

RAJAGIRI COLLEGE OF SOCIAL SCIENCES KALAMASSERY

Department of Computer Science



COURSE MANUAL

**MSC CS (Data Analytics)
(2022 - 2024 Batch)**

Semester II

December 08, 2022 – April 31, 2023

CSDA 201 Java Programming

Course Facilitator : Fr. Angelo Baby CMI
: frangelo@rajagiri.edu
: 8281371477

Course Code	CSDA 201	Course Title	Java Programming
Course Type	Core	Contact Hours	4 Hours per Week
Credit	3	Domain	Computing

Syllabus

Syllabus	
I	Module 1: Basics of Java: Java - What, Where and Why?, History and Features of Java, Internals of Java Program, Difference between JDK,JRE and JVM, Internal Details of JVM, Variable and Data Type, Unicode System, Naming Convention. OOPS Concepts: Advantage of OOPs, Object and Class, Method Overloading, Constructor, static variable, method and block, this keyword, Inheritance (IS-A), Aggregation and Composition(HAS-A), Method Overriding, Covariant Return Type, super keyword, Instance Initializer block, final keyword, Runtime Polymorphism, static and Dynamic binding, Abstract class and Interface, Downcasting with instanceof operator ,Package and Access Modifiers, Encapsulation, Object class, Object Cloning, Java Array, Call By Value and Call By Reference
II	Module 2: Core java Features: String Handling, Exception Handling, Nested classes, Packages and Interfaces. Multithreaded Programming – synchronization, Input/Output – Files – Directory ,Utility Classes, Generics, Generic Class, Generic methods.
III	Module 3: Serialization: Serialization & Deserialization, Serialization with IS-A and Has-A, Transient keyword. Networking: Socket Programming, URL class, Displaying data of a web page, InetAddress class, DatagramSocket and DatagramPacket, Two way communication
IV	Module 4: JDBC: - Overview, JDBC implementation, Connection class, Statements, Catching Database Results, handling database Queries. Error Checking and the SQLExceptionClass , The SQLWarning Class, JDBC Driver Types, ResultSetMetaData, Using a Prepared Statement, Parameterized

	Statements, Stored Procedures, Transaction Management. Collection: Collection Framework, ArrayList class, LinkedList class, ListIterator interface, HashSet class
V	Module 5: Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers, adapter classes and Menus. Swing: Basics of Swing, JButton class, JRadioButton class, JTextArea class, JComboBox class, JTable class, JColorChooser class, JProgressBar class, JSlider class, Displaying Image, JMenu for Notepad, Open Dialog Box
REFERENCE BOOKS:	
JAVA The Complete Reference- Patrick Naughton and Herbert Schidt.- fifth Edition Tata McGraw Hill.	
The Complete reference J2SE - Jim Keogh – Tata McGraw Hills	
Programming and Problem Solving With Java, Slack, Thomson Learning, 1Edn	
Java Programming Advanced Topics, Wigglesworth, Thomson Learning, 3Edn	
Java Programming, John P. Flynt , Thomson Learning, 2Edn.	
Ken Arnold and James Gosling, The Java Programming language, Addison Wesley, 2nd Edition, 1998	
Patrick Naughton and Herbert Schidt. The Complete Reference, JAVA fifth Edition Tata McGraw Hill.	
Maydene Fisher, Jon Ellis, Jonathan Bruce; JDBC API Tutorial and Reference, Third Edition, Publisher: Addison-Wesley	
Thinking java – Bruce Eckel – Pearson Education Association	
COURSE PRE-REQUISITES:	
CSDA 102, CSDA 106	
COURSE OBJECTIVES:	
1. To understand and comprehend object-oriented programming concepts using Java	
2. To provide a comprehensive coverage of Internet programming using java.	
3. To achieve the designing of platform independent applications	
COURSE OUTCOMES:	
CO. No	Course Outcome Description
CSDA202.1	Ability to solve problems using only pure object-oriented concepts
CSDA202.2	Make decision to solve a problem using package, library and threads Handling Errors and Exceptions
CSDA202.3	Able to develop networking applications
CSDA202.4	Ability to design and develop database applications
CSDA202.5	Design and develop software solutions

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CSDA 202.1	2	2	1								2			2		
CSDA 202.2	2	2	1		2						2			2		
CSDA 202.3	2	2	2								2			1		
CSDA 202.4	2	2	2		2											
CSDA 202.5	2	2	2		2			1			2			3		

Justification of CO- PO/ PSO Mapping

- CSDA 202.1 By learning the object-oriented concepts for solving computational programs based on entities, thereby able to analyze, design and represent entities as objects.
- CSDA 202.2 By implementing programs using package, library and threads Handling Errors and Exceptions, thereby able to solve problems
- CSDA 202.3 By developing networking applications, they will be able to solve problems
- CSDA 202.4 By implementing programs with database applications, they will be able to develop solutions
- CSDA 202.5 By designing and developing software solutions, thereby creating opportunity to solve problems and innovate.

CO Assessment Rubrics

Evaluation Criteria	CO
Written Assignment	
CAE1	CSDA 202.1 CSDA 202.2
CAE2	CSDA 202.3 CSDA 202.4
Research Oriented Mini Project	CSDA 202.1 CSDA 202.2, CSDA 202.3, CSDA 202.4, CSDA 202.5

CATE GORY	Assessed Course objective	Assessment				
		A+	A	B	C	D
CAE1 and CAE2	1,2,3,4	Correctly answer the conceptual questions which are not straight forward, may be combining different concepts	Answer direct questions perfectly.	Attempts direct questions and answers partially.	Concepts are not clear	Cannot answer any question.
Assign ment	1,2	Completes the work with ample references/ illustrations to the concepts asked in the assignment	Completes the work with minor mistakes; higher levels of thinking not reflected in the work.	Completes the work with mistakes and/or Documentat ion is not neat.	Submitted with mistakes and not on time	Not submitted
Resear ch Orient ed Project	1,2,3,4	Perfect Solution with expected funcionalit y	80% Completed Solution	50% correct Solution	Below 30% funcionalit y	Below 10% funcionalit y
Semes ter Exam	1,2,3,4,5	Successful ly answer two sections of Question papers	Partially answer the sets of questions with minor mistakes	Answer the questions with mistakes	Incomplete/ wrong answers	The Basic concepts are not clear

		which encompass the concepts				
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Session Plan

Session No	Topic Planned	Date/Remark
1	Basics of Java: Java - What, Where and Why?, History and Features of Java, Internals of Java Program, Difference between JDK,JRE and JVM, Internal Details of JVM	
2	Variable and Data Type, Unicode System, Naming Convention. OOPS Concepts: Advantage of OOPs, Object and Class	
3	Method Overloading, Constructor, static variable, method and block, this keyword Inheritance (IS-A), Aggregation and Composition(HAS-A), Method Overriding, super keyword	
4	Covariant Return Type, Instance Initializer block, final keyword,Runtime Polymorphism, static and Dynamic binding, Abstract class and Interface, Downcasting with instanceof operator	
5	Package and Access Modifiers, Encapsulation, Object class	
6	Object Cloning, Java Array, Call By Value and Call By Reference	
7	Core java Features: String Handling, Exception Handling	
8	Nested classes, Packages and Interfaces	
9	Multithreaded Programming	
10	Synchronization,	
11	Input/Output – Files – Directory	
12	Utility Classes, Generics, Generic Class, Generic methods.	
13	Serialization: Serialization & Deserialization, Serialization with IS-A and Has-A, Transient keyword	

14	Networking: Socket Programming,	
15	URL class, Displaying data of a web page	
16	InetAddress class, DatagramSocket and DatagramPacket,	
17	Two way communication	
18	JDBC: - Overview, JDBC implementation, Connection class, Statements, Catching Database Results, handling database Queries.	
19	Error Checking and the SQLException Class , The SQLWarning Class	
20	JDBC Driver Types, ResultSetMetaData, Using a Prepared Statement, Parameterized Statements	
21	Stored Procedures, Transaction Management	
22	Collection: Collection Framework, ArrayList class,	
23	LinkedList class, ListIterator interface, HashSet class	
24	Introducing AWT: Working with Windows Graphics and Text.	
25	Using AWT Controls, Layout Managers, adapter classes and Menus.	
26	Swing: Basics of Swing, JButton class, JRadioButton class, JTextArea class	
27	JComboBox class, JTable class, JColorChooser class, JProgressBar class, JSlider class,	
28	Displaying Image, JMenu for Notepad, Open Dialog Box	
29	Java applets- Life cycle of an applet – Adding images to an applet – Adding sound to an applet	
30	Passing parameters to an applet. Event Handling.	

Written Assignment

Grading Scheme

QUESTIONS	WEIGHT
Q1	1
Q2	2
Q3	2
Q4	1

1. Find out an application where Java is predominantly using now.
2. Explain the latest advancement on it. (Technical perspectives)
3. What further enhancements can be incorporated? (your contribution)
4. Substantiate the above with two research papers of the year 2021 or 2022.
(Attach the paper and link to it)

Research Oriented Project Development

Grading

Question	Wt
Q1	2
Q2	3
Q3	3
Q3	2
Total	10

Develop a mini application project based on modules 1, 2, 3, 4, 5.

1. Concept Development and Relevance
2. Implementation
3. Outcome
4. Design

CSDA 202 Data Communications and Computer Networks

Course Facilitator : Diljith K Benny
: diljith@rajagiri.edu
: 9567738713

Course Code	CSDA 202	Course Title	Data Communications and Computer Networks
Course Type	Core	Contact Hours	4 Hours per Week
Credit	3	Domain	Networking

Syllabus

Syllabus	
I	Module 1: Introduction: Data Communications, Computer Networks, Network Layering: OSI reference Model, TCP-IP Protocol Suite. Physical Layer: Data and Signals, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data rate Limits. Digital-to-Digital Conversion, Analog-to-Digital Conversion, Digital-to-Analog Conversion, Analog-to-Digital Conversion
II	Module 2: Physical Layer: Transmission and Switching Transmission Modes, Transmission media- Guided, unguided media. Multiplexing, Switching-Circuit Switching, packet switching.
III	Module 3: Data Link Layer: Nodes and Links, Link-Layer Addressing, error Detection and Correction- Block coding, Cyclic Codes, Checksum, Forward Error Correction, Simple, Stop-and-wait, Go-back-N, Selective Repeat Media Access Control: Random Access-ALOHA, CSMA, CSMA/CD, CSMA/CD, Controlled Access, Channelization-FDMA, TDMA, CDMA.
IV	Module 4: Network Layer: Services, Routing Algorithms: Distance Vector, Link State, Path Vector, and Unicast Routing Algorithms.
V	Module 5: Multicasting Basics: Addresses, Delivery at Data Link Layer, Multicast Forwarding, Two Approaches to Multicasting. IP Addressing, Classes, Subnetting.
REFERENCE BOOKS:	

Forouzan, “Data Communications and Networking”, 5th Edition, McGraw Hill, 2013.

Andrews. Tanenbaum, “Computer Networks”, 5th edition. Prentice-Hall.

William Stallings, “Data and Computer Communication”, 8th edition

COURSE PRE-REQUISITES:

Basic Knowledge in Digital Systems

COURSE OBJECTIVES:

1. Acquire knowledge in data communication in computer networks.
2. Learn the different models and layers included in TCP/IP protocol suite.
3. Learn routing of IP packets and the various protocols used for the effective data transfer on the internet.
4. To assign IP for the various devices in a LAN.

COURSE OUTCOMES:

CO. No	Course Outcome Description
CSDA 202.1	To introduce the students, the basic concepts and models used in computer networks.
CSDA 202.2	To Understand the technology used in different transmission media.
CSDA 202.3	To Understand and Apply error detection and correction mechanisms used for error free data transfer.
CSDA 202.4	To Understand how the IP packets are routed throughout the internet.
CSDA 202.5	To Apply the IP assignment for a particular networking scenario.

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1
CSDA 202.1	3	2		1							1
CSDA 202.2	1	1		1							1
CSDA 202.3	3	3		1							1
CSDA 202.4	2	1		1							1
CSDA 202.5	2	2		1							1

Justification of CO- PO/ PSO Mapping

- CSDA 202.1: By understanding the basic concepts and techniques of Data Communications and Networking, they are able to comprehend the significance of the techniques in the current scenario.
- CSDA 202.2: By understanding the different technologies used in media for data transfer they will be able to suggest the type of medium for a particular network.
- CSDA 202.3: By understanding the methods for detecting and correcting errors in the network, the students will be able to do the calculations for finding checksum.
- CSDA 202.4: By understanding the routing concepts in internet, the students will be able to suggest the appropriate algorithms that can be adapted for a network.
- CSDA 202.5: By understanding the IP addressing and subnetting, the students will be able to do IP assignments and subnetting for a network.

CO Assessment Rubrics

Evaluation Criteria	CO
Written Assignment	CSDA 202.1, CSDA 202.2
CAE1	CSDA 202.1, CSDA 202.2
CAE2	CSDA 202.3, CSDA 202.4
Quiz/ Viva	CSDA 202.1, CSDA 202.2, CSDA 202.3, CSDA 202.4, CSDA 202.5

Session Plan

Session No	Topic Planned	Date/Remark
1	Introduction: Data Communications, Computer Networks.	
2	Introduction: Computer Networks.	
3	Network Layering: OSI reference Model	
4	TCP-IP Protocol Suite.	
5	Physical Layer: Data and Signals.	
6	Periodic Analog Signals	
7	Digital Signals	
8	Transmission Impairment, Data rate Limits.	
9	Digital-to-Digital Conversion.	

10	Digital-to-Digital Conversion	
11	Analog-to-Digital Conversion	
12	Digital-to-Analog Conversion	
13	Analog-to-Digital Conversion	
14	Physical Layer: Transmission and Switching Transmission Modes.	
15	Transmission media- Guided, unguided media.	
16	Multiplexing.	
17	Switching-Circuit Switching	
18	Switching- packet switching	
19	Switching- Message switching	
20	Data Link Layer: Nodes and Links, Link-Layer Addressing.	
21	Error Detection and Correction- Block coding	
22	Cyclic Codes, Checksum	
23	Cyclic Codes, Checksum	
24	Forward Error Correction, Simple, Stop-and-wait.	
25	Go-back-N, Selective Repeat.	

26	Media Access Control: Random Access-ALOHA, CSMA	
27	CSMA/CD, CSMA/CA.	
28	Controlled Access.	
29	Channelization-FDMA, TDMA, CDMA	
30	Network Layer: Services.	
31	Routing Algorithms: Distance Vector.	
32	Link State, Path Vector	
33	Unicast Routing Algorithms.	
34	IP Addressing, Classes.	
35	Subnetting.	
36	Multicasting Basics: Addresses.	
37	Delivery at Data Link Layer.	
38	Multicast Forwarding.	
39	Two Approaches to Multicasting.	
40	Revision/Quiz/Viva	

WRITTEN ASSIGNMENT

Grading Scheme

QUESTION	WEIGHT
Q1	0.5
Q2	0.5

Questions

1.

2.

Quiz/Viva-Voice

Grading

Question	Weightage
Total	2

CSDA 203 Advanced Software Engineering

Course Facilitator : Dr. Keerthy A. S
: keerthy@rajagiri.edu
: 9446483652

Course Code	CSDA 203	Course Title	Advanced Software Engineering
Course Type	Core	Contact Hours	4 Hours per Week
Credit	3	Domain	Professional Core

Syllabus

I	Introduction to Software Engineering , Process Models, Understanding Requirements Agile methodology - Agile – Primer, Manifesto, Characteristics, Daily Stand-up, Definition of Done, Release Planning, Iteration Planning, Product Backlog
II	Requirements Modelling - Analysis, UML Models, Data Modelling, Class-Based Modelling, Webapps Design Concepts - Design Model, Software Architecture- Styles- Design, Component Level Design- Class based Components, User- Interface Design Interface Analysis, Interface design, WebApp Design
III	Software Quality Assurance , Software Testing Strategies, Testing Applications Conventional-Object-oriented- Web
IV	Project Management Concepts - Process Metrics, Estimation, Scheduling, Risk Management, Maintenance and re-engineering
V	DevOps - JUnit - git - github - Docker - Containers - Continuous Integration - Selenium - HTTP loadtestingtool-Design patterns

REFERENCE BOOKS:

Software Engineering, a Practitioner's Approach- Roger S Pressman 7th Edition, Tata Mc-Graw Hill Publishing Co. Ltd.

Software Engineering – Ian Somerville 9th Edition, Pearson Education

An Integrated Approach to Software Engineering- Pankaj Jalote 3rd edition, Narosa Publishing House

Fundamentals of Software Engineering- Ghezzi, Jazayer's and Mandriolli 2nd Edition, PHI	
Software Engineering principles & Practice- Waman S Jawadekar 2nd Edition, Tata Mc-Graw Hill Publishing Co. Ltd	
Software Project Management: Pankaj Jalote, Pearson Education	
Software Project Management –A Unified Framework: Walker Royce, Pearson Education	
Software Project Management – S A Kelkar, Prentice Hall India	
Selenium Simplified, second edition	
COURSE PRE-REQUISITES:	
Basic Knowledge of Computer Science	
COURSE OBJECTIVES:	
<ol style="list-style-type: none"> 1. Knowledge of basic Software Engineering methods and practices, and their appropriate application 2. A general understanding of software process models. 3. An understanding of software requirements and the SRS document. 4. An understanding of design concepts and different software architecture styles. 5. An understanding of implementation issues such as modularity and coding standards. 6. An understanding of approaches to verification and validation including static analysis, and reviews. and software testing approaches 7. An understanding of software evolution and related issues such as version management. 8. An understanding of quality control and how to ensure good quality software. 9. An understanding of quality control and how to ensure good quality software. 10. An understanding of the role of project management including planning, scheduling, risk management, etc. 11. Understanding the latest tools in Software engineering 	
COURSE OUTCOMES:	
CO. No	Course Outcome Description
CSDA203.1	To Identify the process model suitable for software development, perform the requirement analysis
CSDA203.2	To understand the design methodology available for software engineering
CSDA203.3	To understand software testing and quality assurance techniques used in the software engineering process
CSDA203.4	To understand estimation, scheduling, risk management, and maintenance in the software engineering process
CSDA203.5	To identify various development platforms, testing tools, etc used in SE

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1
CSDA203.1	2	3	2					2	2	1	
CSDA203.2	2	2	3					2		1	
CSDA203.3		2			2			2	1	1	
CSDA203.4		2				1		2		1	
CSDA203.5					2	1				1	

Justification of CO- PO/ PSO Mapping

- By understanding the different process models, the students will be able to choose the suitable process model for the development of software tool
- By learning requirement analysis techniques, the methods suitable for identifying the requirements for software development can be analyzed.
- By learning design concepts suitable design methodology for the software engineering process can be chosen.
- By learning the testing strategies, the quality assurance of the software can be performed.
- By learning project management concepts, proper scheduling of projects can be performed
- By learning different tools used in the software engineering process, can assist in choosing suitable tools for activities in data analysis.

CO Assessment Rubrics

Evaluation Criteria	CO
Written Assignment	
CAE1	CSDA 203.1 CSDA 203.2
CAE2	CSDA 203.3 CSDA 203.4
Case Study	CSDA 203.5

Weightage for Components

Components	Weightage
Assignment	1
Case Study	2
CAE1 & CAE2	2 (1 each)

Session Plan

Session No	Topic Planned	Date/Remark
1	Introduction to Software Engineering, Process Models – <ul style="list-style-type: none"> • A Generic process Model, • <i>Process Assessment And Improvement,</i> • Prescriptive Process Models 	
2	<ul style="list-style-type: none"> • Specialized Process Models, • Unified Process Models, • Personal and team process Models 	
3	Understanding Requirements: <ul style="list-style-type: none"> • Requirement Engineering • <i>SRS Template</i> • Establishing the Ground Work • Eliciting Requirements 	
4	<ul style="list-style-type: none"> • Developing the Use Cases – Use case diagram • Building the Requirement Model – UML Activity Diagram, Class Diagram 	
5	<ul style="list-style-type: none"> • Negotiating requirements • Validating requirements 	
6	Agile methodology <ul style="list-style-type: none"> • Agile – Primer, Manifesto, Characteristics, Daily Stand-up 	
7	Definition of Done, Release Planning, Iteration Planning, Product Backlog	
8	Requirements Modelling <ul style="list-style-type: none"> • Requirements Analysis • Scenario Based Modeling • UML Models, 	
9	Data Modelling, Class-Based Modelling	
10	Requirements Modelling For Webapps	
11	Design Concepts	
12	Design Model	
13	Software Architecture- Styles, Design	
14	Component Level Design	

	Class-based Components	
15	User- Interface Design- Interface Analysis,	
16	Interface design, <i>WebApp Design</i>	
17	Software Quality Assurance <ul style="list-style-type: none"> • Elements of SQA • SQA tasks, goals & Metrics • <i>Statistical Software Quality Assurance</i> • Software Reliability • <i>SQA Plan</i> 	
18	Software Testing Strategies <ul style="list-style-type: none"> • Strategic Approach • Testing Strategies • Unit Testing • Integration Testing 	
19	<ul style="list-style-type: none"> • Validation Testing • System Testing • Debugging 	
20	Testing conventional Applications <ul style="list-style-type: none"> • White Box Testing • Control Structure Testing 	
21	<ul style="list-style-type: none"> • Black box Testing • Model-Based Testing 	
22	<ul style="list-style-type: none"> • Testing Object-Oriented Applications • Testing Web Applications 	
23	<ul style="list-style-type: none"> • Project Management Concepts • Process Metrics 	
24	Estimation	
25	Scheduling	
26	Risk Management	
27	Maintenance and re-engineering	
28	DevOps - JUnit - git – github – Docker - Containers	
29	Continuous Integration - Selenium	
30	HTTP loadtestingtool-Designpatterns.	

***Bold Italics in Session Plan is for Self Study**

Written Assignment

Grading Scheme

QUESTION	WEIGHT
Q1	1

Question:

Conduct a Requirement Analysis for developing a web application. Prepare a detailed system study report for the same. The report must have Use Case Diagrams, Activity diagrams, and Swim Lane Diagrams or the other relevant representations.

Case Study

Grading Scheme

QUESTION	WEIGHT
Report	1
Presentation	1

Identify a software tool used in the SE process currently used in the industry. Prepare a detailed case study report on the working of the tool.

The report will be evaluated for plagiarism. There will be a presentation for the same (ppt with max 15 slides)

CSDA 204 Artificial Intelligence

Course Facilitator : Dr Sabeen Govind
: sabeengovind@rajagiri.edu
: 9496442093

Course Code	CSDA 204	Course Title	Artificial intelligence
Course Type	Core	Contact Hours	4 Hours per Week
Credit	4	Domain	Machine learning

Syllabus

Syllabus	
I	Introduction - Overview of AI applications. Introduction to representation and search. The Propositional calculus, Predicate Calculus, Using Inference Rules to produce. Predicate Calculus expressions, Application – A Logic based financial advisor.
II	Introduction to structure and Strategies for State Space search, Graph theory, Strategies for state space search, Heuristic Search: introduction, Hill-Climbing and Dynamic Programming, The Best-first Search Algorithm, Admissibility, Monotonicity and informedness, Using Heuristics in Games-Minimax algorithm, Alpha beta pruning.
III	Building Control Algorithm for Statespace search – Introduction, Production Systems, Knowledge Representation – Issues, History of AI representational schemes, Conceptual Graphs, Alternatives to explicit Representation, Agent based and distributed problem solving.
IV	Strong Method Problem Solving – Introduction, Overview of Expert System Technology, Rule Based Expert system, Introduction to Planning. Reasoning in Uncertain Situation – introduction, Bayes Rule Inference, Belief Network, Utility Based System, Decision Network
V	Machine Learning: Symbol Based – Introduction, Frame –work. The ID3 Decision tree Induction algorithm, Unsupervised learning, Reinforcement Learning, Machine Learning: Connectionist – Introduction, foundations, Perceptron learning. Machine learning: Social and emergent: Models, The Genetic Algorithm.
REFERENCE BOOKS:	

George F Luger, Artificial Intelligence – Structures and Strategies for Complex problem solving, 5thEdn, pearson.

E. Rich, K. Knight, S B Nair, Artificial intelligence, 3rdEdn,

McGraw Hill. S. Russel and p. Norvig, Artificial intelligence – A Modern Approach, 3rdEdn,

Introduction to Artificial Intelligence and Expert Systems, PHI, 1990 Nilsson N.J., Artificial Intelligence - A New Synthesis, Harcourt Asia Pvt. Ltd.

COURSE PRE-REQUISITES:

COURSE OBJECTIVES:

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence
2. To provide a basic exposition to the goals and methods of Artificial Intelligence
3. To enable the student to apply these techniques in applications which involve perception, reasoning and learning

COURSE OUTCOMES:

CO. No	Course Outcome Description
CSDA204.1	Understand the various underlying concepts in Artificial Intelligence
CSDA204.2	Acquire the knowledge of search techniques used in Artificial Intelligence
CSDA204.3	Acquire the concepts of knowledge representation.
CSDA204.4	Understand the concept of expert system.
CSDA204.5	To apply the concept of machine learning algorithms.

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1
CSDA204.1	2										
CSDA204.2	2	2		1							
CSDA204.3	2	2									
CSDA 204.4	2										
CSDA204.5	2	2	3	1							

Justification of CO- PO/ PSO Mapping

- CSDA204.1 is mapped with computational knowledge.
- CSDA204.2 is mapped with computational knowledge, problem analysis and design and development of solutions.
- CSDA204.3 computational knowledge, problem analysis is required.
- CSDA 204.4 computational knowledge required.
- CSDA 204.52 is mapped with computational knowledge, problem analysis and design and development of solutions and Conduct Investigations of Complex Computing Problems.

CO Assessment Rubrics

Evaluation Criteria	CO
Written Assignment	CSDA204.1 CSDA204.2
CAE1	CSDA 204.1 CSDA 204.2

CAE2	CSDA 204.3CSDA 204.4
Project	CSDA 204.5

CATE GORY	Assessed Course objective	Assessment				
		A+	A	B	C	D
CAE1 and CAE2	1,2,3,4	Correctly answer the conceptual questions which are not straight forward, may be combining different concepts of data structures	Answer direct questions perfectly.	Attempts direct questions and answers partially.	Concepts are not clear	Cannot answer any question.
Assign ment	1,2	Completes the work with ample references/ illustrations to the concepts asked in the assignment	Completes the work with minor mistakes; higher levels of thinking not reflected in the work.	Completes the work with mistakes and/or Documentation is not neat.	Submitted with mistakes and not on time	Not submitted
	1,2,3,4	Perfect Solution with expected	80% Completed Solution	50% correct Solution	Below 30% functionality	Below 10% functionality

		functionalit y				
Semes ter Exam	1,2,3,4,5	Successful ly answer two sections of Question papers which encompass the concepts learned in the Theory	Partially answer the sets of questions with minor mistakes	Answer the questions with mistakes	Incomplete/ wrong answers	The Basic concepts are not clear

Session Plan

Session No	Topic Planned	Date/Remark
1	Introduction - Overview of AI applications.	
2	Introduction to representation and search.	
3	The Propositional calculus, Predicate Calculus,	
4	Inference Rules	
5	Application – A Logic based financial advisor.	
6	Introduction to state space graph	
7	Graph theory, Strategies for state space search	
8	Heuristic Search:	
9	Hill-Climbing and Dynamic Programming	
10	The Best-first Search Algorithm	
11	Admissibility, Monotonicity and informedness	
12	Heuristics in Games-Minimax algorithm	
13	Alpha beta pruning.	

14	Building Control Algorithm for Statespace search – Introduction	
15	Production Systems	
16	Knowledge Representation – Issues	
17	Conceptual Graphs	
18	Alternatives to explicit Representation	
19	Agent based and distributed problem solving.	
20	Overview of Expert System Technology,.– introduction,	
21	Rule Based Expert system,	
22	Introduction to Planning	
23	Reasoning in Uncertain Situation	
24	Bayes Rule Inference, Belief Network, Utility Based System	
25	Decision Network	
26	Machine Learning: Introduction,	
27	The ID3 Decision tree	
28	Unsupervised learning,	
29	Reinforcement Learning,	
30	Machine Learning: Connectionist – Introduction, foundations, Perceptron learning	
31	The Genetic Algorithm.	

WRITTEN ASSIGNMENT

Grading Scheme

QUESTION	WEIGHT
Q1	
Q2	
Q3	
Q4	
Q5	

Questions

1.

2.

3.

4.

5.

Project/Viva-Voice/Assignment/Test

Grading

Question	Wt
Q1	
Q2	
Q3	
Q4	
Q5	
Total	

CSDA 205 Data Mining

Course Facilitator : Sr. Jinsi Jose
 : jinsijose@rajagiri.edu
 : 8792191152

Course Code	CSDA 205	Course Title	Data Mining
Course Type	Core	Contact Hours	4 Hours per Week
Credit	4	Domain	Professional Core

Syllabus

Course Code	CSDA205	Course Title	Data Mining
Course Type	Core	Contact Hours	4 Hours per Week
Credit	4	Domain	Professional Core

Syllabus

I	Introduction Data Warehousing, Multidimensional Data Model, OLAP Operations, Introduction to KDD process, Data mining, Data mining -On What kinds of Data, Data mining Functionalities, Classification of Data Mining Systems. Data Preprocessing Data Cleaning, Data Integration and Transformation, Data Reduction, Data discretization and concept hierarchy generation
II	Exploring Data and Visualization Techniques General Concepts, Techniques, Visualizing Higher Dimensional Data, Tools Association Analysis Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods: Apriori Algorithm, generating association Rules from Frequent Item sets, Improving the Efficiency of Apriori. Mining Frequent item sets without Candidate Generation, Evaluation of Association Patterns, Visualization. A Case Study on Association using Orange Tool
III	Classification Introduction to Classification and Prediction, Classification by Decision Tree Induction: Decision Tree induction, Attribute Selection Measures, Tree Pruning, Bayesian Classification: Bayes' theorem, Naïve Bayesian Classification, Rule Based Algorithms: Using If - Then rules of Classification, Rule Extraction from a Decision Tree, Rule Induction

	Using a Sequential Covering algorithm, K- Nearest Neighbour Classifiers, Support Vector Machine. Evaluating the performance of a Classifier, Methods for comparing classifiers, Visualization. A Case Study on Classification using Orange Tool											
IV	Prediction Linear Regression, Nonlinear Regression, Other Regression-Based Methods Cluster Analysis I: Basic Concepts and Algorithms Cluster Analysis, Requirements of Cluster Analysis’ Types of Data in Cluster Analysis, Categorization of Major Clustering Methods, Partitioning Methods: k-Means and k- Medoids, From K-Medoids to CLARANS. A Case Study on Clustering using Orange Tool.											
V	Cluster Analysis II: Hierarchical Method: Agglomerative and Divisive Hierarchical Clustering. Density-based Clustering – DBSCAN, Grid-based Clustering – STING, Evaluation of Clustering Method.											
REFERENCE BOOKS:												
Pang-Ning Tan, Michael Steinbach, Vipin Kumar, ‘Introduction to Data Mining’.												
Data Mining Concepts and Techniques – Jiawei Han and Micheline Kamber, Second Edition, Elsevier, 2006.												
G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.												
Making sense of Data: A practical guide to exploratory Data Analysis and Data Mining - Glenn J Myatt												
COURSE PRE-REQUISITES:												
CSDA 103, CSDA 104												
COURSE OBJECTIVES:												
1. Acquire knowledge in Data mining and warehousing 2. Learn the different techniques for discovery of patterns hidden in large data sets and their Visualizations 3. Learn data mining tasks such as classification, estimation, prediction, affinity grouping and clustering.												
COURSE OUTCOMES:												
CO. No	Course Outcome Description											
CSDA 205.1	To introduce the students, to the basic concepts and techniques of Data mining and Warehousing and data pre-processing.											
CSDA 205.2	Understand association mining algorithms for the discovering frequent item patterns in large data sets and their Visualizations.											
CSDA 205.3	Understand classification analysis algorithms for discovering and generating rules in large data sets and their Visualizations.											
CSDA 205.4	Understand basic and advanced clustering analysis algorithms and Visualizations in Data Mining.											
CSDA 205.5	Understand and evaluate different clustering methods in data mining.											
CO-PO AND CO-PSO MAPPING												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	

CSDA 205.1	3	2		1	1						2
CSDA 205.2	1	1		1	2						1
CSDA 205.3	1	1		1	2						1
CSDA 205.4	1	1		1	2						1
CSDA 205.5	1	1		1	2						1

Justification of CO- PO/ PSO Mapping

- CSDA 205.1 By understanding, the basic concepts and techniques of Data mining and Warehousing and data pre-processing.
- CSDA 205.2 By understanding association mining algorithms for discovering frequent item patterns in large data sets and their Visualizations.
- CSDA 205.3 By Understanding and implementing classification analysis algorithms for discovering and generating rules in large data sets and their Visualizations.
- CSDA 205.4 By comprehending and advanced clustering analysis algorithms and Visualizations in Data Mining.
- CSDA 205.5 By understanding and evaluating different clustering methods in data mining.

CO Assessment Rubrics

Evaluation Criteria	CO
Written Assignment	CSDA 205.1
CAE1	CSDA 205.1, CSDA 205.2
CAE2	CSDA 205.3, CSDA 205.4
Case Study	CSDA 205.5

Session Plan

Session No	Topic Planned	Date/Remark
Session 1	Introduction data mining and KDD process	
Session 2	Data Warehousing, Classification of Data Mining Systems.	

Session 3	Data preprocessing: Cleaning, Data Integration and Transformation, Data Reduction, Data discretization and concept hierarchy generation.	
Session 4	Exploring Data and Visualization Techniques	
Session 5	Association Analysis: Efficient and Scalable Frequent Item set Mining Methods: Apriori Algorithm.	
Session 6	Evaluation of Association Patterns, Visualization. A Case Study on Association using Orange Tool	
Session 7	Classification and Prediction, Classification by Decision Tree Induction: Decision Tree induction, Attribute Selection Measures, Tree Pruning	
Session 8	Bayesian Classification: Bayes' theorem, Naïve Bayesian Classification.	
Session 9	Rule Based Algorithms: Using If - Then rules of Classification, Rule Extraction from a Decision Tree.	
Session 10	Rule Induction Using a Sequential Covering algorithm.	
Session 11	K- Nearest Neighbour Classifiers.	
Session 12	Support Vector Machine.	
Session 13	Evaluating the performance of a Classifier.	
Session 14	Methods for comparing classifiers, Visualization.	
Session 15	Prediction: Linear Regression.	
Session 16	Nonlinear Regression.	
Session 17	Other Regression-Based Methods.	

Session 18	Cluster Analysis I: Basic Concepts and Algorithms.	
Session 19	Types of Data in Cluster Analysis	
Session 20	Categorization of Major Clustering Methods.	
Session 21	Partitioning Methods: k-Means and k-Medoids.	
Session 22	From K-Medoids to CLARANS, A Case Study on Clustering using Orange Tool.	
Session 23	Cluster Analysis II: Hierarchical Method: Agglomerative.	
Session 24	Divisive Hierarchical Clustering.	
Session 25	Density-based Clustering – DBSCAN.	
Session 26	Grid-based Clustering – STING.	
Session 27	Evaluation of Clustering Method.	
Session 28	Case Study presentations of students.	
Session 29	Case Study presentations of students.	
Session 30	Revision	

WRITTEN ASSIGNMENT

Grading Scheme

QUESTION	WEIGHT
Q1	1
Q2	1
Q3	1

Questions

1. Write a note on Multidimensional Data Model.
2. Describe the classification of Data Mining Systems.
3. Explain data mining Functionalities.

Case Study

Grading

Question	Wt
Q1	2
Total	2

CSDA 206 Java Programming Lab

Course Facilitator : Fr. Angelo Baby CMI
: frangelo@rajagiri.edu
: 8281371477

Course Code	CSDA 206	Course Title	Java Programming Lab
Course Type	Core	Contact Hours	4 Hours per Week
Credit	2	Domain	Practical

Syllabus

Syllabus	
I	Program to illustrate class, objects and constructors Program to implement overloading, overriding, polymorphism etc.
II	Program to implement the usage of packages Program to create user defined and predefined exception Program for handling file operation Directory manipulation in java
III	Program to implement the usage of packages Program to create user defined and predefined exception Program for handling file operation Directory manipulation in java
IV	Program to implement JDBC in GUI and Console Application
V	Program for event-driven paradigm in Java Event driven program for Graphical Drawing Application Program that uses Menu driven Application
REFERENCE BOOKS:	
JAVA The Complete Reference- Patrick Naughton and Herbert Schidt.- fifth Edition Tata McGraw Hill.	
The Complete reference J2SE - Jim Keogh – Tata McGraw Hills	
Programming and Problem Solving With Java, Slack, Thomson Learning, 1Edn	
Java Programming Advanced Topics, Wigglesworth, Thomson Learning, 3Edn	
Java Programming, John P. Flynt , Thomson Learning, 2Edn.	

Ken Arnold and James Gosling, The Java Programming language, Addison Wesley, 2nd Edition, 1998

Patrick Naughton and Herbert Schidt. The Complete Reference, JAVA fifth Edition Tata McGraw Hill.

Maydene Fisher, Jon Ellis, Jonathan Bruce; JDBC API Tutorial and Reference, Third Edition, Publisher: Addison-Wesley

Thinking java – Bruce Eckel – Pearson Education Association

COURSE PRE-REQUISITES:

CSDA 106, CSDA 201

COURSE OBJECTIVES:

1. To understand and comprehend object-oriented programming concepts using Java
2. To provide a comprehensive coverage of Internet programming using java.
3. To achieve the designing of platform independent applications

COURSE OUTCOMES:

CO. No	Course Outcome Description
CSDA206.1	Ability to solve problems using only pure object-oriented concepts
CSDA206.2	Make decision to solve a problem using package, library and threads Handling Errors and Exceptions
CSDA206.3	Able to develop networking applications
CSDA206.4	Ability to design and develop database applications
CSDA206.5	Design and develop software solutions

CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CSDA 206.1	2	2	1								2			2		
CSDA 206.2	2	2	1		2						2			2		
CSDA 206.3	2	2	2								2			1		
CSDA 206.4	2	2	2		2											
CSDA 206.5	2	2	2		2			1			2			3		

Justification of CO- PO/ PSO Mapping

- CSDA 206.1 By learning the object-oriented concepts for solving computational programs based on entities, thereby able to analyze, design and represent entities as objects.
- CSDA 206.2 By implementing programs using package, library and threads Handling Errors and Exceptions, thereby able to solve problems

- CSDA 206.3 By developing networking applications, they will be able to solve problems
- CSDA 206.4 By implementing programs with database applications, they will be able to develop solutions
- CSDA 206.5 By designing and developing software solutions, thereby creating opportunity to solve problems and innovate.

CO Assessment Rubrics

1. CAEP covering Lab Cycle mapped to CSDA206.1, CSDA206.2, CSDA206.3 and CSDA206.4
2. Project mapped to CSDA206.1, CSDA206.2, CSDA206.3, CSDA206.4 and CSDA206.5
3. Semester Exam mapped to CSDA206.1, CSDA206.2, CSDA206.3, CSDA206.4 and CSDA206.5

Grading criteria

Practical Course

Sl No	Component	Weightage
1	CAEP	2
2	Lab Assessment and Record	1
3	Viva Voce	2
Total		5

Session Plan

Session No	Topic Planned	Date/Remark
1	<ol style="list-style-type: none"> 1. Write a program to print your name 2. Write a program to display two numbers received as command line argument, and print its product 3. Write a program to display two strings received as command line arguments 4. Write a program to read two numbers and display the output in the form of 'Sum of 2 and 3 is 5 5. Write a program to accept two numbers from the keyboard and swap them. 	
2	<ol style="list-style-type: none"> 6. WAP to read three numbers and the find maximum 7. Find the minimum of three numbers using a single statement 8. WAP to search for a given element in an array. 9. WAP to sort elements in an array in ascending order. 10. Write a program to print the row wise and column wise sum of a 2D array. 	

3	<p>11. WAP with two functions to check for an integer palindrome.</p> <p>12. WAP to display numbers from m to n using a single while loop. (eg: m=2, n=8 - randomly given numbers)</p> <p>13. WAP to find the sum of the series $1+(1+2)+(1+2+3)+(1+2+3+\dots+n)$ using a single while loop.</p> <p>14. WAP to find the sum of $1+2/2!+3/3!+4/4!+\dots+n/n!$ using a single for loop.</p> <p>15. WAP to calculate the area of a circle (method with no argument and no return type. // use the concept of constructors by passing arguments)</p> <p>16. WAP to reverse a number (method with argument and no return type.)</p> <p>17. WAP to calculate the sum of digits of a number (method with argument and return type.)</p> <p>18. WAP to calculate sum of n even numbers (method with no argument and return type.)</p>	
4	<p>19. A function takes 2 arguments and returns the maximum. Use this function for finding max of 3 numbers. (use both the concepts of method overloading and reusability)</p> <p>20. WAP to find the factorial of n, using recursion.</p> <p>21. WAP to display numbers from n to 1 and vice versa, using recursion.</p> <p>22. Create a class complex having a real and imaginary part. Provide functions for read, display ,add and multiplying two complex numbers</p> <p>23. Program to explain static keyword with different usage including function</p> <p>24. WAP to display even numbers upto 'n' using a static function</p>	
5	<p>25. WAP (menu driven) to demonstrate function overriding in java, by displaying details of a student, and a teacher</p> <p>26. Create a class for employees having eno,ename and esal as data members. Provide functions for reading and displaying employee details. (Accept information of n employees in the main function, display the same and search for an emp (using eno)).</p>	
6	<p>27. Program to implement ISA and HASA relationship.</p> <p>28. Program to overcome function overriding in java</p>	

	<p>29. Program to implement run time polymorphism in Java using Interface, wrt calculating area of a triangle.</p> <p>30. Create an interface Shape having two prototypes disp() and calc(), to display the shape and calculate area respectively. Create two classes: circle and rectangle which implements the above interface. In the main function create a reference of Shape depending on the user-choice.</p> <p>31. WAP to implement a function using call by value to swap two float numbers.</p> <p>32. WAP to implement a function using call by reference to find the square root of a given number.</p>	
7	<p>33. Create a class for Cstring having a string data member and provide functions for read, display, compare (return Boolean value), add and concatenate.</p> <p>34. Write a program to implement object cloning for the class Distance which has inch and feet as data members.</p> <p>35. Write a menu driven program for performing the following operations.</p> <ul style="list-style-type: none"> Length of a given string Compare for equality Extract a substring from a string. Convert to uppercase and lowercase <p>36. Write a program to reverse a string</p> <p>37. Write a program to calculate the prime factors of a given number, using packages.</p>	
8	<p>38. Read numbers into an array. Perform validations using multiple catch statements / predefined Exceptions.</p> <p>39. Write a program to implement a user defined Exception, which will throw an Exception when a given number is prime.</p> <p>40. Write a program to implement throw and finally.</p>	
9	<p>41. Write a program to create multiple threads by extending the Thread class.</p> <p>42. Write a program to implement threads by implementing the Runnable interface.</p> <p>43. Write a program to implement Synchronization using inter-thread communication.</p>	

	44. Implement the Producer- Consumer Problem, using Threads.	
10	45. Write a program to display the contents of a directory by displaying the subdirectory's name first, then the file names. 46. Write a program to search for a given file name in a directory 47. Write a program to search for a given string in a file. 48. Write a program to find the number of characters, number of words and number of lines in a given file 49. Write a program to accept two filenames, copy the content from the first file to the second file.	
11	50. Write a menu driven program to demonstrate Random Access File handling, with options for creating, deleting, 61writing, appending and reading the file. 51. Write a program to implement a Generic method, which can display the elements of various arrays of different data types, and find the length of each array. 52. Write a program to implement a Generic class, and display the types of various parameters passed.	
12	53. Program to implement Serialization and De-Serialization, for an object of Student Class 54. Program to implement IS A Serialization and De-Serialization, for a Maruti Car inherited from Vehicle 55. Write a program to implement HAS-A Serialization and De-Serialization for the Engine of a Vehicle. 56. Write a program to Serialize/De-Serialize selected attributes of an Employee.	
13	57. Write a program to implement various methods of a StringBuffer class. 58. Write a program to implement communication between a client and server client, via Socket Programming 59. Write a program to implement one-one chatting using the TCP protocol.	
14	60. Write a program to implement public chatting.	
15	61. Write a program to get protocol, file name, host, path and port of a given URL. 62. Write a program to download a file from a given URL 63. Implement Two- way Communication using UDP Protocol.	

16	<p>64. Write a program to create a table Citizen(Id(Primary), Name, age, address, DOB), insert records, and display the records.</p> <p>65. Assume that login is a table which has Uname, Upass. Check whether a record with “Uname=”Bob” and “UPass=”Alice123#”is present in the table.</p>																
17	<p>66. Construct the following tables: Department (dno(Primary), dname, dloc) Emp (eno(Primary), ename, esal ,dno(Foreign))</p> <p>67. Write a program for displaying information in the following order:</p> <table><tr><td>eno</td><td>ename</td><td>esal</td><td>dname</td><td>dloc</td></tr><tr><td>101</td><td>Rani</td><td>10,000</td><td>MSC</td><td>Kochi</td></tr><tr><td>102</td><td>Vani</td><td>20,000</td><td>MSW</td><td>Delhi</td></tr></table>	eno	ename	esal	dname	dloc	101	Rani	10,000	MSC	Kochi	102	Vani	20,000	MSW	Delhi	
eno	ename	esal	dname	dloc													
101	Rani	10,000	MSC	Kochi													
102	Vani	20,000	MSW	Delhi													
18	<p>68. Write a JDBC program with Parametrized queries to update a given record (Rani’s salary to 15,000) in the Emp table.</p> <p>69. Write a JDBC program with Parametrized queries to list the records of Emp table which has records whose names start with the alphabet “R”.</p>																
19	<p>70. Write a JDBC program with PreparedStatement to delete the records of Emp table which has records whose salary is less than 10,000.</p>																
20	<p>71. Implement a JDBC program which uses a Stored Procedure to insert records into Department table.</p> <p>72. Use Callable statement to implement a Stored Procedure to display the Ename and Salary of all employees.</p> <p>73. Write a JDBC program to implement Transaction Management in the Department table.</p> <p>74. Write a JDBC program to depict the usage of SQLException Class and SQLWarning Class</p>																
21	<p>75. Using Java AWT components, read text from a text box, and insert it into a list. Similarly, remove selected items from the list, and place it into another list.</p> <p>76. Implement a numeric calculator using Java AWT.</p>																
22	<p>77. Create a menu, for file and edit options. using AWT</p> <p>78. Replicate a Notepad editor using AWT</p> <p>79. Design a login frame for a shopping site, using GUI – Database Connectivity.</p> <p>80. Using AWT, draw a house/ car</p>																
23	<p>81. With music in the background, use AWT components to find the sum and product of two numbers.</p>																

24	82. AWT / SWING - PROJECT	
25-30	PROJECT	

CSDA 207 Data Mining Lab

Course Facilitator : Sunu Mary Abraham
: sunumary@rajagiri.edu
: 9400700485

Course Code	CSDA 207	Course Title	Data Mining Lab
Course Type	Core	Contact Hours	4 Hours per Week
Credit	2	Domain	Practical

Syllabus

Syllabus	
I	Demonstration of Pre-processing techniques
II	Demonstration of Association Rule Mining –Analysis and Evaluation of Model Performance <ul style="list-style-type: none">● Apriori Algorithm● FP-Growth Algorithm
III	Demonstration of Classification and Prediction Techniques- Analysis and Evaluation of Model Performance <ul style="list-style-type: none">● Decision Tree● Naïve Bayesian Classifier● K-Nearest Neighbour Classification● Support Vector Machines● Linear Regression
IV	Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance <ul style="list-style-type: none">● K-Means Algorithm● K-Medoids Algorithm● Hierarchical Clustering Algorithms
V	Project
REFERENCE BOOKS:	
Pang-Ning Tan, Michael Steinbach, Vipin Kumar, 'Introduction to Data Mining'	
Data Mining Concepts and Techniques – Jiawei Han and Micheline Kamber, Second Edition, Elsevier, 2006	

G. K. Gupta, "Introduction to Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, 2006.

Making sense of Data: A practical guide to exploratory Data Analysis and Data Mining- Glenn J Myatt

COURSE PRE-REQUISITES:

CSDA 103, CSDA205

COURSE OBJECTIVES:

1. Acquire knowledge in Data mining techniques
2. Learn the different techniques for discovery of patterns hidden in large data sets and their Visualizations
3. Learn data mining tasks such as classification, estimation, prediction, affinity grouping and clustering.

COURSE OUTCOMES:

CO. No	Course Outcome Description
CSDA207.1	To illustrate the need for pre-processing raw data before analysing
CSDA207.2	To analyse and demonstrate association between different variables.
CSDA207.3	To implement classification techniques and analyse the data using different classification methodologies.
CSDA207.4	To analyse and implement clustering techniques.
CSDA207.5	To do a Data Analytics Project

CO-PO AND CO-PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1
CSDA207.1		3			3								3
CSDA207.2		3			3								3
CSDA207.3		3			3								3
CSDA207.4		3			3								3
CSDA207.5		3			3								3

Justification of CO- PO/ PSO Mapping

- CSDA207.1 By learning the pre-processing techniques data cleaning and initial analysis of data.
- CSDA207.2 Association analysis aids in understanding the interdependency between variables in a dataset.
- CSDA207.3 Classification techniques aids in classifying the data based on underlying relation among attributes.
- CSDA203.4 Clustering techniques helps in grouping data that have similarity and this helps in anomaly detection as well.
- CSDA203.5 By doing a data analytics project, students will learn key analytical skills (data cleaning, analysis, & visualization) and apply different tools to discover useful patterns within the data provided.

CO Assessment Rubrics

1. CAEP covering Lab Cycle. (mapped to CSDA207.1, CSDA207.2, CSDA207.3 and CSDA207.4)
2. Lab assignments mapped to CSDA207.3
3. Project Viva mapped to CSDA207.5
4. Semester Exam - mapped to CSDA207.1, CSDA207.2, CSDA207.3, CSDA207.4 and CSDA207.5

Session Plan

Session No	Topic Planned	Date/Remark
1	Demonstrate the working of Orange Tool.	
2	Demonstrate the working of WEKA Tool.	
3	Preprocessing ORANGE/WEKA 1. Perform Imputation 2. Perform Discretization	
4	Preprocessing ORANGE/WEKA 1. Perform Continuization 2. Perform normalization	
5	Preprocessing ORANGE/WEKA 1. Perform Randomization 2. Perform Remove Sparse	
6	Preprocessing ORANGE/WEKA Perform Feature Selection	
7	Association Rule Mining ORANGE/WEKA Generate association rules – Dataset -1 1. Apriori algorithm 2. FP – growth Algorithm	
8	Association Rule Mining ORANGE/WEKA Generate association rules – Dataset -2 1. Apriori algorithm 2. FP – growth Algorithm	
9	Association Rule Mining ORANGE/WEKA Generate association rules –Dataset 3 1. Apriori algorithm	

	2. FP – growth Algorithm	
10	Association Rule Mining ORANGE/WEKA Generate association rules –Dataset 4 1. Apriori algorithm 2. FP – growth Algorithm	
11	Demonstration of Classification Techniques- Analysis and Evaluation of Model Performance – ORANGE/WEKA Generate a classifier using – Dataset -1 1. Decision Tree 2. Naïve Bayesian Classifier	
12	Demonstration of Classification Techniques and Prediction Techniques - Analysis and Evaluation of Model Performance – ORANGE/WEKA Generate a classifier using – Dataset -2 1. Decision Tree 2. Naïve Bayesian Classifier	
13	Demonstration of Prediction Techniques and Prediction Techniques - Analysis and Evaluation of Model Performance – ORANGE/WEKA Generate a classifier using – Dataset -3 1. Decision Tree 2. Naïve Bayesian Classifier	
14	Demonstration of Classification and Prediction Techniques- Analysis and Evaluation of Model Performance - ORANGE/WEKA Generate a classifier in Orange Tool using -Dataset 4 1. K-Nearest Neighbour Classification 2. Support Vector Machines	
15	Demonstration of Classification and Prediction Techniques- Analysis and Evaluation of Model Performance - ORANGE/WEKA Generate a classifier in Orange Tool using -Dataset 5 1. K-Nearest Neighbour Classification 2. Support Vector Machines	

16	<p>Demonstration of Classification and Prediction Techniques- Analysis and Evaluation of Model Performance ORANGE/WEKA</p> <p>Generate a classifier in Linear Regression –Dataset 1</p>	
17	<p>Demonstration of Classification and Prediction Techniques- Analysis and Evaluation of Model Performance ORANGE/WEKA</p> <p>Generate a classifier in Linear Regression –Dataset 2</p>	
18	<p>Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance ORANGE/WEKA with Dataset 1</p> <p>1. K-Means Algorithm 2. K-Medoids Algorithm</p>	
19	<p>Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance ORANGE/WEKA with Dataset 2</p> <p>1. K-Means Algorithm 2. K-Medoids Algorithm</p>	
20	<p>Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance ORANGE/WEKA with Dataset 3</p> <p>1. K-Means Algorithm 2. K-Medoids Algorithm</p>	
21	<p>Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance</p> <p>Hierarchical Clustering Algorithms – Dataset 1</p>	
22	<p>Demonstration of Clustering Techniques- Analysis and Evaluation of Model Performance using Iris dataset in WEKA</p> <p>Hierarchical Clustering Algorithms – Dataset 2</p>	
23-30	Project	

PROJECT

	Wt
Presentation	1
Report	1
Viva	1
Total	3



Dept. of Computer Science
Rajagiri College of Social Sciences,
Rajagiri P O, Kalamassery,
Kerala. India 683104