VISION, MISSION AND QUALITY POLICY OF THE COLLEGE

VISION

Kovai Kalaimagal College of Arts and Science shall inspire and guide students to acquire knowledge, develop skill and a positive attitude that will enhance their personality, providing self-confidence to face the competitive world.

MISSION

1. To strive for excellence in academics.

2. To inculcate a positive attitude and to develop skill in students, to meet the challenges of the competitive world.

3. To develop self-confidence through adequate inter-action and relevant exposure.

4. To promote ethical and social values in the students.

5. To identify and encourage talents in academics and sports by rewarding them with scholarships.

QUALITY POLICY

"KKCAS shall provide value-based education to its students for continual improvement in their academic performance, enhancing their competency for higher education and employment."

VISION, MISSION AND OBJECTIVES OF THE DEPARTMENT

VISION

The department of Information Technology to attain a status of excellence by producing adequately knowledgable,technically strong, emotionally sound and socially responsible persons to cater to the demands of the industry and society .

MISSION

- To make the students conversant with the technical concepts.
- To provide adequate knowledge through structured Curriculum designed with the inputs of Industry, Alumni, Subject Experts and students.
- To devise suitable training programms to train the students in the technical and other skills as per expectations of the industry.
- To arrange for programmes which would instil in the minds of students human values and a sense of responsibility towards society
- To produce ethically and professionally responsible graduates through balanced curriculum.
- To create a learning environment that motivates the students to have a thirst for knowledge through lifelong learning.

OBJECTIVES OF THE DEPARTMENT

1. To make the students to have a thorough understanding of the basic concepts in the field of Information Technology.

2. To arrange for a number of seminars and guest lectures which would enhance the knowledge of students in the recent advances in the field of Information Technology.

3. To take the students to industries to make them have first hand knowledge on the application of the softwares.

4. To train the students in the development of softwares for solving certain simple problems.

5. To provide training for the development of soft skills so as to make the students employable.

GRADUATE ATTRIBUTES

Our Graduates to posses

- Communication skills
- In-depth domain knowledge
- Technical skills
- Knowledge Inter-disciplinary in nature
- Positive attitude
- Critical thinking and problem solving skills
- Dynamism and team building skills
- Professional ethics and social values
- Self-awareness and emotional intelligence
- Entrepreneurship qualities
- Responsibility towards Society and environment
- Thirst for knowledge through lifelong learning

PROGRAMME EDUCATIONAL OBJECTIVES AND PROGRAMME OUTCOME

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: Graduates would be ideal IT professionals carrying out their tasks with professionalism and professional Ethics.

PEO2: Graduates would have become entrepreneurs in their own capacity.

PEO3: Graduates would be pursuing research programmes in order to contribute to the ever changing IT industry with innovative products.

PROGRAMME OUTCOMES:

After completion of two years of study, our M.Sc IT Graduates will be able to :

PO1: Demonstrate english language proficiency to an appropriate level to perform effectively in the enterprise/industry/Community such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO2: Develop domine knowledge relevant to the industry enabling to succeed in rapidly changing working environment.

PO3: Ability to apply the knowledge of computer system design principles in building system software and hardware.

PO4: Acquiring adequate knowledge in interdisciplinary subjects such as Commerce, Mathematics and Statistics for enhanced applications of softwares developed.

PO5: Developing positive attitude by instilling confidence in the minds of students by suitable programs.

PO6: An ability to make the students think out of the box and solve complex problems arising in shop floor situation.

PO7: Work individually or as a team with responsibility to function on multidisciplinary teams.

PO8: Carrying out the task assigned by the industries with professional ethics and at the same time with the consent for well being of the society.

PO9: An ability to recognize their own strengths and weaknesses and balance their own emotions at the time of crisis

PO10: An ability to acquire entrepreneurship qualities and to take efforts to become entrepreneurs.

PO11: Extend the services of the department for the betterment of the society and environmental protection.

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

MAPPING OF GRADUATE ATTRIBUTES WITH PROGRAMME OUTCOMES

After completion of two years of study, our M.Sc IT Graduates will be able to :

S.No	Graduates Attributes	Program Outcome
1	Communication skills	Demonstrate english language proficiency to an appropriate level to perform effectively in the enterprise/industry/Community such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
2	In-depth domain knowledge	Develop domine knowledge relevant to the industry enabling to succeed in rapidly changing working environment.
3	Technical skills	Ability to apply the knowledge of computer system design principles in building system software and hardware.
4	Knowledge Inter-disciplinary in nature	Acquiring adequate knowledge in inter disciplinary subjects such as Commerce, Mathematics and Statistics for enhanced applications of softwares developed.
5	Positive attitude	Developing positive attitude by instilling confidence in the minds of students by suitable programs.
6	Critical thinking and problem solving skills	An ability to make the students think out of the box and solve complex problems arising in shop floor situation.
7	Dynamism and team building skills	Work individually or as a team with responsibility to function on multidisciplinary teams.
8	Professional ethics and social values	Carrying out the task assigned by the industries with professional ethics and at the same time with the consent for well being of the society.
9	Self-awareness and emotional intelligence	An ability to recognize their own strengths and weaknesses and balance their own emotions at the time of crisis.
10	Entrepreneurship qualitative	An ability to acquire entrepreneurship qualities and to take efforts to become entrepreneurs.
11	Responsibility towards	Extend the services of the department for the betterment of the

	Society and environment	society and environmental protection.
12	Thirst for knowledge through lifelong learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

KOVAI KALAIMAGAL COLLEGE OF ARTS AND SCIENCE

DEPARMENT OF INFORMATION TECHNOLOGY

SCHEME OF EXAMINATION AND PROGRAMME STRUCTURE

Master of Information Technology (2023-2025)

Sem	Course Code	Study Components	Ins. Hours per week	CIA	Exam	Total	Credits
		Semester – I					
I	23P1ITCT01	**Core 1:** Advanced Java Programming	5	25	75	100	4
	23P1ITCT02	**Core 2:** Network Security	5	25	75	100	4
	23P1ITCT03	**Core 3:** Cyber laws and Security Polices	5	25	75	100	3
	23P1ITCT04	**Core 4:** Design and Analysis of Algorithms	5	25	75	100	4
	23P1ITCP05	**Core 5:** Advanced Java Programming - Practical	4	40	60	100	4
	23P1ITCP06	**Core 6:** Design and Analysis of Algorithms –Practical	4	40	60	100	3
	23P1ITCP07	**Core 7:** Open Source Tools Practical	2	20	30	50	2
		Library work	2	-	-	-	-
		Total				650	24
		Semester – II					
II	23P2ITCT08	**Core 8:** Distributed Computing and Linux	5	25	75	100	4
	23P2ITCT09	**Core 9:** Python Programming	4	25	75	100	3
	23P2ITCT10	**Core 10:** Object Oriented	4	25	75	100	3

		Analysis and Design					
	23P2ITCT11	**Core 11:** Big Data Analytics	5	25	75	100	4
	23P2ITCP12	**Core 12:** Linux- Practical	4	40	60	100	3
	23P2ITCP13	**Core 13:** Python programming – Practical	4	40	60	100	3
	23P2ITCP14	**Core 14:** MATLAB Practical	2	20	30	50	2
	23P2ITET1A **23P2ITET1B** **23P2ITET1C** **23P2ITET1D** **23P2ITET1E**	**Elective 1:**Grid Computing **Elective 1:**Introduction to Robotics **Elective 1**: Bioinformatics **Elective 1:**Wireless Communication **Elective 1:**Advanced Database Technology	4	25	75	100	4
	23P2INTR01	Internship Training (15 days)	-	-	-	-	**-**
		Library work	2	-	-	-	-
	Total					**750**	**26**

SEMESTER I

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P1ITCT01	Core 1 : Advanced Java Programming	Batch	2023-2025
			Semester	I
Hrs/week	5 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To provide an indepth knowledge about the concepts of language structure, program divisions of JAVA.
- Ability to design console based, GUI based programming language and Web based applications
- Understand the concept of JSP,Servlet Basics and JDBC and Inter Servlet Communications.
- Understand the Java Bean Component model.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Explain the fundamental concepts of Java language.
CO2	Use GUI components from AWT and Swing including buttons and text components
CO3	Illustrate the methods to send and receive data through sockets
CO4	Describe the concept of JSP,Servlet Basics and JDBC
CO5	Summarize the concepts of JavaBean

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	M	H	H	H	M	L	H	H	H
CO2	L	H	H	M	H	H	H	M	L	H	H	H
CO3	L	H	H	M	H	H	H	M	L	H	H	H
CO4	L	H	H	M	H	H	H	M	L	H	H	H
CO5	L	H	H	M	H	H	H	M	L	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I   **(Hours : 10)**

Introduction to Advanced Java Programming:OverView of the Java Platform, A Brief History of the Java Platform, Object-Oriented Programming in Java,Standard SDK ToolsClasses and Objects-Introduction, classes and Object-Oriented Programming,Using Constructors and Finalizers,Reference Objects and the Garbage Collector.

UNIT - II   **(Hours : 12)**

Common Elements of Graphical User Interfaces:Introduction, Main features and Technology of GUI, Introducing the Java foundation classes, Event Model, JFC Sample programs, Layout managers, Events. Swing–EventHandling,J-Frames,Lists,Tables,Trees, Text Components-Progress Indicator.

UNIT - III   **(Hours : 10)**

Networking Programming:Introduction- Working with URLs, Working with Sockets-Remote Method-Invocation

UNIT - IV   **(Hours : 12)**

JSP Fundamentals: JSP Overview and Architecture – JSP Implicit Objects – JSP Standard Actions – Handling JSP Errors- Custom JSP Tag. Servlet Fundamentals: Servlet Overview and Architecture- Servlet Basics – JDBC and Inter – Servlet Communications.

UNIT - V   **(Hours : 12)**

JavaBeans:Introduction,JavaBeans Component Model,Bean Development Environments,Using the Sun BeanBox, Creating a JavaBean Class,Exploring JavaBean Property Types, JDBC-Design of JDBC -Configuration-Executing SQL Statemetns.

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	Joe Wiggles Worth and Paula Mc Millan	Java programming: Advanced Topics	Thomson
2.	CayS.Horstmans, Gary Coronell	Core Java Volume II -Advanced Features	PearsonEducation
3.	James Goodwill	Developing Java Servlets	Techmedia Publication
4.	Uttam K. Roy	Advanced Java Programming	Oxford University Press

WEBSITE REFERENCES

- https://www.linkedin.com/learning/advanced-java-programming
- https://www.quora.com/in/What-is-advanced-Java
- https://www.javatpoint.com/servlet-tutorial
- https://www.tutorialspoint.com/servlets/
- https://docs.oracle.com/javase/7/docs/technotes/guides/idl/corba.html

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google Classroom

SEMESTER I

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P1ITCT02	Core 2: Network Security	Batch	2023-2025
			Semester	I
Hrs/week	5 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- Understand the fundamental principles of network, various network, cryptographic techniques, authentication and its standards.
- Understand the various methods of password management and protocols to maintain system security
- Understand various types of attacks and their characteristics
- Learn the security concepts exposed to original research in network security

COURSE OUTCOMES (CO)

On successful completion of the course the student should be able to

CO Number	CO Statement
CO1	Explain various types of attacks and their characteristics
CO2	Illustrate the basic concept of encryption and decryption for secure data transmission.
CO3	Describe the fundamentals of secret and public cryptography
CO4	Describe the various methods of password management and protocols to maintain system security
CO5	Survey the security concepts exposed to original research in network security

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	H	H	H
CO2	L	H	H	H	H	M	M	M	M	H	H	H
CO3	L	H	H	H	H	M	M	M	M	H	H	H
CO4	L	H	H	H	H	M	M	M	M	H	H	H
CO5	L	H	H	H	H	M	M	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I   (Hours:10)

Introduction – Primer on Networking –Active and Passive Attacks -Possible Types of Attacks–Layers and Cryptography – authorization Viruses, worms, Trojan Horses.

UNIT - II   (Hours:10)

Cryptography :Plain text and Cipher Text, Substitution techniques, Caesar Cipher, Mono-alphabetic Cipher, Polygram, Polyalphabetic Substitution, Playfair, Hill Cipher, Transposition techniques, Encryption and Decryption, Steganography, Key Range and Key Size.

UNIT - III   (Hours:12)

Symmetric Key Algorithms and AES:Algorithms types and modes, Overview of Symmetric key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish, Advanced Encryption Standard (AES) Asymmetric Key Algorithms, Digital Signatures and RSA: Brief history of Asymmetric Key Cryptography, Overview of AsymmetricKey Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures, Knapsack Algorithm.

UNIT - IV   (Hours:10)

User Authentication and Kerberos: Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos, Key Distribution Center (KDC) , Security Handshake Pitfalls, Single Sign On (SSO) Approaches.

UNIT - V   (Hours:12)

Network Security: Firewalls and Virtual Private Networks: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion. Internet Security Protocols: Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL vs SET, 3-D Secure Protocol, Electronic Money, E-mail Security, Wireless Application Protocol (WAP) Security, Security in GSM, Security in 3G .

REFERENCE BOOKS

S.No	Author Name	Title of the Book	Publisher
1	Atul Kahate	Cryptography and Network Security	Tata Mc.Graw Hill
2	Charlie Kaufman, Radia Perlman and Mike Speciner	Network Security Private Communication in a Public World	Pearson Education, New Delhi
3	Stallings William	Cryptography and Network Security Principles and Practices	Prentice Hall India, New Delhi
4	Stallings William	Network Security Essentials Applications and Standards	Prentice Hall India, New Delhi
5.	V.K.Pachghare	Cryptography and Information Security	PHI , New Delhi

WEBSITE REFERENCES

- https://www.go4expert.com/articles/types-of-attacks
- https://www.tutorialspoint.com/cryptography

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies.

SEMESTER I

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P1ITCT03	Core 3 : Cyber Laws and Security Policies	Batch	2023-2025
Hrs/week	5 Hours		Semester	I
			Credits	3

COURSE OBJECTIVES

To enable the Students

- Understand the Basics of Cyber Law and Cyber Security.
- Identify how intruders escalate privileges and what steps can be taken to secure a system.
- Introduce and demonstrate hacking tools for penetration testing purposes only.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Explain the basic concepts of Cyber Law & Ethics of Cyber Law.
CO2	Indicate the various Data Encryption Methodologies.
CO3	Enumerate about the Cyber Crime factors & Preventive Measures.
CO4	Demonstrate the use of Digital Signatures & Certificates .
CO5	Recognize and Detect Cyber Attacks.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	H	H	H	H
CO2	L	H	H	H	H	M	M	M	H	H	H	H
CO3	L	H	H	H	H	M	M	M	H	H	H	H
CO4	L	H	H	H	H	M	M	M	H	H	H	H
CO5	L	H	H	H	H	M	M	M	H	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I   (Hours: 08)

Concept of cyber law and space : Introduction – Meaning – Features – Significant of cyber law – Advantages of cyber law – Cyber law governance – Cyber space – meaning – Inclusive of cyber space – Facilitating functions of cyber space – Major issues in cyber space - E commerce & Cyber law : Meaning – History – Division – Benefits – Major Issues .

UNIT - II   (Hours:08)

Data Security : Meaning – Fundamental requirements – Precautions – Encryption – Advantages of Encryption technology – Means of encryption of data – Public key Infrastructure – Cyber Security issues in India – Digital signature – Features– Types– Components of a Digital Signature Certificate – Use of Digital Signature Certificate .

UNIT - III   (Hours: 08)

The Evidence Aspect in Cyber Law: Evidence as Part of the Law of Procedures – Applicability of the Law of Evidence on Electronic Records - The Indian Evidence Act – The Criminal Aspect in Cyber Law: What is Crime? – What is Computer Crime – Factors Contributing to Computer Crime

UNIT - IV   (Hours: 10)

Global Trends in Cyber Law: The Contract Aspect – The Security Aspect – The Intellectual Property Aspects – The Criminal Aspect – Global Miscellany – Legal Framework for Electronic Data Interchange : The EDI Mechanism – The Electronic Data Interchange Scenario in India.

UNIT - V   (Hours: 08)

The Information Technology Act : Definition – Authentication of electronic records Electronic Governance - Digital Millennium Copyright Act (DMCA) – Cyber Security Enhancement Act 2002. Proper and Ethical Disclosure: CERT's Current Process – Full Disclosure Policy – Organization for Internet Safety.

REFERENCE BOOKS

S.No.	Author Name	Title of the Book	Publisher
1.	Dr.B.Kirubashini., P.Kavitha	Cyber Law	Nandhini Pathippagam
2.	Suresh T.Viswanathan., N.Chanrababu Naidu	Indian Cyber Laws with Cyber Glossary	Bharath Law House PVT .LTD
3.	Dean Armstrong, Dan Hyde, Sam Thomas	Cyber Security Laws & Practice	Jordans Publishing Limited
4.	Dr.B.Kirubashini., P.Kavitha	Cyber Law	Nandhini Pathippagam
5.	Suresh T.Viswanathan., N.Chanrababu Naidu	Bharath Law House	

WEBSITE REFERENCES

- https://www.tutorialspoint.com › ... › Cyber Law - Quick Guide meity.gov.in/cyber-security
- gvpce.ac.in/syllabi/Mtech15-16/cyber-security/clsp kenes-exhibitions.com › Cyber Security Conference
- https://www.wileyindia.com/introduction-to-information-security-and-cyber-laws.htm
- https://www.wisdomjobs.com/e.../information-security-cyber-law-tutorial-2355.html
- https://cyber.laws.com/ethical-hacking-tutorials

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER I

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P1ITCT04	Core 4: Design and Analysis of Algorithms	Batch	2023-2025
			Semester	I
Hrs/week	5 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To write efficient algorithms for simple computational tasks and reasoning about the correctness of them.
- To Understand different design strategies and the use of data structures in improving algorithmic performance.
- To Understand the security concepts exposed to original research in network security
- To learn the Branch and Bound Techniques

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Analyze the asymptotic performance of algorithms
CO2	Differentiate different algorithmic approaches, techniques and methods
CO3	Apply design and analysis techniques for a given algorithm.
CO4	Apply optimization techniques for improving the efficiency of algorithms.
CO5	Find optimal solution by applying various methods

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	H	M	M	M	H	H
CO2	L	H	H	H	H	H	H	M	M	M	H	H
CO3	L	H	H	H	H	H	H	M	M	M	H	H
CO4	L	H	H	H	H	H	H	M	M	M	H	H
CO5	L	H	H	H	H	H	H	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I   (Hours : 10)

Introduction : Algorithm definition, performance analysis, space complexity, time complexity, worst case – best case – average case complexity, asymptotic notation, sorting algorithms (insertion sort, heap sort) , sorting in linear time, searching algorithms, recursive algorithms (Tower of Hanoi , Permutations).

UNIT - II   (Hours : 10)

Divide and conquer: General method - binary search, merge sort, Quick sort, Strassen's matrix multiplication .Greedy method- knapsack problem, job sequencing with deadlines. Minimum-cost spanning trees, Kruskal and Prim's algorithm, optimal storage on tapes, optimal merge patterns, Huffman coding.

UNIT - III   (Hours : 10)

Dynamic programming- matrix chain multiplication, single source shortest paths, Dijkstra's algorithm, Bellman- ford algorithm , all pairs shortest path, longest common subsequence, string editing, 0/1 knapsack problem, Traveling salesperson problem.

UNIT - IV   (Hours : 10)

Decrease and conquer: - DFS and BFS, Topological sorting, connected components. Backtracking: General method, 8 Queen's problem, Sum of subsets problem, graph coloring problem, Hamiltonian cycle, Knapsack problem.

UNIT - V   (Hours : 10)

Branch and Bound Technique : FIFO, LCBB, LC search, The 15 puzzle, NP hard and NP Complete problems : Basic concepts – classes NP hard & NP complete – NP hard graph problems : Clique ecision Problem(CDP) – Chromatic Number Decision Problem(CNDP) – Directed Hamilton Cycle(DHC)

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	Ellis Horowitz, Sartaj Sahni & Sanguthevar Rajasekaran,	Computer Algorithms	Galgotia.
2.	T.H. Cormen, C.E. Leiserson,R.L. Rivest and C. Stein	Introduction to Algorithms	HI Learning private limited
3.	A. Aho, J. Hopcroft, & J. Ullman	The Design and Analysis of Computer Algorithms	Addison Wesley

WEBSITE REFERENCES

- https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
- https://www.edx.org/course/algorithm-design-analysis-pennx-sd3x
- www. personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
- https://www.coursera.org/courses?query=Algorithm%20design%20and%20analysis
- https://www.coursera.org/specializations/algorithms

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google Classroom

SEMESTER I

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P1ITCP05	Core 5: Advanced Java Programming- Practical	Batch	2023-2025
			Semester	I
Hrs/week	4		Credits	4

COURSE OBJECTIVES

To enable the students
- To gain knowledge in developing Java Programs for certain specified problems.
- To understand the basics of various applications using servlet communications.
- To understand the concepts of virtual functions and control structures

COURSE OUTCOMES (CO)

At the end of the practical session, students should be well-versed in

CO Number	CO Statement
CO1	Develop programs in Java to demonstrate Classes and objects
CO2	Use various types constructors and JFC.
CO3	Apply the concepts of virtual functions and control structures.
CO4	Design various applications using servlet communications.
CO5	Demonstrate Bean Development Environment and JSP Scripts.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	H	H	M	H	H	H	H
CO2	L	H	H	H	H	M	M	M	H	H	H	H
CO3	L	H	H	H	H	M	M	M	H	H	H	H
CO4	L	H	H	H	H	M	M	M	H	H	H	H
CO5	L	H	H	H	H	M	M	M	H	H	H	H

L-Low M-Medium H-High

SYLLABUS

1. Develop a Java program using control structures.

2. Develop a Java program which demonstrates Classes and objects

3. Develop a Java program to illustrate the concept of constructors.

4. Develop a Java program to demonstrate the usage of GUI concepts

5. Develop a Java program using JFC.

6. Develop a Java program for Sockets-Remote Method

7. Develop a Java program to indicate Servlet Communications.

8. Develop a Java JSP program using implicit objects.

9. Develop a Java JSP program using servlet communications.

10. Develop a Java program to demonstrate Bean Development Environments.

WEB REFERENCES
- https://www.linkedin.com/learning/advanced-java-programming
- https://www.quora.com/in/What-is-advanced-Java
- https://www.javatpoint.com/servlet-tutorial
- https://www.tutorialspoint.com/servlets/
- https://docs.oracle.com/javase/7/docs/technotes/guides/idl/corba.html

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation

SEMESTER I

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P1ITCP06	Core 6 :Design and Analysis of Algorithms - Practical	Batch	2023-2025
			Semester	I
Hrs/week	4 Hours		Credits	3

COURSE OBJECTIVES

To enable the students
- To gain knowledge about the teaching methodologies useful for the implementation and empirical evaluation of various algorithms
- To efficiently implement the solutions for specific problems.

COURSE OUTCOMES (CO)

At the end of the practical session, students should be well-versed in

CO Number	CO Statement
CO1	Identify the problem given and design the algorithm using various algorithm design techniques.
CO2	Implement various algorithms in a high level language
CO3	Analyze the performance of various algorithms.
CO4	Compare the performance of different algorithms for same problem.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	H	H	H
CO2	L	H	H	H	H	M	M	M	M	H	H	H
CO3	L	H	H	H	H	M	M	M	M	H	H	H
CO4	L	H	H	H	H	M	M	M	M	H	H	H
CO5	L	H	H	H	H	M	M	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

1. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal''s algorithmObtain the Topological ordering of vertices in a given digraph

2. Implement 0/1 Knapsack problem using Dynamic Programming.

3. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra''s algorithm.

4. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal''s algorithm.

5. Print all the nodes reachable from a given starting node in a digraph using BFS method

6. Check whether a given graph is connected or not using DFS method.

7. Find Minimum Cost Spanning Tree of a given undirected graph using Prim''s algorithm.

8. Implement N Queen's problem using Back Tracking.

9. Implement All Pairs Shortest Paths Problem using Floyd's algorithm

WEBSITE REFERENCES

- https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
- https://www.edx.org/course/algorithm-design-analysis-pennx-sd3x
- www. personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
- https://www.coursera.org/courses?query=Algorithm%20design%20and%20analysis
- https://www.coursera.org/specializations/algorithms

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation

SEMESTER I

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P1ITCP07	Core 7 : Open Source Tools Practical	Batch	2023-2025
			Semester	I
Hrs/week	2 Hours		Credits	2

COURSE OBJECTIVES
To enable the students
- To develop web applications using different programming languages.
- To apply the concepts like different controls and mathematical functions.

COURSE OUTCOMES (CO)

At the end of the practical session, students should be well-versed in

CO Number	CO Statement
CO1	Develop a program for different operations using PHP
CO2	Creating an application and finding out the biggest number
CO3	Creating an application using Getter and Setter methods.
CO4	Creating an application using POST method

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	H	H	H
CO2	L	H	H	H	H	M	M	M	M	H	H	H
CO3	L	H	H	H	H	M	M	M	M	H	H	H
CO4	L	H	H	H	H	M	M	M	M	H	H	H
CO5	L	H	H	H	H	M	M	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

1. Write a program to show data types in PHP.

2. Write a Program to use arithmetic operators in PHP.

3. Write a Program for finding the biggest number in an array without using an array function.

4. Write a Program for bubble sorting in PHP.

5. Write a Program to concatenate two strings character by Character.

6. Write a PHP Program using Getter and Setter.

7. Write a PHP Program using constructor and destructor.

8. Write a PHP Program using POST Method.

WEBSITE REFERENCES

- https://www.w3schools.com/PHP/ Language
- https://www.sourcecodester.com/PHP

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P2ITCT08	Core 8: Distributed Computing and Linux	Batch	2023-2025
			Semester	II
Hrs/week	5 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To provide an indepth knowledge about the concepts of Distributed computing and enable the students to write programs using Linux.
- To understand the concept of distributed process and communication.
- To understand the concept of Linux,file managemet operation and shell script.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Discuss the concept of distributed system,types and its architecture
CO2	Describe the concept of distributed process and communication
CO3	Summarize the distributed synchronization and its algorithms
CO4	Use the Fault Tolerance and Client-Server Communication
CO5	Summarize the concepts of Linux, file management operation and shell script.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	H	M	M	H	H	H
CO2	L	H	H	H	H	M	H	M	M	H	H	H
CO3	L	H	H	H	H	M	H	M	M	H	H	H
CO4	L	H	H	H	H	M	H	M	M	H	H	H
CO5	L	H	H	H	H	M	H	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I **(Hours:10)**

Introduction-Definition of a Distributed System- Goals- Types of Distributed systems – Architectures : Architectural styles – System Architectures -Architectures VS Middleware – Interceptors – Self management in distributed systems.

UNIT - II **(Hours: 12)**

Processes: Threads -Virtualization– Clients – Servers – code migration: Approaches to code migration – Migration and Local Resources – Migration in Heterogeneous Systems – Software agents – Communication: Fundamentals – RPC -Naming: naming Entities: names, identifiers and Addresses –Flat Naming – Structured naming

UNIT - III **(Hours: 12)**

Synchronization: clock Synchronization - Physical Clock – Synchronization algorithms – use of Synchronized clocks – logical clocks - Mutual Exclusion – Election algorithms - Consistency and Replication – Data Centric Consistency Models – Client-centric consistency models - Replica Management

UNIT - IV **(Hours: 12)**

Fault Tolerance: Introduction to fault tolerance – Process resilience: design issues – Failure Masking and replication – Reliable Client-Server Communication: Point to Point Communication – RPC semantics in the presence of failures – Reliable group of Communication: basic Reliable – multicasting Schemes – Distributed Commit – Recovery.

UNIT - V **(Hours: 14)**

Linux Operating systems : Introduction – History of Linux– Differences between Linux and Other Operating System – User accounts – Accessing the linux system – Linux Commands – Linux File Structure: Linux file types – File structures – managing Files - Managing Directories – File and Directory operation. File Management Operation: File and Directory permissions – Jobs –Shell operations: Command Line – Standard Input/Output- Shell Scripts – Shell Variables - Arithmetic Shell Operations – Control Structures.

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	Andrew S.Tanenbaum and Marten Van Steen	Distributed Systems Principles and Paradigms	Prentice Hall India, New Delhi
2.	Pradeep K.Sinha	Distributed Operating Systems	Prentice Hall India, New Delhi
3.	George coulouris, Jean Dollimore and Tim Kindberg	Distributed Systems Concepts and Design	Pearson Education
4.	Richard Petersen	The Complete Reference – Linux	TMH

WEBSITE REFERENCES

- http://en.wikipedia.org/wiki/List_of_distributed_computing_projects
- http://www.indiastudychannel.com/resources/107761-Design-Issues-Distributed-Operating-System.aspx
- http://www.inf.uni-konstanz.de/dbis/teaching/ss06/os/ch14-wrongNumber.pdf
- https://www.cs.rutgers.edu/~pxk/rutgers/notes/content/ft.h
- Overview of Linux Distributions URL:http://distrowatch.com /dwres.php?resource=major

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITCT09	Core 9 : Python Programming	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	3

COURSE OBJECTIVE:

To enable the students

- To learn Syntax, semantics and create Functions in Python.
- To understand Regular expressions in constructing Data Structures and Build Web Services.
- To understand the Data Structures using Python
- To understand the concepts of Regular Expressions and Object-Oriented programming as used in Python

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Exposed to Python syntax and semantics and be fluent in the use Python flow control and functions.
CO2	Create and run Python Programs using Lists, Dictionaries and handle File Systems.
CO3	Explain the concepts of Regular Expressions and Object-Oriented programming as used in Python.
CO4	Build Data Structures using Python.
CO5	Create programming projects from scratch using in-demand skill and technologies

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	H	M	M	H	H	H
CO2	L	H	H	H	H	M	H	M	M	H	H	H
CO3	L	H	H	H	H	M	H	M	M	H	H	H
CO4	L	H	H	H	H	M	H	M	M	H	H	H
CO5	L	H	H	H	H	M	H	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

Unit - I   (Hours:10)

Terminology: Interpreter and compiler, Writing a program- Variables, expressions and statements: Values and types-Variables – Statements – Expressions. Conditional execution-Functions: Built-in functions-Type conversion functions-Random numbers-Math functions-Adding new functions-Dentitions and uses.

Unit – II   (Hours:12)

Iteration-The while statement-Infinite loops and break, Finishing iterations with continue-Definite loops using for-Loop patterns-Strings-String comparison-string methods-Parsing strings-Format operator- Files- Opening files-Text files and lines-Reading files-Searching - Using try, except, and open and writing files-Lists- Traversing a list, List operations, List slices, List methods-Deleting elements-Lists and functions- Lists and strings-Parsing lines-Objects and values.

Unit - III   (Hours:10)

Tuples :Tuples are immutable-Comparing tuples-Tuple assignment-Dictionaries and tuples- Multiple assignment with dictionaries-Sequences-Regular expressions- Character matching-Extracting-Combining searching and extracting, Escape character. Classes and objects: User-defined compound types-Classes and functions-MyTime-Pure functions-Modifiers-Operator overloading, Polymorphism.

Unit - IV   (Hours:10)

Stacks, Abstract data types, The Stack ADT, Implementing stacks with Python lists, Pushing and popping, Using a stack to evaluate postfix, Parsing, Evaluating postfix, Clients and providers, Queues, The Queue ADT, Linked Queue, Performance characteristics, Improved Linked Queue, Priority queue.

Unit -V   (Hours:10)

Networked programs: Hypertext Transport Protocol – HTTP, The World's Simplest Web Browser, Retrieving an image over HTTP, Retrieving web pages with url lib, Parsing HTML and scraping the web, Parsing HTML using Regular Expressions, Parsing HTML using Beautiful Soup, Reading binary files using urllib,eXtensible Markup Language – XML, Parsing XML, Looping through nodes, JavaScript Object Notation – JSON, Parsing JSON, Application Programming Interfaces (API).

REFERENCE BOOKS

S.No	Authors	Title	Publishers
1	Charles Severance	Python for Informatics	CreateSpace Independent Publishing Platform, First Edition
2	Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers	How to Think Like a Computer Scientist: Learning with Python	Open Book Project, Second Edition
3	Mark Lutz	Learning Python	O'Reilly Media, Fifth Edition
4	Wesley Chun	Core Python Applications Programming	Prentice Hall India, New Delhi, Third Edition
5.	Alex Martelli	Python in a Nutshell	O'Reilly Media, Second Edition

WEBSITE REFERENCES:

- https://pythonprogramming.net
- https://www.sanfoundry.com/python-problems-solutions
- https://www.tutorialspoint.com/python/python_linked_lists.htm
- http://interactivepython.org/runestone/static/pythonds/BasicDS/toctree.html
- https://pythonprogramminglanguage.com

Means of Curriculum Delivery: Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P2ITCT10	Core 10: Object Oriented Analysis And Design	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	3

COURSE OBJECTIVES

To enable the students

- To specify, analyze and design the use case driven requirements for a particular system to model the event driven state of object and transform them into implementation specific layouts.
- To understands the UML programming by exploiting the objects in the real world.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Analyze and design the use case driven requirements for a particular system
CO2	Analyze and identify the subsystems, various components and collaborate them interchangeably
CO3	Recollect about the basic functionality of object and to know how objects work with different methodologies.
CO4	To analyse the problem and tends to refine the problem into concepts.
CO5	Describe the UML programming by exploiting the objects in the real world.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	M	H	H
CO2	L	H	H	H	H	M	M	M	M	M	H	H
CO3	L	H	H	H	H	M	M	M	M	M	H	H
CO4	L	H	H	H	H	M	M	M	M	M	H	H
CO5	L	H	H	H	H	M	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS
UNIT I (Hours:12)

Object Basics: Introduction – An Object - Oriented Philosophy – Objects – Attributes – Object Behavior And Methods – Objects Respond To Messages – Encapsulation And Information Hiding – Class Hierarchy – Polymorphism – Object Relationships And Associations – Aggregations And Object Containment – Meta-Classes – Object- Oriented System Development Life Cycle.

UNIT II (Hours: 10)

Object-Oriented Methodologies: Rumbaugh Object Modeling Technique – The Booch Methodology – The Jacobson Methodologies – Patterns – Frameworks – The Unified Approach.

UNIT III (Hours: 10)

Object-Oriented Analysis: Business Object Analysis – Use-Case Driven Object-Oriented Analysis – Business Process Modeling – Use-Case Model – Object Analysis – Noun Phrase Approach –Common Class Pattern Approach – Use-Case Driven Approach – Classes, Responsibilities And Collaborators.

UNIT IV (Hours: 10)

Object-Oriented Design: Object-oriented Design Process – Object-Oriented Design Axioms – Corollaries –Design Patterns - designing classes – case study.

UNIT V (Hours: 10)

UML and Programming: Introduction – Static and Dynamic Models – Introduction to the Unified Modelling Language – UML Diagrams – UML Class Diagram – Use Case Diagram – UML Dynamic Modelling – Case study to inventory, sales and banking.

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	Ali Bahrami	Object Oriented Systems Development	Irwin-McGraw Hill
2.	Gredy Booch	Object Oriented Analysis and Design With Applications	Addition Wesley
3.	Martin Fowler	UML Distilled	PHI Education
4.	Rumbaugh, James, Jacobson, Ivar, and Booch, Grady	The Unified Modeling Language Reference Manual	Addison Wesley

WEBSITE REFERENCES

- https://en.wikipedia.org/wiki/Object-oriented_analysis_and_design
- https://www.tutorialspoint.com/object_oriented_analysis_design/
- https://en.wikipedia.org/wiki/Object-oriented_analysis_and_design
- https://airbrake.io/blog/design-patterns/object-oriented-analysis-and-design
- https://medium.com/.../object-oriented-analysis-and-design

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P2ITCT11	Core 11: Big Data Analytics	Batch	2023-2025
			Semester	II
Hrs/week	5 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To provide the knowledge about the Big Data Fundamentals, including the characteristics of Big Data, the sources Big Data (such as social media, sensor data, geospatial data etc),
- To enable the studetns to understand the challenges imposed around information management, data analytics, privacy and security, as well as platforms and architectures
- Understand the the concepts of HDFS and MapReduce framework

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Explain the the concepts of HDFS and MapReduce framework
CO2	Explain the Hadoop 2.x Architecture
CO3	Implement HBase and MapReduce Integration
CO4	To analyse the problem and tends to refine the problem into concepts. Implement best Practices for Hadoop Development
CO5	Work on a Real Life Project on Big Data Analytics

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	M	H	H
CO2	L	H	H	H	H	M	M	M	M	M	H	H
CO3	L	H	H	H	H	M	M	M	M	M	H	H
CO4	L	H	H	H	H	M	M	M	M	M	H	H
CO5	L	H	H	H	H	M	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT I   **(Hours:12)**

        INTRODUCTION TO BIG DATA: Introduction to BigData Platform –Challenges of Conventional Systems - Intelligent data analysis –Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re - Sampling - Statistical Inference   - Prediction Error.

UNIT II   **(Hours: 12)**

MINING DATA STREAMS: Introduction To Streams Concepts –Stream Data Model and Architecture -Stream Computing -Sampling Data in a Stream –Filtering Streams –Counting Distinct Elements in a Stream –Estimating Moments –Counting Oneness in a Window –Real time Analytics Platform(RTAP) Applications

UNIT III   **(Hours: 13)**

HADOOP: History of Hadoop-The Hadoop Distributed File System –Components of Hadoop-Analyzing the Data with Hadoop-Scaling Out-Hadoop Streaming-Design of HDFS-Java interfaces to HDFS-Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort –Task execution -Map Reduce Types and Formats

UNIT IV   **(Hours: 11)**

HADOOP ENVIRONMENT: Setting up a Hadoop Cluster -Cluster specification -Cluster Setup and Installation -Hadoop Configuration-Security in Hadoop -Administering Hadoop –HDFS - Monitoring-Maintenance-Hadoop benchmarks-Hadoop in the cloud.

UNIT V   **(Hours: 12)**

FRAMEWORKS: Applications on Big Data Using Pig and Hive –Data processing operators in Pig –Hive services –HiveQL –Querying Data in Hive -fundamentals of HBase and ZooKeeper -IBM InfoSphere. Visualizations -Visual data analysis techniques, interaction techniques.

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	Tom White	Hadoop: The Definitive Guid	O'reilly Media
2.	Anand Rajaraman and Jeffrey David Ullman	Mining of Massive Datasets	Cambridge University Press
3.	Bill Franks,	Taming the Big Data Tidal Wave	John Wiley & sons
4.	Michael Berthold, David J. Hand,	Intelligent Data Analysis	Springer

WEBSITE REFERENCES

- https://www.sas.com › SAS Insights › Analytics Insights
- https://analyticstraining.com › Big Data Analytics
- https://www.qubole.com/big-data-analytics
- https://en.wikipedia.org/wiki/Big_data
- https://www.edx.org/course/big-data-analytics-adelaidex-analyticsx

Means of Curriculum Delivery: Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P2ITCP12	Core 12:Linux - Practical	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	3

COURSE OBJECTIVES
To enable the students

- To develop the applications using Linux Programming.
- To apply the concepts of shell script and linux programming

COURSE OUTCOMES (CO)
At the end of the practical session, students should be well-versed in

CO Number	CO Statement
CO1	Learn to know the working of RMI and RPC
CO2	Know the concept working in syncronization
CO3	How to make, remove, rename, copy and move files and directories
CO4	Learn to identify and change the permissions of files and directories and what the consequences of these are.
CO5	Learn to write shell scripting.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	H	M	M	M	M	H	H
CO2	L	H	H	H	H	H	M	M	M	M	H	H
CO3	L	H	H	H	H	H	M	M	M	M	H	H
CO4	L	H	H	H	H	H	M	M	M	M	H	H
CO5	L	H	H	H	H	H	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

Distributed System:

1. To study Client Server based program using RMI

2. To study Client Server based program using RPC.

3. To study Implementation of Election algorithm.

4. To study Implementation of Mutual Exclusion algorithms.

Linux Programming :

5. Study of General Purpose Utility Commands.

6. Study of File System Navigation Commands Text Processing Tools.

7. Write shell script to perform integer arithmetic operations

8. Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.

9. Write a shell script that computes the gross salary of a employee according to the following
   1) if basic salary is <1500 then HRA 10% of the basic and DA =90% of the basic
   2) if basic salary is >=1500 then HRA 500 and DA =98% of the basic
10. Write a shell script to search an element in the list

WEBSITE REFERENCES
- https://www.tutorialspoint.com/java_rmi/java_rmi_application.htm
- hhttp://mrbool.com/how-to-create-rmi-client-and-server-to-invoke-remove-method-of-rmi-server-in-java/28320
- http://www.learntosolveit.com/java/MutualExclusion.html
- https://opensource.com/resources/linux

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation.

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITCP13	Core 13 :Python Programming- Practical	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	3

COURSE OBJECTIVES
To enable the students
- To write, test, and debug simple Python programs.
- To develop the applications using Python programming language.

COURSE OUTCOMES:
At the end of the practical session, students should be well-versed in

CO Number	CO Statement
CO1	Develop proficiency in creating applications,testing and debugging of code written in Python using the Python Programming Language.
CO2	Understand the various data structures available in Python programming language and apply them in solving computational problems.
CO3	Perform text filtering with regular expressions in Python
CO4	Draw various kinds of plots using Python Lab

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	M	M	H	M	M	H	H	H
CO2	L	H	H	H	M	M	H	M	M	H	H	H
CO3	L	H	H	H	M	M	H	M	M	H	H	H
CO4	L	H	H	H	M	M	H	M	M	H	H	H
CO5	L	H	H	H	M	M	H	M	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

1. Develop programs to understand the control structures of python

2. Develop programs to learn different types of structures (list, dictionary, tuples) in python

3. Develop programs to learn concept of functions scoping, recursion and list mutability.

4. Develop programs to understand working of exception handling and assertions.

5. Develop programs for data structure algorithms using python searching and sorting

6. Develop programs to learn regular expressions using python.

7. Learn to plot different types of graphs using PyPlot.

8. Implement classical ciphers using python

WEB REFERENCES

- https://www.w3resource.com/python-exercises
- http://www.introtopython.org/
- https://inventwithpython.com/hacking/chapters

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITCP14	Core 14: MATLAB Practical	Batch	2023-2025
Hrs/week	2 Hours		Semester	II
			Credits	2

COURSE OBJECTIVES

To enable the Students

- To know about the basics of MATLAB.

- To understand the method of computation of matrices and vectors.

- To know about solving equations, interpolating values, analyzing data and calculation of statistical concepts.

- To understand clearly solving problems related to numerical integration and differential equations.

- To know about plotting 2D and 3D images using MATLAB.

COURSE OUTCOMES (CO)

In Successful Completion of the course the students should be able to

CO Number	CO Statement
CO1	Explain about basic Matlab windows and commands.
CO2	Solve matrix in Matlab.
CO3	Find eigen value of matrix, mean and median.
CO4	Solve differential equation and integration using Matlab commands.
CO5	Explain to draw graph using 2-D plots and 3-D plots.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	L	M	H	L	L
CO2	H	H	H	H	H	H	H	H	H	H	H	H
CO3	H	H	H	H	H	H	H	M	H	H	H	H
CO4	M	H	H	H	H	H	H	L	H	H	H	H
CO5	H	H	H	H	H	H	H	M	H	H	H	H

SYLLABUS

UNIT I   **(Hours : 12)**

Introduction – Basics of MATLAB-MATLAB Windows-Online help-Input-Output, File types-General Commands

UNIT II   **(Hours : 12)**

Interactive Computation - Matrices and Vectors- Matrix and Array Operations-Command line Functions-Using Built in Functions and ON-line Help

UNIT III   **(Hours : 12)**

Applications- Linear Algebra-Curve fitting and Interpolation-Data analysis and Statistics

UNIT IV   **(Hours : 12)**

Numerical Integration-Ordinary Differential Equations-Nonlinear Algebraic Equations.

UNIT V   **(Hours : 12)**

Programming in MATLAB-Scripts and Function-Script Files-Function files-Plotting Simple graphs-Graphics- Basic 2D plots-3D plots.

TEXT BOOKS:
Recent editions of the following books only are recommended

S. No.	Author Name	Title of the Book	Publisher
1	Rudra Pratap:	MATLAB- A Quick introduction for Scientists and Engineers	Oxford University Press

REFERENCE BOOKS:

S. No.	Author Name	Title of the Book	Publisher
1	Rudra Pratap	Matlab-7	Oxford University Press,New Delhi-
2	V.Kirani Singh, B.B. Chandhur	MATLAB Programming	Printice Hall of India Private Limited, New Delhi-

WEBSITE REFERENCE
- https://www.mathworks.com
- https://www.Mathworks.com/matlab central/mathlab/ref/.html

Means of Curriculum Delivery : Lecture, Group Discussion, Seminar, Assignment, Google classroom.

SEMESTER II

Programme Code :	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code :	23P2ITET1A	Elective 1 : Grid Computing	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery.
- To design and implement Grid computing applications using Globus or similar toolkits.
- To justify the applicability, or non-applicability, of Grid technologies for a specific application.
- To understand where the grid computing could be effectively utilized by illustrations of applications of grid computing.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Explain various Grid Standards, Principles, Approaches, and Methods in Grid Environment.
CO2	Know the application, History, learning and Motivation theories in assessing the Economic Strategy and Satisfaction.
CO3	Describe the grounding in the architecture of the Grid, and exposure to various implementations of the infrastructure.
CO4	Evaluate the Grid Service Taxonomy, functionalities in Grid Service Architecture.
CO5	Explain the various applications of grid computing.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	H	H	H	H
CO2	L	H	H	H	H	M	M	M	H	H	H	H
CO3	L	H	H	H	H	M	M	M	H	H	H	H
CO4	L	H	H	H	H	M	M	M	H	H	H	H
CO5	L	H	H	H	H	M	M	M	H	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I (Hours : 10)

Introduction: Grid Computing & Key Issues –Applications –Other Approaches –Grid Computing Standards –Pragmatic Course of Investigation Grid Computing Software Interface-Grid Computing Infrastructure Development.

UNIT - II (Hours : 10)

Grid Benefits & Status of Technology: Motivations –History of Computing, Communications and Grid Computing –Grid Computing Prime Time– Suppliers and Vendors – Economic Value –Challenges.

UNIT – III (Hours : 10)

Components of Grid Computing Systems and Architectures: Basic Constituent Elements-A Functional View –A Physical View –Service View Grid Environment-Grid Security Infrastructure-Delegation-Higher Level Authorization Tools.

UNIT - IV (Hours : 10)

Grid Computing Standards - OGSI: Standardization –Architectural Constructs –Practical View-OGSA/OGSI Service Elements and Layered Model –More Detailed View.

UNIT - V (Hours : 10)

Standards Supporting Grid Computing-OGSA: Functionality Requirements –OGSA Service Taxonomy –Service Relationships –OGSA Services –Security Considerations.

REFERENCE BOOKS

S. No.	Author Name	Title of the Book	Publisher
1.	Daniel Minoli	A Networking Approach to Grid Computing	Wiley Publication
2.	Ahmar Abbas	Grid Computing –A Practical Guide to Technology and Applications	Charles River Media Publication.
3.	Barry Wilkinson	Grid Computing Techniques and Applications	CRC Press

WEBSITE REFERENCES
- https://www.techopedia.com/definition/87/grid-computing
- https://computer.howstuffworks.com › ... › Computer Hardware › Networking
- https://searchdatacenter.techtarget.com/definition/grid-computing
- https://azure.microsoft.com/en-in/overview/what-is-grid-computing/
- https://techterms.com/definition/grid_computing

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITET1B	Elective 1 : Introduction to Robotics	Batch	2023-2025
			Semester	II
Hrs/week	4 Hours		Credits	4

COURSE OBJECTIVES

To enable the students

- To learn the basic concepts of Robots and the concepts of Kinematics of Robotics
- To learn the concepts of Motions, velocities and dynamic analysis of force
- To understand the concepts of Motion planning and Trajectory Planning
- To understand the concepts Actuators and sensors.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Explain the basic concepts of Robots.
CO2	Describe the working kinematics of Robots
CO3	Explain the concept of motion, velocities and dynamic forces
CO4	Realise the Motion and Trajecctory planning
CO5	Explain the different Actuators and Sensors.

MAPPING WITH PROGRAMME OUTCOMES

COs/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	H	H	M	H	H	H
CO2	L	H	H	H	H	M	H	H	M	H	H	H
CO3	L	H	H	H	H	M	H	H	M	H	H	H
CO4	L	H	H	H	H	M	H	H	M	H	H	H
CO5	L	H	H	H	H	M	H	H	M	H	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT – I   **(Hours : 10)**

Fundamentals: What is a Robot? Classification of Robots. What is Robotics? History of Robotics. Advantages and Disadvantages of Robots. Robot Components. Robot Degrees of Freedom. Robot Joints. Robot Coordinates. Robot Reference Frames. Programming Modes. Robot Characteristics. Robot Workspace. Robot Languages. Robot Applications. Other Robots and Applications. Social Issues.

Unit – II   **(Hours : 10)**

Robot Kinematics:Position Analysis: Robots as Mechanisms. Matrix Representation. Homogeneous Transformation Matrices. Representation of Transformations. Inverse of Transformation Matrices. Forward and Inverse Kinematics of Robots.

Unit – III   **(Hours : 10)**

Differential Motions and Velocities:Differential Relationships. Jacobian. Differential Motions of a Frame. Interpretation of the Differential Change. Differential Changes Between Frames. **Dynamic Analysis and Forces:**Lagrangian Mechanics: A Short Overview. Effective Moments of Inertia. Dynamic Equations for Multiple-Degree-of-Freedom Robots. Static Force Analysis of Robots. Transformation of Forces and Moments Between Coordinate Frames

Unit -IV   **(Hours : 10)**

Trajectory Planning: Path vs. Trajectory. Joint-Space vs. Cartesian-Space Descriptions. Basics of Trajectory Planning. Joint-Space Trajectory Planning. Cartesian-Space Trajectories. Continuous Trajectory Recording.

Unit - V   **(Hours : 10)**

Actuators: Characteristics of Actuating Systems. Comparison of Actuating Systems. Hydraulic Devices. Pneumatic Devices. Electric Motors. Microprocessor Control of Electric Motors. Magnetostrictive Actuators. Shape-Memory Type Metals. Speed Reduction

Sensors: Sensor Characteristics. Position Sensors. Velocity Sensors. Acceleration Sensors. Force and Pressure Sensors. Torque Sensors. Microswitches. Light and Infrared Sensors. Touch and Tactile Sensors. Proximity Sensors. Range-finders. Sniff Sensors. Vision Systems. Voice Recognition Devices. Voice Synthesizers. Remote Center Compliance (RCC) Device

REFERENCE BOOKS

S.NO	Author Name	Title of the Book	Publisher
1	Saeed B. Niku	Introduction to Robotics: Analysis, Systems, Applications	Hoboken,N.J Wiley
2	Ghosal, A.	Robotics:Fundamental Concepts and Analysis	Oxford University Press
3.	Doughales R. Halconnjr.	An Introduction to Robotics	-

WEBSITE REFERENCES

- http://engineering.nyu.edu/mechatronics/smart/pdf/Intro2Robotics.pdf

- https://www.ohio.edu/mechanical-faculty/williams/html/PDF/IntroRob.pdf

- http://courses.csail.mit.edu/6.141/spring2014/pub/labs/lab7/docs/Arm-Assembly-Instructions.pdf

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITET1C	Elective 1 : Bioinformatics	Batch	2023-2025
			Semester	II
Hrs/week	4 Hrs		Credits	4

COURSE OBJECTIVES:
To enable the students
- To understand the basic concepts in molecular biology and genetics.
- To understand the various methods of phylogenetic tree construction
- To understand the various techniques of proteomics.
- To understand the structure and functions of the genomes.
- To know the application areas of bioinformatics.

COURSE OUTCOMES (CO)
On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Describes about the concepts of molecular biology.
CO2	Interpret the characteristics of phylogenetic methods
CO3	Explain the pair wise sequence alignment methods.
CO4	Explain the protein synthesis in eukariotic cells.
CO5	Describe the various bioinformatics applications.

MAPPING WITH PROGRAMME OUTCOMES

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	M	H	H
CO2	L	H	H	H	H	M	M	M	M	M	H	H
CO3	L	H	H	H	H	M	M	M	M	M	H	H
CO4	L	H	H	H	H	M	M	M	M	M	H	H
CO5	L	H	H	H	H	M	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT I   **(Hours:10)**
Molecular Biology, Gene Structure and Information Content, Molecular Biology Tools, Genomic Information Content, Data Searches and Pairwise Alignments, Gaps, Scoring Matrices, Needleman and Wunsch Algorithm, Global and Local Alignments, Database Searches. Self Study: Scoring Matrices

UNIT II   **(Hours:10)**
Patterns of Substitution Within Genes, Estimating Substitution Numbers, Molecular Clocks, Molecular Phylogenetics, Phylogenetic Trees, Distance Matrix Methods. Self Study: Distance Matrix Methods

UNIT III   **(Hours:10)**
Character-Based Methods Of Phylogenetics, Parsimony, Ancestral Sequences, Searches, Consensus Trees, Tree Confidence, Genomics, Prokaryotic Gene Structure, Gene Density,Eukariotic Genomes, Gene Expression. Self Study: Gene Expression.

UNIT IV   **(Hours:10)**
Protein and RNA Structure Prediction, Polypeptic Composition, Secondary and Tertiary Structure, Algorithms For Modeling Protein Folding, Structure Prediction. Self Study: Structure Prediction.

UNIT V   **(Hours:10)**
Proteomics, Protein Classification, Experimental Techniques, Ligand Screening, Post-Translational Modification Prediction. Self Study: Protein Classification.Bioinformatics Applications – Agricultural – Transgenic Plants and Animals, Pharmaceutical –Drug design and Medical – SNP, Genetic Disorders, Gene therapy.

REFERENCE BOOKS

S. No	Author Name	Title of the Book	Publisher
1.	D. E. Krane and M. L. Raymer	Fundamental Concepts of Bioinformatics	Pearson Education
2.	T. K. Attwood and D. J. Parry-Smith	Introduction to Bioinformatics	Pearson Education
3.	J. H. Zar	Biostatistical Analysis	Pearson Education

WEB REFERENCES
- www.Bioinformatics.org
- www.bioinfo.mbb.yale.edu/mbb452a/intro/
- www.biology.ucsd.edu/others/dsmith/Bioinformatics.html

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITET1D	Elective 1 : Wireless Communication	Batch	2023-2025
Hrs/week	4 Hours		Semester	II
			Credits	4

COURSE OBJECTIVES

To enable the Students

- To understand the basics of wireless voice and data communication technologies.
- To study the working principles of wireless LAN and its standards .
- To build working knowledge on various telephone and satellite networks.
- To build knowledge on various Mobile Computing algorithms.

COURSE OUTCOMES (CO)

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Recognize various bandwidth Coherences and various Channels.
CO2	Explain the Cellular concepts and Frequency coverage calculations.
CO3	Elucidate the Wireless computing Algorithms and Technologies.
CO4	Identify two core networks associated with 3G Cellular networks
CO5	Compare the data transfer rates with those over Wireless LAN

MAPPING WITH PROGRAMME OUTCOMES

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	M	H	H
CO2	L	H	H	H	H	M	M	M	M	M	H	H
CO3	L	H	H	H	H	M	M	M	M	M	H	H
CO4	L	H	H	H	H	M	M	M	M	M	H	H
CO5	L	H	H	H	H	M	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT - I (Hours:10)

Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design– Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters- Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread .

UNIT - II (Hours:10)

Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept-Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service – Coverage and capacity improvement.

UNIT - III (Hours:10)

Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle – Cyclic prefix, Windowing, PAPR.

UNIT - IV (Hours:10)

Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing an LMS Algorithms. Diversity – Micro and Macro diversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver.

UNIT - V (Hours:10)

MIMO systems – spatial multiplexing - System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

REFERENCE BOOKS

S. No.	Author Name	Title of the Book	Publisher
1.	Rappaport,T.S.	Wireless Communications	Pearson Education
2.	Andreas.F. Molisch	Wireless Communications	John Wiley – India
3.	David Tse, Pramod Viswanath	Fundamentals of Wireless Communication	Cambridge University Press
4.	Upena Dalal	Wireless Communication	Oxford University Press
5.	Van Nee, R. and Ramji Prasad	OFDM for Wireless Multimedia Communications	Artech House

WEBSITE REFERENCES

- https://www.engineersgarage.com/articles/wireless_communication
- https://www.tutorialspoint.com › ... › Wireless Communication – Overview
- https://www.edgefx.in/different-types-wireless-communication-technologies/
- https://www.techopedia.com/definition/10062/wireless-communications
- https://www.electronicshub.org › General

Means of Curriculum Delivery : Lecture, Group Learning, Seminar, Assignment, Case studies, Google classroom.

SEMESTER II

Programme Code	M.Sc IT	Programme Title	Master of Science (Information Technology)	
Course Code	23P2ITET1E	Elective 1 : Advanced Database Technology	Batch	2023-2025
Hrs/week	4 Hours		Semester	II
			Credits	4

COURSE OBJECTIVES

To enable the Students
- To understand the concepts of DBMS.
- To have knowledge on DBMS.
- To develop the skills of Embedded and Dynamic SQL.

COURSE OUTCOMES

On successful completion of the course, students should be able to

CO Number	CO Statement
CO1	Define the concept of Database and Database Design
CO2	Use the Commands and understand table
CO3	Use SQL query structure and modify the table
CO4	Describe about function, grouping and PL/SQL
CO5	Define the concept of Embedded SQL and PL/SQL

MAPPING WITH PROGRAMME OUTCOMES

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	L	H	H	H	H	M	M	M	M	M	H	H
CO2	L	H	H	H	H	M	M	M	M	M	H	H
CO3	L	H	H	H	H	M	M	M	M	M	H	H
CO4	L	H	H	H	H	M	M	M	M	M	H	H
CO5	L	H	H	H	H	M	M	M	M	M	H	H

L-Low M-Medium H-High

SYLLABUS

UNIT I (Hours : 10)

RELATIONAL MODEL: ER Model - Normalization - Query Processing - Query Optimization - Transaction Processing - Concurrency Control - Recovery - Database Tuning.

UNIT II (Hours : 10)

DISTRIBUTED DATABASES: Parallel Databases – Inter and Intra Query Parallelism – Distributed Database Features – Distributed Database Architecture – Fragmentation – Distributed Query Processing – Distributed Transactions Processing – Concurrency Control – Recovery – Commit Protocols.

UNIT III (Hours : 10)

OBJECT ORIENTED DATABASES : Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence - Query Languages - Transaction - Concurrency - Multi Version Locks- Recovery – Postgres-Jasmine-Gemstone-ODMG Model.

UNIT IV (Hours : 10)

EMERGING SYSTEMS: Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

UNIT V (Hours : 10)

CURRENT ISSUES: Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases– Multimedia Data Structures – Multimedia Query languages - Spatial Databases.

REFERENCE BOOKS

S. No.	Author Name	Title of the Book	Publisher
1.	R. Elmasri, S.B. Navathe,	Fundamentals of Database Systems	Pearson Education
2.	Abraham Silberschatz, Henry F. Korth, S. Sudharshan	Database System Concepts	Tata McGraw Hill
3.	C.J.Date, A.Kannan, S.Swamynathan	An Introduction to Database Systems	Pearson Education

WEBSITE REFERENCES

- https://en.wikipedia.org/wiki/RDBMS

- https://www.tutorialspoint.com/DBMS

- https://www.geeksforgeeks.org/

Means of Curriculum Delivery : Power point presentation, Lab Assignments, Observation, Google

Classroom