammars to solve various language class problems	K3
CO3	identify formal language classes and prove language membership properties	K4
CO4	determine concepts relating to the theory of computation and computational models including decidability and intractability	K5
CO5	construct automata applications and Finite state machines	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
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Nov 18 – 25, 2024 (Day Order 1-6)	1	1.1 Fundamentals and Finite Automata Basic concepts - Strings, Alphabets, Languages, Finite State Machine, Definitions, Finite Automaton model, Acceptance of Strings and Languages, Deterministic Finite Automaton (DFA) and Non-deterministic Finite automaton (NFA)	K1-K6	5	1-5	Lecture, Group Discussion	Problem Solving
Nov 26- Dec 3, 2024 (Day Order 1 to 6)	1	Transition diagrams and Language recognisers, Extended transition function, Acceptance of languages, Subset construction, Equivalence of NFA and DFA (Proof needed),	K1-K6	5	1-5	Lecture, Case Study	Problem Solving Assignment on Lexical Analyzers
Dec 4-11, 2024 (Day Order 1 to 6)	1	NFA with ϵ - transitions- Eliminating ϵ - transitions	K1-K6	5	1-5	Lecture	Quiz on identifying if a certain word belongs to a language
	2	2.1 Regular Languages The operators of Regular Expressions - Building Regular Sets Expressions, Precedence of Regular Expression operators	K1-K6	5	1-5	Lecture / Presentation	Group Discussion
Dec 12-19, 2024 (Day Order 1 to 6)	2	Finite Automata and Regular Expressions- From DFA's to Regular Expressions and	K1-K6	5	1-5	Lecture	Worksheet Tutorials

		conversion of a given regular expression into a Finite Automata					
Dec 20, 2024 (Day Order 1)	2	Conversion of DFA into a Regular Expression by eliminating states	K1-K6	1	1-5	Lecture, Group Discussion	Problem Solving
Jan 3 – 7, 2025 (Day Order 3 to 6)	2	Pumping Lemma for Regular Language (Proof needed) - Closure Properties of Regular Language (proofs not required)	K1-K6	4	1-5	Lecture / Presentation	Group Discussions Component – I Problem Solving on NFA, DFA and regular expressions Test (25 marks)
Jan 8 – 17, 2025 (Day Order 1 to 6)	3	3.1 Grammar Formalism Definition of a Context Free Grammars, Derivations using a Grammar, Language of a Grammar, Leftmost and rightmost derivation of strings and sentential forms	K1-K6	4	1-5	Lecture / Presentation	Worksheet
Jan 18 - 23, 2025	C.A. Test - I						
Jan 24 -31, 2025 (Day Order 1 to 6)	3	Parse Trees – Constructing parse trees, Yield of a parse tree, From Trees to derivations, Ambiguous Grammars, Removing Ambiguity from Grammars, Leftmost Derivation, Inherent ambiguity, Normal forms for Context Free Grammars	K1-K6	5	1-5	Lecture / Presentation, Group Discussion	Problem Solving
Feb 3-8, 2025	4	4.1 Pushdown Automata	K1-K6	5	1-5	Lecture / Presentation,	Component – II Seminar on application of

(Day Order 1 to 6)		Definition – Model - Graphical notation - Instantaneous descriptions - Acceptance of Context Free Languages - Acceptance by Final State and Acceptance by Empty State and its Equivalence				Simulation and Group discussion	formal languages in day-to-day applications (Traffic lights, Kolam, Pattern matching) (Cumulative Assessment) (25 marks)
Feb 10– 18, 2025 (Day Order 1 to 4)	4	Equivalence of Context Free Grammars and Pushdown Automata - Inter- conversion (Proofs not required) - Introduction to Deterministic Pushdown Automata	K1-K6	4	1-5	Lecture / Presentation, Case Study	Report on power and the limitations of regular languages and context-free languages.
Feb 19- 26, 2025 (Day Order 1-6)	4	4.2 Turing Machines and Undecidability Notation - Instantaneous descriptions - Transition Diagrams – Language – Turing Machines and Halting - Undecidability- A Language that is Not Recursively Enumerable, An Undecidable Problem that is RE, Undecidable Problems about Turing Machines	K1-K5	5	1-4	Lecture / Presentation, Case study	Group Discussion and Analysis of a language
Feb 27- Mar 6, 2025 (Day Order 1 to 6)	5	5.1 Mealy and Moore Machine Finite Automata with Output – Mealy machine, Moore Machine, Properties, Comparison of Mealy	K1-K5	5	1-4	Lecture / Presentation	Discussion and Problem Solving

		and Moore Machine - Conversion of Mealy to Moore and vice versa					
Mar 7 – 11, 2025 (Day Order 1 to 3)	5	5.2 Applications Applications of Finite Automata – NFA for Text Search, DFA to recognise a set of Keywords	K1-K6	2	1-5	Lecture / Presentation, Case Study	Problem Solving and Questioning
Mar 12 –17, 2025	C.A. Test - II						
Mar 18 – 20, 2025 (Day 4 to 6)	5	Applications of Regular Expressions - Regular Expressions in UNIX, Lexical Analysis, Finding Patterns in Text	K1-K6	3	1-5	Lecture / Presentation, Case Study	Group Discussion and Questioning
Mar 21 - 28, 2025 (Day Order 1 to 6)	5	Applications of Context Free Grammars -Parsers, the YACC parser – Generator - Markup Languages, XML and Document –Type Definitions	K1-K6	5	1-5	Lecture / Presentation, Case Study	Group Discussion and Questioning
Mar 29- April 2, 2025 (Day Order 1 to 3)	REVISION						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (November 2024 – April 2025)

Department : Computer Science
Name/s of the Faculty : Dr. Swetha Margaret T A, Ms. Madhura Prabha R
Course Title : Cloud Computing: Theory and Practice
Course Code : 23CS/PC/CT45
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	define the core foundational concepts and terminologies of cloud computing paradigm	K1
CO2	outline the various working frameworks of cloud anatomy and architecture	K2
CO3	identify various storage and resource utilization methods in cloud computing	K3
CO4	analyze cloud software programming models to implement on working cloud environments	K4
CO5	adapt the demonstrations of cloud storage systems through cloud	K5, K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 18 – 25, 2024 (Day Order 1 to 6)	1	Cloud computing foundations 1.1 Motivation for Cloud Computing - Defining	K1-K3	6	1-3	Lecture/ Discussion / Demo /	Interactive lab session assessment (quiz)

		Cloud Computing - NIST Definition of Cloud Computing - Cloud Computing is a Service - Cloud Computing is a Platform - Principles of Cloud computing - Essential Characteristics - Cloud Deployment Models- Cloud Service Models				Presentation/ Simulation through Qwiklabs Reference: <ul style="list-style-type: none"> Google Cloud Skills Boost 	through Whizlabs Cloud
Nov 26- Dec 3, 2024 (Day Order 1 to 6)	1	1.2 Cloud Ecosystem - Requirements for Cloud Services - Cloud Application - Cloud Vulnerabilities - Cloud Architecture - Anatomy of the Cloud - Applications on the Cloud - Managing the Cloud - Migrating Application to Cloud - Responsibility Sharing between User and Cloud Service Provider - User Experience - Software Licensing	K1-K3	6	1-3	Lecture/ Discussion / Demo / Presentation Reference: <ul style="list-style-type: none"> Google Cloud Skills Boost Cloud Analyst Cloud Alliance 	Hands-On Labs and Simulations Case-Based Learning Exploring Google Cloud Pricing Calculator
Dec 4-11, 2024 (Day Order 1 to 6)	2	Paradigms and Technological Drivers for Cloud Computing 2.1 SOA and Cloud - Existing Cloud Applications and New	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	Hands-On Labs and Simulations Case-Based Learning

		Application Opportunities - Architectural Styles for Cloud Applications					Exploring cloud-based CRM-Salesforce Google Maps API
Dec 12-19, 2024 (Day Order 1 to 6)	2	Coordination Based on a State Machine Model: The ZooKeeper - The MapReduce Programming Model - Case Study: The GrepTheWeb Application	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	MapReduce word count practical assessment
Dec 20, 2024 (Day Order 1)	2	2.2 High Performance Computing on a Cloud-Cloud Computing Interoperability: The Intercloud	K1 – K6	1	1-5	Lecture/ Discussion / Demo / Presentation	Group activity on Monte Carlo simulations and Weather Prediction Models, Social web, Semantic Web, Google Firebase
Jan 3 – 7, 2025 (Day Order 3 to 6)	2	Web standards: Web 2.0 - Characteristics of Web 2.0 –Web 2.0 and Cloud Computing - Web 3.0 - Components of Web 3.0	K1 – K6	3	1-5	Lecture/ Discussion / Demo / Presentation	Component – I Objective based test Max. Marks: 25
Jan 8 – 17, 2024 (Day Order 1 to 6)	3	Virtualization and Load balancing Layering and Virtualization – Virtual Machine Monitors- Virtual	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	Exploring Cloud Analyst, VMware Workstation, Oracle

		Machines- Types of virtualizations – Approaches to virtualization – Hypervisors					VirtualBox, and Multiple isolated user-space instances
Jan 18 - 23, 2025	C.A. Test – I						
Jan 24 - 31, 2025 (Day Order 1 to 6)	3	Types of hypervisors - Resource Pooling, Sharing and Provisioning - Scaling in the Cloud – Load balancing – Goals of Load balancing - Load Balancing in Cloud – Load balancing algorithm	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	Group activity on creating containers
Feb 3-8, 2025 (Day Order 1 to 6)	3	Multicore Technology: Multicore Processors and VM Scalability - Multicore Technology and the Parallelism	K1 – K6	4	1-5	Lecture/ Discussion / Demo / Presentation	Exploring Google Cloud Free Tier and Azure Load Balancer
Feb 10– 18, 2025 (Day Order 1 to 4)	4	Cloud Application Development Amazon Web Services understanding and requirements – Working with the Elastic Compute Cloud (EC2) - Working with Amazon Storage Systems (S3) - Amazon Elastic Block Store (EBS)	K1 – K6	4	1-5	Lecture/ Discussion / Demo / Presentation	Practical activity to set up a basic web server and to implement Hello World app using Node.js or Python Flask or Bucket Creation

Feb 19- 26, 2025 (Day Order 1-6)	4	Understanding CloudFront - Amazon SimpleDB - Amazon Relational Database Service (RDS)- Cloud simulation tools: Cloud analyst and CloudSim - Google Web Services: Working with the Google App Engine	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	<p>Component - II Case study analysis through presentation</p> <p>Max. Marks: 25 (Problem Identification: 10 marks Case study report: 10 marks Presentation: 5 marks)</p> <p>Activity: Exploring Google app engine to develop a simple SSL configuration</p>
Feb 27- Mar 6, 2025 (Day Order 1 to 6)	5	<p>Cloud Storage, SLA and Security The Evolution of Storage Technology - Memory and Storage Technologies - Cloud Storage Requirements - Storage as a Service (STaaS)</p>	K1 – K6	6	1-5	Lecture/ Discussion / Demo / Presentation	<p>Activity: Exploring Google Cloud Storage or Docker to create own cloud space, upload files, and set up access controls.</p>

Mar 7 – 11, 2025 (Day Order 1 to 3)	5	Emerging Trends and Technologies in Cloud Storage - Google File System	K1 – K6	3	1-5	Lecture/ Discussion / Demo / Presentation	Activity in exploring Google File System and Hadoop by creating a simple MapReduce job
Mar 12 –17, 2025	C.A. Test – II						
Mar 18 – 20, 2025 (Day 4 to 6)	5	Apache Hadoop - Transaction Processing and NoSQL Databases	K1 – K6	3	1-5	Lecture/ Discussion / Demo / Presentation	Activity in exploring Google File System and Hadoop by creating a simple MapReduce job
Mar 21 - 28, 2025 (Day Order 1 to 6)	5	Service Level Agreement (SLA)– Types of SLA - Life Cycle of SLA - SLA Management in Cloud - Virtualization Security - Network Security - Data Security	K1 – K6	6	1-5	Discussion / Demo / Presentation	Activity – Creation of an SLA Template using uptime guarantees, penalties, and monitoring methods. Exploring AWS CloudWatch
Mar 29- April 2, 2025 (Day Order 1 to 3)	REVISION						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**COURSE PLAN (November 2024 – April 2025)**

Department : Computer Science
Name/s of the Faculty : Ms. A R Charulatha, Dr.Renuka Devi D
Course Title : Dissertation
Course Code : 23CS/PC/DS48
Shift : II

COURSE OUTCOMES (COs)

COs	Description	CL
CO1	define a problem statement	K1
CO2	summarize necessary literatures to understand the problem	K2
CO3	choose an appropriate development environment for the chosen problem	K3
CO4	analyse an application/research problem effectively	K4
CO5	estimate and evaluate the accuracy of the result	K5, K6
	CL – Cognitive Level K1 – Remember K2 – Understand K3 – Apply K4 – Analyse K5 – Evaluate K6 – Create	

Week	Unit No.	Content	Cognitive Level	Teaching Hours	Cos	Teaching Learning Methodology	Assessment Methods
Nov 18 – 25, 2024 (Day Order 1-6)		Topic / domain selection / problem statement for application	K1, K2	6	CO1-CO2	Lecture / Demo	Research Journals –

							Recording key terms Discussion
Nov 26- Dec 3, 2024 (Day Order 1 to 6)		Topic / domain selection / problem statement for application	K1, K2	6	CO1-CO2	Lecture / Demo	Literature Matrix, Reverse Abstracting
Dec 4-11, 2024 (Day Order 1 to 6)		Abstract Introduction and Motivation	K1, K2	6	CO1- CO2	Lecture / Demo	Abstract Writing, ResearchMap ping
Dec 12-19, 2024 (Day Order 1 to 6)		Literature Survey	K1-K3	6	CO1 – CO3	Lecture / Demo	Component I (25 marks) Report Submission (Problem statement, Objectives, Background Study)
Dec 20, 2024 (Day Order 1)		Model Development	K1-K6	1	CO1 – CO5	Lecture / Demo	Create a model
Jan 3 – 7, 2025 (Day Order 3 to 6)		Model Development	K1-K6	4	CO1 – CO5	Lecture / Demo	Create a model

Jan 8 – 17, 2024 (Day Order 1 to 6)		Model Implementation	K1-K6	6	CO1 – CO5	Lecture / Demo	Create a model
Jan 18 - 23, 2025	C.A. Test – I						
Jan 24 -31, 2025 (Day Order 1 to 6)		Model Implementation	K1-K6	6	CO1 – CO5	Lecture / Demo	Create a model
Feb 3-8, 2025 (Day Order 1 to 6)		Model Implementation	K1-K6	6	CO1 – CO5	Lecture / Demo	Create a model
Feb 10– 18, 2025 (Day Order 1 to 4)		Model Implementation	K1-K6	4	CO1 – CO5	Lecture / Demo	Self-Evaluation of Research Process
Feb 19- 26, 2025 (Day Order 1-6)		Results and Inferences	K1-K6	6	CO1 – CO5	Lecture / Demo	Component II – (25 marks) 80 % Research project Completion - Review
Feb 27- Mar 6, 2025 (Day Order 1 to 6)		Results and Inferences	K1-K6	6	CO1 – CO5	Lecture / Demo	Key Findings Quiz
Mar 7 – 11, 2025 (Day Order 1 to 3)		Results and Inferences	K1-K6	3	CO1 – CO5	Lecture / Demo	Review / Discussion

Mar 12 –17, 2025	C.A. Test – II						
Mar 18 – 20, 2025 (Day 4 to 6)		Results and Inferences	K1-K6	3	CO1 – CO5	Lecture / Demo	Research Report
Mar 21 - 28, 2025 (Day Order 1 to 6)		Documentation	K1-K6	6	CO1 – CO5	Lecture / Demo	Research Report
Mar 29- April 2, 2025 (Day Order 1 to 3)	REVISION						

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STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (November 2024 – April 2025)

Department : Computer Science
Name/s of the Faculty : Ms. Roselin Clara A, Dr. Faustina Joan S P
Course Title : ADVANCED TECHNOLOGIES IN INFORMATION TECHNOLOGIES
Course Code : 23CS/PE/AT15
Shift : II

COURSE OUTCOMES (COs)

COs	Description						CL
CO1	recall the concepts in neural network, deep learning, bitcoin and blockchain						K1
CO2	explain the architecture of deep learning and bitcoin						K2
CO3	apply the knowledge gained in bitcoin mining and natural language processing						K3
CO4	analyze deep networks, bitcoin transactions and blockchain features						K4
CO5	determine the neural network architecture, Merkle trees and transaction aggregates						K5
Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Nov 18 – 25, 2024 (Day Order 1 to 6)	1, 3	1.1 Neural Networks and Deep Learning Neural Networks	K1 – K2	3	1 – 2	Lecture / Storytelling	Activity – Trivia Quiz

		3.1 Bitcoin Bitcoin – History of Bitcoin – Bitcoin Uses, Users – Transactions	K1 – K2	3	1 – 2		
Nov 26 – Dec 3, 2024 (Day Order 1 to 6)	1, 3	1.1 Neural Networks and Deep Learning Training NN 3.1 Bitcoin Blocks, Mining and the Blockchain – Bitcoin Transactions – Constructing a Transaction – Adding the Transaction to the Ledger – Propagation – Receiver’s view – Bitcoin Mining	K1 – K2 K1 – K4	3 3	1 – 2 1 – 4	Lecture / Role Play	Classroom Discussion
Dec 4 – 11, 2024 (Day Order 1 to 6)	1, 3	1.1 Neural Networks and Deep Learning Activation Functions 3.1 Bitcoin Mining transactions in blocks – Spending the transaction –Cryptography	K1 – K2 K1 – K5	3 3	1 – 2 1 – 5	Lecture / Analogy	Activity – Exploring Online Bitcoin Dashboards
Dec 12-19, 2024 (Day Order 1 to 6)	1, 3	1.1 Neural Networks and Deep Learning Loss Functions 3.1 Bitcoin Digital Signatures – Elliptic Curve Cryptography	K1 – K2 K1 – K5	3 3	1 – 2 1 – 5	Lecture / Learning by Doing	Classroom Discussion

Dec 20, 2024 (Day Order 1)	1	1.1 Neural Networks and Deep Learning Hyper Parameters	K1 – K2	1	1 – 2	Lecture / Presentation	Classroom Discussion
Jan 3 – 7, 2025 (Day Order 3 to 6)	3, 4	3.1 Bitcoin Keys – Addresses – Wallets 4.1 Bitcoin Network Introduction – Bitcoin Addresses	K1 – K5 K1 – K2	3 2	1 – 5 1 – 2	Lecture / Analogy	Component 1 – Objective Questions (25 marks)
Jan 8 – 17, 2024 (Day Order 1 to 6)	2, 4	2.1 Deep Networks Architectural Principles of Deep Networks 4.1 Bitcoin Network Cryptographic Hashing – Hashing Algorithms	K1 – K5 K1 – K5	3 3	1 – 5 1 – 5	Lecture / Learning by Doing	Classroom Discussion
Jan 18 – 23, 2025	C.A. Test - I						
Jan 24 – 31, 2025 (Day Order 1 to 6)	2, 4	2.1 Deep Networks Building Blocks of Deep Networks 4.1 Bitcoin Network Encoding – Key Formats – Wallets –The Bitcoin Network – Peer-to-Peer Network Architecture	K1 – K5 K1 – K5	3 3	1 – 5 1 – 5	Lecture / Presentation	Activity – Who am I?
Feb 3 – 8, 2025 (Day Order 1 to 6)	2, 4	2.1 Deep Networks Unsupervised Pretrained Networks 4.1 Bitcoin Network Node Types and Roles – The Extended Bitcoin Network –	K1 – K5 K1 – K5	3 3	1 – 5 1 – 5	Lecture / Role Play	Classroom Discussion

		Network Discovery – Full Nodes – Exchanging “Inventory”					
Feb 10 – 18, 2025 (Day Order 1 to 4)	2, 4	2.1 Deep Networks Convolution Neural Networks – Transfer Learning 4.1 Bitcoin Network Simplified Payment Verification (SPV) Nodes	K1 – K5 K1 – K5	3 1	1 – 5 1 – 5	Lecture / Presentation	Classroom Discussion
Feb 19 – 26, 2025 (Day Order 1 to 6)	2, 4, 5	2.1 Deep Networks Recurrent NNs – Recursive NNs 4.1 Bitcoin Network Bloom Filters – Transaction Pools 5.1 Blockchain The Blockchain – Structure of a Block – Block Header	K1 – K5 K1 – K4 K1 – K2	3 1 2	1 – 5 1 – 4 1 – 2	Lecture / Analogy	Component 2 – Presentation on any advanced technology (25 marks)
Feb 27 – Mar 6, 2025 (Day Order 1 to 6)	2, 5	2.1 Deep Networks Applications of Deep Learning in Natural Language Processing 5.1 Blockchain Block Identifiers – Block Header Hash and Block Height – The Genesis Block – Linking Blocks in the Blockchain	K1 – K5 K1 – K5	1 5	1 – 5 1 – 5	Lecture / Case Study / Learning by Doing	Classroom Discussion

Mar 7 – 11, 2025 (Day Order 1 to 3)	5	5.2 Merkle Tree Merkle Trees – Merkle Trees and Simplified Payment Verification (SPV) Mining and Consensus – Decentralized Consensus	K1 – K5	3	1 – 5	Lecture / Group Discussion	Activity – The Blockchain Game
Mar 12 –17, 2025	C.A. Test - II						
Mar 18 – 20, 2025 (Day Order 4 to 6)	5	5.2 Merkle Tree Independent Verification of Transactions – Mining Nodes – Aggregating Transactions into Blocks – Mining the Block – Assembling and Selecting Chains of Blocks	K1 – K5	3	1 – 5	Lecture / Learning by Doing	Activity - Using https://bloxxgame.io/ Application
Mar 21 – 28, 2025 (Day Order 1 to 6)	5	5.2 Merkle Tree Mining and the Hashing Race –Consensus Attacks – Bitcoin Security – Security principles – User Security Best Practices	K1 – K5	6	1 – 5	Lecture / Case Study	Classroom Discussion
Mar 29 – April 2, 2025 (Day Order 1 to 3)	REVISION						

