Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

Department: Computer Science Engineering **Rev:** Course Structure/01/NEP/2023-24

Class: S.Y. B.Tech **Semester:** III

Sr No	Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credits
				L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
1	23CS2301	PCC	Mathematics for Computer Science	3		-	3	10	10	30	50	100	3
2	23CS2302	PCC	Data Structure and Its Application	3	-	-	3	10	10	30	50	100	3
3	23CS2303	PCC	Computer Networks	3	-	-	3	10	10	30	50	100	3
4	23CS2304	PCC	Data Structure and Its Application Laboratory	-	-	2	2	15	15	-	20	50	1
5	23CS2305	PCC	Computer Networks Laboratory	-	-	2	2	15	15	-	20	50	1
6	23CS2306	PCC	Web Technology Laboratory	-	-	2	2	15	15	-	20	50	1
7	23CS2307	VEC	Environmental Sciences	2	-	-	2	25	25	-	-	50	2
8	23CS2308	CEP	Mini Project – II	-	-	2	2	25	25	-	-	50	1
9	23CS2309	EEM	Intellectual Property Rights	1	-	-	1	25	25	-	-	50	1
10	23CSMDXX	MDM	Multidisciplinary Minor	2	-	-	2	10	10	30	50	100	2
11	23OECS21	OE	Open Elective I	2	-	-	2	10	10	30	50	100	2
12	23HSSM01	VEC	Aptitude Skills-I	1	-	-	1	25	25	-	-	50	1
13	23HSSM02	VEC	Language Skills-I	-	-	2	2	25	25	-	-	50	1
Total				**17**	**-**	**10**	**27**	**220**	**220**	**150**	**310**	**900**	**22**

***Open Elective I:** Software Testing

Note- Open Elective course will be offered to students of other programs and will not be offered to students of the same program.

Multidisciplinary Minor-

Basket	Agriculture	Management	Healthcare
Course Code, Name	Agriculture Informatics (23CSMDA1)	Fundamentals of Finance and Management (23CSMDB1)	Medical Imaging and Image Processing (23CSMDC1)

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2301	PCC	Mathematics for Computer Science	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basic Logic & Probability, Set, Graph related Concepts

Course Outcomes: At the end of the course, students will be able to:

CO1	Apply the operations of sets, use Venn diagrams to represent sets and Identify different types of binary relations on the basis of its properties
CO2	Define an argument using logical notation and determine if the argument is valid or invalid
CO3	Identify the appropriate algebraic structure and lattice
CO4	Illustrate and formulate fundamental probability distribution and density functions, as well as functions of random variable.
CO5	Apply different methods to find the correlation between the variables. Develop basic mathematical tools for regression analysis.
CO6	Apply various statistical tests to test the hypothesis.

Course Contents:

Unit 1: Set theory Basic concepts of set theory, Operations on sets, Ordered pairs, Cartesian Products, Representation of discrete structures, Relation and ordering - properties of binary relations in a set, Relation matrix and the graph of a relation, Partition and Covering of set, Equivalence relations, Composition of Binary relations, Partial ordering , POSET and Hasse diagram, Functions – types, composition of functions, Inverse functions.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • DEPT. OF COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 2: Mathematical logic Statements and Notations, Connectives , Statement formulas and truth tables, well-formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal and principal normal forms, completely parenthesized infix and polish notations, Theory of Inference for statement calculus – validity using truth table, rules of inference.	[6]
Unit 3: Algebraic systems Algebraic systems, properties and examples, Semigroups and Monoids, properties and examples, Homomorphism of Semigroups and Monoids, Groups: Definition and examples, Subgroups and homomorphism.	[6]
Unit 4: Basic Probability Basic concepts of probability, Random variables, Probability distributions, Probability mass function, Probability density function. Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial & Poisson's distributions, Properties of binomial, Poisson and normal distributions.	[6]
Unit 5: Correlation & Linear Regression Analysis Introduction, Types of correlation, Karl Pearson's correlation coefficient, Spearman's rank correlation Coefficient, Probable errors Linear and non-linear regression, Lines of regression, Derivation of regression lines of y on x and x on y, Coefficients of regression, Properties of regression coefficient.	[6]
Unit 6: Testing of Hypothesis Test of significance for Large sample size (z tests) for single mean, difference of means, proportion, difference of proportions, Test of significance for small sample size (t test)	[6]

Textbooks:-

1. Discrete Mathematics Structures with Applications to computer science-J.P.Tremblay & R.Manohar (MGH International)
2. C.L.Liu , Elements of Discrete Mathematics , Mc Graw- Hill Pulication, 3rd Edition , 2008, Kenneth H.Rosen, Discrete Mathematics and its Applications, Mc Graw- Hill Publication, 6th Edition , 2010

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3. G. V. Kumbhojkar, Probability and Random Processes, C. Jamnadas and Co., 14th Edition, 2010.
4. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010

Reference Boks:

1. Lipschutz, Discrete Mathematics, McGraw-Hill Publication, 3rd Edition,2009
2. V.K.Balakrishnan, Schaum's Outline of Graph Theory, Mc Graw-Hill Publication, 1st Edition, 1997.
3. Eric Gossett, Discrete Mathematics with Proof, Wiley Publication, 2nd Edition,2009
4. Y.N.Singh, Discrete Mathematical Structures, Wiley Publication, 1 st Edition, 2010.
   Dr. Sukhendu Dey, Graph Theory with Application, SPD Publication, 1 st Edition, 2012
5. Kishor S. Trivedi, Probability, Statistics with Reliability, Queuing and Computer Science Applications, Wiley India Pvt. Ltd, 2nd Edition, 2001

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2302	PCC	Data Structure and its Application	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basics of c programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Interpret the basics of data structure and its application.
CO2	Outline Concepts of stack and queue to solve real-time problems.
CO3	Apply various operations on Linked List.
CO4	Make use of the concepts of Trees and its traversal techniques.
CO5	Examine searching and hashing algorithms.
CO6	Make use of basic terminologies of graph and its representation.

Course Contents:

Unit 1: Introduction to Data Structure Introduction: Basic Terminologies, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 2: Stack, Queue Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. Recursion - Factorial, GCD, Fibonacci Sequence, Tower of Hanoi .ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.	[6]
Unit 3: Linked List Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.	[6]
Unit 4: Tree Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, and Application of Binary Trees. Tree variants: AVL Tree, height of an AVL Tree, insertion, deletion of node in AVL Trees, Single and Double rotation of AVL Trees	[6]
Unit 5: Sorting & Hashing Sorting and Hashing: Objective and properties of different sorting algorithms: Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.	[6]
Unit 6: Graph Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis. Terminology and representation of graphs using adjacency matrix, Wars hall's algorithm and analysis.	[6]

Textbooks:-

1. Thomas Cormen, Introduction to Algorithms, PHIP ublication, 2nd Edition, 2002.
2. E. Horowitz, S. Sahani, Fundamentals of Data Structures, Galgotia Publication, 1st Edition, 1983.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Reference Books:-

1. Kyle Loudon, Mastering Algorithms with C: Useful Techniques from Sorting to Encryption, O'Reilly Media, 1st Edition,1999
2. Mark Allen Weiss, Data structures and algorithms analysis in C++, Pearson Education, 4th Edition, 2013.
3. S. Lipschutz, Data Structures, McGraw-Hill Publication, Revised 1st Edition, 2014.
4. Y. Langsm, M. Augenstin, A. Tanenbaum, Data Structure using C and C++, Prentice Hall India Learning Private Limited, 2nd Edition,1998.
5. Trembley and Sorenson, Introduction to Data Structures, PHI Publication, 2nd Revised Edition, 1983

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2303	PCC	Computer Networks	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Define the basic concepts of computer network.
CO2	Outline the OSI layered architecture.
CO3	Explain the concept of network layer.
CO4	Explain the concept of transport layer.
CO5	Demonstrate the concept of file transfer.
CO6	Apply the concepts of Network security on its applications.

Course Contents:

Unit 1: Fundamentals of Computer Network Definition And Need of Computer Network, Applications, Data communication process and its components, protocols, standards, transmission rate, Modes of data communication, Classification Of Network: LAN, WAN, MAN, Network connecting devices, network topologies.	[6]
Unit 2: OSI Model The OSI model: Layered Architecture, Encapsulation, Layers in OSI Model, introduction to Physical Layer, functions of physical layer, Data Link Layer, services provided by the DLC, Data link layer protocols.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 3: Network Layer Network layer services, routing algorithms- Link State Routing algorithm, Distance Vector Routing Algorithm, packet switching, Addressing: Physical Address, Logical Address, Port Address, IP Address-Concept, IPv4 Addressing: Address Space ,Classful and Classless Addressing ,DHCP, IPv6 addressing and basic structure, IPv4 and IPv6 difference.	[6]
Unit 4: Transport Layer Introduction to transport layer, transport layer services, multiplexing and Demultiplexing, Connectionless transport UDP, UDP segment structure, UDP Checksum, Pipelined reliable data transfer protocols, connection oriented transport.	[6]
Unit 5: File Transfer File transfer, FTP Commands, Electronic Mail in the internet, SMTP, Mail Message format, Mail Access protocol, DNS, Service provided by the DNS, Working of DNS, DNS Records and Messages, Peer-to-Peer Application, P2P File Distribution, Distributed Hash Function, Socket Programming with UDP, Socket Programming with TCP.	[6]
Unit 6: Network Security Overview of network security, classification of network attacks, security methods, Symmetric key Cryptography: Data Encryption Standard (DES), Advance Encryption Standard (AES), And Public key Cryptography: RSA Algorithm, Digital signature, Firewall and packet filtering.	[6]

Textbooks:-

1. Behrouz and Forouzan, Data communication and networking –fourth edition, by McGraw Hill Indian Edition.
2. Andrew S Tanenbunm, computer network, fifth edition, Pearson

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2304	PCC	Data Structure and its Application Laboratory	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA I: 15 Marks CA II: 15 Marks Practical Oral Exam: 20 Marks

Pre-Requisites: Basics of c programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Interpret the basics of data structure and its application.
CO2	Outline Concepts of stack and queue to solve real-time problems.
CO3	Apply various operations on Linked List.
CO4	Make use of the concepts of Trees and its traversal techniques.
CO5	Examine searching and hashing algorithms.
CO6	Make use of basic terminologies of graph and its representation.

Course Contents:

List of Experiments:

1. Design C program to traverse array for inserting and deleting an element.
2. Write program for linear search and Binary search.
3. Design program for stack operations (Push, Pop and Display).
4. Design a program on recursion for Factorial, GCD, and Fibonacci.
5. Write a program for infix to postfix and postfix to infix conversion.
6. Write a program for linear queue operations.
7. Write a program for circular queue operations.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur.

8. Write a program for singly and doubly Linked list.
9. Design a program for tree traversal in order, preorder and post order.
10. Write a program to create n vertices using adjacency list.
11. Write a program for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort (Any Three).
12. Write a program for search an element using hashing techniques.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2305	PCC	Computer Networks Laboratory	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA I: 15 Marks CA II: 15 Marks Practical Oral Exam: 20 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Define the basic concepts of computer network.
CO2	Outline the OSI layered architecture.
CO3	Explain the concept of network layer.
CO4	Explain the concept of transport layer.
CO5	Demonstrate the concept of file transfer.
CO6	Apply the concepts of Network security on its applications.

Course Contents:

List of Experiments:

1. Analyze the type of network topology used in your lab and prepare technical specifications for it.
2. Connect computer using given topology with wired media.
3. Configure static and dynamic IP addresses.
4. Simulate and understand IP forwarding with a LAN and across a router.
5. Understand the working of connection establishment in TCP using a network simulator.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

6. Run basic utilities and network commands: ipconfig, ping,tracert,netstat, pathping ,route.
7. Study how data rate of wireless LAN (IEEE 802.11) network varies as distance between the access point and wireless node is varied.
8. Study the working and routing table format of interior routing protocol i.e. routing information protocol(RIP) and Open shortest path first(OSPF).
9. Write a client server program using TCP/IP socket.
10. Implement encryption & decryption algorithm.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2306	PCC	Web Technology Laboratory	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA I: 15 Marks CA II: 15 Marks Practical Oral Exam: 20 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop web pages using HTML
CO2	Develop web pages using Cascading Styles sheets.
CO3	Develop a dynamic web pages using JavaScript (client side programming).
CO4	Develop an interactive web applications using HTML, Java Scripts
CO5	Develop a Program using XML.
CO6	Apply Server side technologies for Web development

Course Contents:

List of Experiments:

1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2. Create user Student feedback form (use textbox, text area, checkbox, radio button, select box etc.).
3. Create your resume using HTML tags also experiment with colors, text, link, size and also other tags you studied.
4. Use Inline CSS to format your resume that you created.
5. Use External CSS to format your class timetable as you created.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

6. Use External, Internal, and Inline CSS to format college web page that you created.
7. Develop simple calculator for addition, subtraction, and multiplication and division operation using JavaScript.
8. Create HTML Page that contains form with fields Name, Email, Mobile No, Gender, Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
9. Write a program to create a web page using xml.
10. Write a php program to check if number is prime or not.
11. Write PHP Script for storing and retrieving user information from MySql table.

    1. Design a HTML page which takes Name, Address, Email and Mobile No. From user (register.php).

    2. Store this data in Mysql database / text file.

    3. Next page display all user in html table using PHP (display.php).

Reference Books:-

1. Steven Holzner, "HTML Black Book", Dremtech press.
2. Web Technologies, Black Book, Dreamtech Press.
3. Web Applications: Concepts and Real World Design, Knuckles, Wiley-India.
4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2307	VEC	Environmental Science	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain nature of environmental studies
CO2	Explain various natural resources and associated Problems
CO3	Summarize various ecosystems
CO4	Explain the importance of conservation of biodiversity and its importance in balancing the earth.
CO5	Recognize various causes of environmental pollution along with various protection acts in India to limit the pollution
CO6	Interpret the information based on field study and prepare a report.

Course Contents

Unit 1: Nature of Environmental studies Definition, scope and importance, Multidisciplinary nature of environmental studies. Need for public awareness.	[2]
Unit 2: Natural Resources and Associated Problems **Forest resources:** Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. **Water resources:** Use and over-utilization of surface and ground water, floods, conflicts over water. **Mineral resources:** Usage and exploitation. Environmental effects of extracting and using mineral resources.	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur.

Energy resources: Growing energy needs, renewable and nonrenewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. **Land resources:** land degradation, man induced landslides, soil erosion and desertification. Role of individuals in conservation of natural resources.	
Unit 3: Ecosystems Concept of an ecosystem, types of ecosystem, structure and function of an ecosystem, producers, consumer and decomposers. Energy flow in the ecosystem, food chain, food web and ecologial pyramids, eclogical succession. Different types of ecosystem. a) Forest ecosystem b)Grassland ecosystem c) Desert ecosystem d)Aquatic ecosystem	[4]
Unit 4: Biodiversity Introduction-Definition: genetic, species and ecosystem diversity, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Western Ghat as a biodiversity region Hot spot of biodiversity. Threats to biodiversity, man and wildlife conflicts. Conservation of biodiversity. In-situ conservation and Ex-situ conservation.	[4]
Unit 5: Environmental Pollution and Environmental Protection Definition: Causes, effects and control measures of various types of pollution. Solid waste. Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution, Concept of sustainable development: From Unsustainable to Sustainable development. Environmental Protection Act. Air (Prevention and Control of pollution) Act. Water (Prevention and Control of pollution) Act. Forest conservation Act. Wildlife Protection Act. Human Rights.	[4]
Unit 6: Field work Visit to a local area to document Environmental assets-River, Forest, and Grassland. Visit to local polluted site. Study of common plants, insects, birds. Study of ecosystem river, ponds etc.	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Textbooks:-

1. P. N. Wartikar & amp; J. N. Wartikar, A Text Book of Applied Mathematics (Vol I & II), Pune.Vidyarthi Griha Prakashan, Pune.
2. N. P. Bali, a Text Book of Engineering Mathematics, Laxmi Publications, New Delhi.
3. C. R. Wylie & L. C. Barrett, Advanced Engineering Mathematics, McGraw Hill Publishing Company Ltd.

Reference Books:-

1. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publications, New Delhi.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
4. Peter O" Neil, a Text Book of Engineering Mathematics, Thomson Asia Pvt. Ltd. Singapore.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23HSSM01	**VEC**	**Aptitude Skills-I (Numerical Ability)**	**1-0-0**	**1 Credit**

Teaching Scheme	Examination Scheme
Lecture: 1 hr/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Basic Mathematics.

Course Outcomes: At the end of the course, students will be able to:

CO1	Make use of multiplications, squares, square roots, cubes and cube roots to solve aptitude problems
CO2	Solve questions based on Number system
CO3	Solve questions based on percentage, average, ratio, proportion, Speed, Time and Distance
CO4	Solve questions based on Profit & Loss and mensurations.

Course Contents

Unit 1: Speed Math Techniques Multiplication, Squares, Square roots, Cubes, Cube roots.	[3]
Unit 2: Number System Types of Number System, Last Digit Method, BODMAS Calculation, HCF and LCM, Progressions.	[3]
Unit 3: Basic Aptitude Percentage, Average, Ratio and Proportion, Fraction, Partnership. **Speed- Time- Distance**	[3]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Speed, Time, and Distance, Trains, Boats, Streams, Races.	
Unit 4: Business Aptitude Profit & Loss, Simple Interest, Compound Interest **Geometry and Venn Diagram** 2D and 3D Mensuration, Venn diagram	[3]

Textbooks:-

1. Arun Shrama - Quantitative aptitude for CAT.
2. RS Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S. Chand Publisher; 2016 edition

Reference Book:-

1. Fast Track Objective Arithmetic Paperback, by Rajesh Verma – 2018
2. Teach Yourself Quantitative Aptitude, Arun Sharma
3. The Pearson Guide To Quantitative Aptitude For Competitive Examination by Dinesh Khattar

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23HSSM02	VEC	Language Skills-I	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Basics of Programming.

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop flowchart and Algorithm to solve the given problem statements
CO2	Develops programs using Data Types and Operators
CO3	Make use of Decision Making and Looping Statements to develop conditional programs
CO4	Make use of Arrays to develop programs in C language

Course Contents

Experiment No.	Name of Experiment	
1	Explain basics of C such as Editing, Compiling, Error Checking, executing, testing and debugging of Programs and Deign Algorithms and Flowcharts.	[2]
2	Explain basics of Variable, Data types and operators and develop programs on arithmetic Operators.	[2]
3	Develop programs on Conditional, logical and Bitwise Operators.	[2]
4	Develop programs on Sizeof () and typecasting operator.	[2]
5	Develop programs on increment and decrement operator.	[2]
6	Develop programs on simple if and if-else statement.	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

7	Develop programs on simple if-else ladder and Nested if-else.	[2]
8	Develop programs on Switch case statement.	[2]
9	Develop programs on For-loop & Nested For-loop.	[2]
10	Develop programs on while and do-while loop.	[2]
11	Develop programs on one dimensional array.	[2]
12	Develop programs on two dimensional array.	[2]
13	Develop programs on string handling functions.	[2]

Textbooks:-

1. C Programming Absolute Beginner's Guide, Que Publishing; 3rd edition (22 August 2013)
2. C Programming Language 2nd Edition, Pearson Publication

Reference Books:-

1. Programming in C Practical Approach by Ajay Mittal, Pearson.
2. Let Us C, By Yashwat Kanetkar.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2308	CEP	Mini Project-II	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: None.

About Ideathon

The project is a part of addressing societal and industrial needs. An ideathon is a brief, intense event where students can work on some of the most important problems that the world is facing today. Ideation's are brainstorming events where people with diverse knowledge backgrounds, skill sets and interests get together to predetermined problems, and come up with substantive, innovative and comprehensive solutions. An ideathon's output might be ideas, a roadmap or an actionable plan. Teams leverage design thinking and cutting-edge techniques to brainstorm and collaborate on potential solutions within a given time frame.

Course Outcomes: At the end of the course, students will be able to:

CO1	Identify problems based on societal /research needs
CO2	Apply Knowledge and interpersonal skills to solve societal problems in a group.
CO3	Draw the proper inferences from available results through theoretical/ experimental/simulations.
CO4	Analyze the impact of solutions in societal and environmental context for sustainable development.
CO5	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
CO6	Demonstrate project management principles during project work.

Course Contents:

Week 1: Higher Education and Case Study Pedagogy • Students shall form a group of 3 to 4 students, while forming a group shall not be allowed less than three or more than four students, as it is a group activity. • Allocation of mentor	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Week 2: Topic Selection • Briefly interact with students to provide hand-holding for topic selection. • Students should do survey and identify needs, which shall be converted into problem statement for mini project in consultation with faculty supervisor • **Illustrative Examples : Any Industry or Societal Problem** • Finalization of Title.	[2]
Week 3: Case Study Design/Ideathon: Part 1 • If needed, provide hand-holding to students for finalizing objectives. • Review the objectives of the case study groups. • Identify what can be quantified related to your topic and how. • Decide objectives for your case study. • Continue reading especially recent work specific to your topic.	[2]
Week 4: Case Study Design/Ideathon: Part 2 • Prepare a roadmap of your case study, identify what is to be measured on the field. • Ensure student groups have finalized the objectives.	[2]
Week 5: Survey Design • Prepare a questionnaire and try it out with your group members as mock. • Decide sampling strategy.	[2]
Week 6: Analysis Phase-1 • Students in a group shall understand problem effectively, propose multiple solution. • The students have to work on different approaches and search for the different methodology to solve the problem in consultation with the project guide.	[2]
Week 7 Analysis Phase-2 • The students have to finalize the best methodology to solve the problem in consultation with the project guide. • 25% Presentation has to be conducted by mentor/guide based on above activity.	[2]
Week 8: Analysis-3 • Identify appropriate data visualization tools for your case study. • Analyze the data	[2]
Week 9: Analysis-4	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

• Identify appropriate data visualization tools for your case study. • Analyze the data	
Week 10: Report writing Part:1 • Prepare an outline of the report and start organizing the write-up for the first draft. • Prepare and submit the first draft of the report to the course coordinator.	[2]
Week 11: Report writing Part:2 • Make necessary corrections if any as per the suggestions of course coordinator. • Submit the final draft of the case study	[2]
Week 12: Final Presentation • 50% Presentation has to be conducted by mentor/guide based on above activity.	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2309	EEM	Intellectual Property Rights	1-0-0	1 Credit

Teaching Scheme	Examination Scheme
Lecture: 1 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil.

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain key principles of intellectual property rights
CO2	Illustrate information about patents, including registration, writing, and searching, both in India and outside.
CO3	Outline awareness of copyrights, the rights associated with them, and the registration process; to spread awareness of trademarks and the registration process
CO4	Illustrate information about design, geographical indication (GI), plant variety, and layout design protection, as well as registration aspects.

Course Contents

Unit 1: Introduction and the need for intellectual property right (IPR) Types of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design. Genetic Resources and Traditional Knowledge – Trade Secrets, IPR in India: Genesis and development, IPR in abroad.	[3]
Unit 2: Patents Elements of Patentability: Novelty, Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter – Registration. Procedure, Rights and Duties of Patentee, Assignment and license, Restoration of lapsed Patents, Surrender and Revocation of Patents Patent Infringement, Remedies & Penalties – Patent Office and Appellate Board. Patent/Prior art search: Types and tools of patent search. Patent drafting: Elements in patent drafting	[3]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 3: Copyrights Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings, Registration Procedure, Term of protection, Ownership of copyright, Assignment and license of copyright Infringement, Remedies & Penalties – Related Rights -Distinction between related rights and copyrights.	[3]
Unit 4: Trademarks Concept of Trademarks - Different kinds of marks (brand names, logos, signatures, symbols, well-known marks, certification marks and service marks) - Non Registrable Trademarks, Registration of Trademarks - Rights of holder and assignment and licensing of marks. Trademark Infringement, Remedies & Penalties - Trademarks registry and appellate board	[3]

Textbooks:-

1. B.L. Wadera, Patents, trademarks, copyright, Designs and Geographical Judications.
2. P. Narayanan (Eastern Law House), Intellectual Property Law.
3. Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited.
4. Neeraj, P., &Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited.

Reference Books:-

1. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.
2. Subramanian, N., &Sundararaman, M. (2018). Intellectual Property Rights – An Overview. Retrieved from http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf
3. World Intellectual Property Organisation. (2004). WIPO Intellectual property Handbook. Retrieved from https://www.wipo.int/edocs/pubdocs/en/intproperty/489/wipo_pub_489.pdf
4. Journal of Intellectual Property Rights (JIPR): NISCAIR

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDA1	MDM	Agriculture Informatics	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basic knowledge of computer.

Course Outcomes: At the end of the course, students will be able to:

CO1	Relate concepts from agriculture, computer science, and information technology.
CO2	Explain the role of information systems in the agricultural sector and their impact on productivity and sustainability.
CO3	Demonstrate proficiency in data collection, management, and analysis specific to agricultural data.
CO4	Apply principles of precision agriculture to optimize field-level management regarding crop farming.
CO5	Demonstrate decision support systems (DSS) for farm management and other agricultural operations.
CO6	Make use of ethical standards and legal regulations related to data privacy and security in agricultural informatics.

Course Contents

Unit 1: Introduction to Agriculture Informatics	[4]
Overview of agriculture informatics, Importance and scope of informatics in agriculture, Trends and developments in agricultural technology, Traditional vs. modern data collection methods, Principles of Agronomy, Soil Science and Crop Production, Plant Breeding and Genetics, Pest and Disease Management.	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 2: Information Technology in Agriculture Introduction to ICT in Agriculture, Role of IoT in Agriculture, Geographic Information Systems (GIS) and Remote Sensing, Big Data Analytics in Agriculture, Cloud Computing in Agriculture, Sensors and Actuators in Agricultural Systems, Autonomous Vehicles and Drones.	[4]
Unit 3: Data Management in Agriculture Data Collection Methods and Tools, Data Storage and Management Systems, Data Analysis and Interpretation, Overview of Supply Chain in Agriculture, ICT in Supply Chain Management.	[4]
Unit 4: Precision Agriculture Automated Machinery and Equipment, Robotics in Agriculture, Concepts and principles of precision farming, Sensor-based monitoring systems, Yield mapping and variable rate technology, Concepts of Smart Farming, Smart Greenhouses and Vertical Farming, Smart Irrigation Systems.	[4]
Unit 5: Agricultural Decision Support Systems Livestock Monitoring and Management, Role of Artificial Intelligence and Machine Learning in Agriculture, Farm Management Software, Simulation and Modeling Tools, Mobile Applications for Farmers, Emerging Technologies in Agricultural Software.	[4]
Unit 6: Software and Tools for Agriculture Informatics Case Studies of Successful ICT Applications in Agriculture, Real-world Applications and Projects, Analysis of Agricultural Informatics Startups and Innovations, Intellectual Property Rights in Agriculture, Data Privacy and Security in Agricultural Informatics, Ethical Issues and Sustainability.	[4]

Reference Books:-

1. "Agricultural Informatics" Rajeev K. Sinha and Deepak S. Mishra
2. "Precision Agriculture Technology for Crop Farming" Qin Zhang

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3. "Big Data in Agriculture: A Guide to Transforming the Industry" Vikas Kumar and Shivani Pathak
4. "Information and Communication Technology for Agriculture and Rural Development" R.K. Samanta

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDB1	MDM	Fundamentals of Finance and Management	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Communication Skills.

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the concept & different terms of Financial Management
CO2	Outline different types of Annuity and Perpetuity
CO3	Compare Different sources of finance
CO4	Analyze Capital Expenditure Decisions
CO5	Illustrate Dividend Decisions
CO6	Outline Liquidity Management

Course Contents

Unit 1: Introduction & Basic Concepts Important functions of Financial Management, Objectives of the firm: Profit maximization vs. Value maximization, Role of Chief Financial Officer, Time Value of Money: concept and reasons, Compounding and Discounting techniques	[4]
Unit 2: Annuity and Perpetuity Types of Annuity: Deferred annuity, Fixed annuity, Immediate annuity, Variable annuity, Indexed annuity, Life annuity, Group annuity contracts, Fixed annuity, Perpetuity, Annuity payable for guaranteed time, Types of Perpetuity	[4]
Unit 3: Sources of Finance and Cost of Capital Different sources of finance; long term and short term sources, Cost of capital:	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

concept, relevance of cost of capital, Implicit and Explicit cost, specific costs (its computation) and weighted average cost (its computation)	
Unit 4: Capital Expenditure Decisions Objectives of Capital Budgeting Process, Concept of Cash flow, Methods of long term Investment decisions - Discounted Payback Period, Net Present Value, Profitability Index, Average Rate of Return / Accounting Rate of Return, Internal Rate of Return (Including relative merits and demerits of each of the methods)	[4]
Unit 5: Dividend Decisions Meaning, Nature and Types of Dividend, concept of pay-out ratio, retention ratio, Decisions and growth, Dividend policies and formulating a dividend policy, Dividend Theories: Walter's Model, Gordon's Model	[4]
Unit 6: Liquidity Management Various concepts of Working Capital, Management of Working Capital and Issues in Working Capital, Estimating Working Capital Needs; Operating or Working Capital Cycle, Policies relating to Current Assets – Conservative, Aggressive and Balance, Various sources of finance to meet working capital requirements	[4]

Reference Books:-

1. Fundamentals of Financial Management, Vandana Dangi, V.K. Global Pvt. Ltd., New Delhi.
2. Parasuraman – Financial Management: A Step by Step Approach, Cengage Learning.
3. Rostogi, Fundamentals of Financial Management, Taxmann Publications.
4. Fundamental of Financial Management, Sharma, Gupta, Kalyani Publishers, New Delhi.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SC. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDC1	**MDM**	**Medical Imaging and Image Processing**	**2-0-0**	**2 Credits**

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basics of Computer.

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic principles behind various medical imaging modalities.
CO2	Illustrate fundamental techniques for processing and analyzing medical images
CO3	Demonstrate image processing techniques to enhance and interpret medical images.
CO4	Explain the basic principles behind various X-ray medical images.
CO5	Demonstrate various reconstruction technics on medical images.
CO6	Illustrate advanced image processing techniques.

Course Contents

Unit 1: Introduction to Medical Imaging Overview of medical imaging modalities (X-ray, CT, MRI, ultrasound, PET, etc.), Basic principles of image formation in medical imaging, Image representation (pixels, grayscale, color), Image enhancement techniques (histogram equalization, contrast stretching), Image filtering (convolution, smoothing, sharpening), Spatial domain vs. frequency domain processing.	[4]
Unit 2: Image Transformation and Registration Geometric transformations (translation, rotation, scaling), Image registration	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

techniques, Image warping and morphing, Image Segmentation: Thresholding methods, Edge detection algorithms (Sobel, Canny), Region-based segmentation (watershed, region growing).	
Unit 3: Feature Extraction and Pattern Recognition Texture analysis, Shape analysis, Object detection and classification, Anatomical and functional imaging, Tumor detection and classification, Image-based diagnosis and prognosis.	[4]
Unit 4: X-ray Imaging Principles of X-ray production, X-ray detectors and image formation, Digital radiography and fluoroscopy, Applications.	[4]
Unit 5: Image Reconstruction Techniques Principles of computed tomography (CT) reconstruction, MRI image reconstruction, Ultrasound image formation and reconstruction.	[4]
Unit 6: Advanced Image Processing Techniques Machine learning and deep learning in medical imaging, Pattern recognition and classification, Quantitative image analysis, Applications in computer-aided diagnosis (CAD)	[4]

Reference Books:-

1."Medical Imaging: Principles and Practices" by James H. Thrall.
2."Digital Image Processing" by Rafael C. Gonzalez and Richard E. Woods.
3."Principles of Magnetic Resonance Imaging: A Signal Processing Perspective" by Zhi-Pei Liang and Paul C. Lauterbur.
4."Handbook of Medical Imaging" edited by Jacob Beutel, Harold L. Kundel, and Richard L. Van Metter.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

Department: Computer Science Engineering **Rev:** Course Structure/01/NEP/2023-24

Class: S.Y. B.Tech. **Semester:** IV

Sr No	Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credits
				L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
1	23CS2401	PCC	Database Systems	3	-	-	3	10	10	30	50	100	3
2	23CS2402	PCC	Operating System	2	-	-	2	10	10	30	50	100	2
3	23CS2403	PCC	Java Programming	3	-	-	3	10	10	30	50	100	3
4	23CS2404	VSEC	Data Science and Visualization Laboratory	-	-	4	4	15	15	-	20	50	2
5	23CS2405	PCC	Database System Laboratory	-	-	2	2	15	15	-	20	50	1
6	23CS2406	PCC	Java Programming Laboratory	-	-	2	2	15	15	-	20	50	1
7	23CSMDXX	MDM	Multidisciplinary Minor	3	-	-	3	10	10	30	50	100	3
8	23OECS22	OE	Open Elective II	3	-	-	3	10	10	30	50	100	3
9	23MILEXX	AEC	Modern Indian Language	2	-	-	2	25	25	-	-	50	2
10	23HMSS03	VEC	Aptitude Skills-II	1	-	-	1	25	25	-	-	50	1
11	23HMSS04	VEC	Language Skills-II	-	-	2	2	25	25	-	-	50	1
12	23CS2407	CEP	Mini Project – III	-	-	2	2	25	25	-	-	50	1
Total				17	-	12	29	195	195	150	310	850	23

***Open Elective II**: Operating System

Note- Open Elective course will be offered to students of other programs and will not be offered to students of the same program.

Multidisciplinary Minor-

Basket	Agriculture	Management	Healthcare
Course Code, Name	Mobile Application for Agriculture (23CSMDA2)	Leadership & Team Effectiveness (23CSMDB2)	Health Data Analysis & Machine Learning (23CSMDC2)

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • DEPT. OF COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2401	PCC	Database Systems	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic database concepts of DBMS, applications, data models, schemas and instances.
CO2	Demonstrate the use of constraints and relational algebra operations for building applications
CO3	Make use of the basics of SQL and construct queries using SQL in database creation and interaction.
CO4	Construct different normalization techniques in databases.
CO5	Illustrate concepts of indexing and hashing
CO6	Choose different strategies for providing security, privacy, control, backup and recovery of data.

Course Contents:

1.Introduction Concept & Overview of DBMS, Database Languages, Database Users, Database Administrator, Three Schema architecture of DBMS ,Data Abstraction levels, database architecture, Data Models, The Entity-Relationship Model-Constraints, keys, E-R Diagrams, Weak Entity Sets, Extended E-R features.	[6]
2.Relational Model Structure of relational Databases, Database Schemas, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Calculus vs Algebra.	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3.Introduction to SQL Introduction to SQL, Data types in SQL, Basic Structure of SQL Queries, Components of SQL, SQL Operators – Arithmetic operators, Comparison Operators, Logical Operators, Set Operators, pattern Matching operator like, Range searching operator between, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database, Join Expressions, Views, Integrity Constraints.	[6]
4.Relational Database Design The purposes of Normalization, Data Redundancies and Update Anomalies, Functional Dependencies- types of functional dependency, The Process of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.	[6]
5.File Organization Indexing and Hashing Overview of File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer. Basic Concepts of Indexing and Hashing, Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Multiple-Key Access, Static Hashing, Query Processing-Overview, and Measures of Query cost, Evaluation of relational algebra operations, Query optimization.	[6]
6.Transaction management and Concurrency control Transaction concept, A simple transaction model, ACID properties, serializability and, concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping model, Recovery systems-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, checkpoint, Shadow paging.	[6]

Textbooks:-

1. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 6thedition, McGraw- Hill.
2. "Database Systems - A Practical Approach to Design, Implementation and Management", Thomas Connolly, Carolyn Begg, 4th Edition, Addison Wesley.
3. "MySQL Cookbook", Paul DuBois, 3rd edition, O'REILLY.

Reference Books:-

1. "Fundamentals of Database Systems", Ramez, Elmasri, Shamkant B. Navathe, 6thEdition, Addison Wesley.
2. "Database Systems – Design, Implementation and Management", Rob & Coronel, 5thEdition, Thomson Course Technology.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2402	PCC	Operating System	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic concept of operating system.
CO2	Illustrate the flow of process with its states and different process scheduling policies.
CO3	Solve process synchronization problem in IPC.
CO4	Make use of the concept of deadlocks.
CO5	Distinguish various memory management techniques.
CO6	Examine the Disk and File structure.

Course Contents:

Unit 1:- Introduction Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating system.	[4]
Unit 2:Process Management Process: Definition, Process Relationship, Process states, Process State transitions, Process Control Block, Context switching – Threads – Concept of multithreads, Benefits of threads. Process Scheduling: Definition , Scheduling objectives ,Types of schedulers, Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) Scheduling algorithms : Preemptive and Non-	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

preemptive , FCFS , SJF, RR, Priority Algorithm.	
Unit 3: Deadlocks Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance: banker's algorithm, Deadlock detection and Recovery.	[4]
Unit 4:Interprocess Communication Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, ,IPC Modeling -Message Passing and Shared Memory region, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem.	[4]
Unit 5:Memory Management Basic Memory Management: Definition, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction, Paging and Segmentation. Virtual Memory: Basics of Virtual Memory, Page fault, Dirty page/Dirty bit – Demand paging (Concepts only) – Page Replacement policies: Optimal (OPT), First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).	[4]
Unit 6: Storage Management Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Management, RAID Level. File System: file Concept, File Operation, File Attribute, File Type, File Structure, Access Methods, and Directory.	[4]
Textbooks:- 1. Operating System –Concepts VIIIth Edition Silberschatz Galvin John Wiley and Sons 2. Operating System -William Stallings Pearson 3. Operating Systems – concepts and design –Milan Milenkovic (TMGH)	
Reference Books:- 1. Operating System -Achyut S. Godbole Tata McGraw Hill 03 2. Modern Operating systems Andrew tanenbaum-3rd edition PHI	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2403	PCC	: Java Programming	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline basic concepts of object oriented programming
CO2	Illustrate the concept of packages, classes and objects.
CO3	Elaborate the concept of strings, arrays and vectors
CO4	Implement the concept of inheritance and interfaces.
CO5	Implement the notion of exception handling and multithreading.
CO6	Develop Collection framework and GUI based application

Course Contents:

Unit 1: Fundamental Programming in Java Java features and java programming environment define class; create object and accessing members, java tokens, data types, constants. Variables dynamic initialization array string type casting etc. Operators, expression Operator precedence, evaluation of expression, mathematical functions. Decision making and looping – If, If-Else, nested If-Else. Switch case Conditional operator, While loop, do-while loop, for loop, Continue, return keywords, nesting loops.	[6]
Unit 2: Constructor and String Programming in Java Constructors and Methods, Types of constructors, Nesting of Methods, This keyword, command line argument. Garbage collection, finalize () method, object Class .Visibility control –private, public and protected. Friendly private protected access, default, Examples of visibility control, Arrays and Strings – types of arrays, String	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

classes and string buffers. Vectors, Wrapper classes and enumerated types	
Unit 3: Inheritance and Package level Programming in Java Inheritance and its types, Types of inheritance Operator overloading and operator overriding Dynamic method dispatch. Final variable and method Using super abstract methods and classes, static members Interfaces –define, implement, and access. Nested interfaces and examples Define package types of package naming and creating packages, accessing packages. Import statement, static import, adding class and interface to package.	[6]
Unit 4: Exception Handling Multithreading Programming in Java Errors and Exception, types of errors Try, catch, nested try catch Throws, finally statement, build in exception , creating own exception Examples of exception handling ,Multithreaded programming – Creating threads – using extending thread class and runnable interface, Thread life cycle – wait(),notify(),sleep(),suspend(),stop(). Thread exceptions, thread priority, methods Thread synchronization, thread communication, deadlock	[6]
Unit 5: Input Output Files Programming in Java Introduction and concept of stream, stream classes, Byte stream classes, input stream classes, output stream classes. Examples of file handling using stream classes Character stream classes Using File IO Class: IO exceptions, creation of files, reading and writing files Handling primitive data types Examples of handling primitive data types	[6]
Unit 6: Collection and Applet Programming in Java Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Introduction to applet-Applet, Applet Life Cycle. Example of Applet life cycle, html parameters and embedding Applet Graphics Programming – Classes, Line, Examples of graphic programming using Rectangles, circles, Examples of graphic programming using , arcs, polygons	[6]
Textbooks:- 1. Herbert Schildt, JAVA: The Complete Reference", Ninth Edition, Oracle Press.	
Reference Books:- 1. Ivor Horton, Beginning JAVA, Wiley India. 2. "Java: The Complete Reference" by Herbert Schildt 3. JAVA Programming, Black Book, Dreamtech Press	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2404	VSEC	Data Science & Visualization Laboratory	0-4-0	2 Credits

Teaching Scheme	Examination Scheme
Practical:4 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Demonstrate the ability to perform statistical analysis
CO2	Experiment comprehensive exploratory data analysis,
CO3	Demonstrate the capability to integrate data science and visualization techniques
CO4	Develop interactive data dashboards using tools like Dash

Course Contents:

List of Experiment:

1. To study basics of data science. Load a dataset (e.g., CSV, Excel) and perform basic data exploration (head, tail, info, describe).
2. Handle missing data by applying different strategies (mean/mode/median imputation, dropping rows/columns).
3. Perform data normalization/standardization.
4. Perform data transformation (log transformation, one-hot encoding, etc.).
5. Compute basic statistical measures (mean, median, mode, standard deviation, and variance) for a given dataset.
6. Perform hypothesis testing (t-test, chi-square test) on a sample dataset.
7. Explore correlations between different features using a correlation matrix.
8. Create basic plots (line plot, bar chart, histogram) using Matplotlib/Seaborn.
9. Visualize distributions using box plots, violin plots, and pair plots.
10. Create a heatmap to visualize correlations between variables.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

11. Use Plotly or Bokeh to create interactive visualizations.
12. Perform a complete EDA on a real-world dataset (e.g., Titanic, Iris) using Pandas, Seaborn, and Matplotlib.
13. Perform Statistical Analysis and Matrix Operations Using NumPy.
14. Identify and visualize outliers using box plots and scatter plots.
15. Create a time-series plot and perform time-series decomposition.
16. Use Geopandas/Folium to create geographical visualizations.
17. Create a dashboard using Dash or Streamlit to visualize multiple aspects of a dataset.
18. Choose a real-world dataset and perform end-to-end data analysis, from data cleaning to visualization.
19. Analyze sentiment in text data (e.g., tweets, reviews) and visualize the sentiment distribution.
20. Develop a complete data science project using a dataset of your choice, including data preprocessing, exploratory data analysis, and final visualization. Present your findings in a detailed report or presentation.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • COMPUTER SCIENCE & ENGG. • Dept.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2405	PCC	Database Systems Laboratory	0-2-0	1 Credits

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic database concepts of DBMS, applications, data models, schemas and instances.
CO2	Demonstrate the use of constraints and relational algebra operations for building applications
CO3	Make use of the basics of SQL and construct queries using SQL in database creation and interaction.
CO4	Construct different normalization techniques in databases.
CO5	Illustrate concepts of indexing and hashing
CO6	Choose different strategies for providing security, privacy, control, backup and recovery of data.

Course Contents:

List of Experiment:

1. Study the basic concept of Database System and ER Model
2. Installation of MySQL/Oracle and practice DDL commands
   a. Create table • Alter table • Drop Table
3. Practice DML commands
   a. Insert • Update • Delete
4. Implement Structured Query Language
   a. Creating Database • Creating a Table •Specifying Constraints

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • DEPT. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

5. Implement Aggregate Functions, Sub queries.
6. Perform Set operations, Join Queries,
7. Implement the concept of Normalization.
8. Implement views and index.
9. Study & Implementation of Database Backup & Recovery command by using concurrency control protocols
10. Perform DCL Commands.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2406	**PCC**	**Java Programming Laboratory**	**0-2-0**	**1 Credits**

Teaching Scheme	**Examination Scheme**
Practical:2 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline basic concepts of object oriented programming
CO2	Illustrate the concept of packages, classes and objects.
CO3	Elaborate the concept of strings, arrays and vectors
CO4	Implement the concept of inheritance and interfaces.
CO5	Implement the notion of exception handling and multithreading.
CO6	Develop Collection framework and GUI based application

Course Contents:

List of Experiment:

1. Program on various ways to accept data through keyboard and unsigned right shift operator.
2. Program on branching, looping, labelled break and labelled continue.
3. Program to create class with members and methods, accept and display details for single object.
4. Program on constructor and constructor overloading.
5. Program on method overloading.
6. Program on passing object as argument and returning object.
7. Program on creating user defined package.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

8. Program on 1D array.
9. Program on 2D array.
10. Program on String.
11. Program on String Buffer.
12. Program on Vector.
13. Program on single and multilevel inheritance (Use super keyword).
14. Program on abstract class.
15. Program on interface demonstrating concept of multiple inheritance.
16. Program on dynamic method dispatch using base class and interface reference.
17. Program to demonstrate try, catch, throw, throws and finally.
18. Program to demonstrate user defined exception.
19. Program on multithreading.
20. Program on concept of synchronization.
21. Program on passing parameters to applets.
22. Program to create GUI application without event handling using AWT controls.
23. Program to create GUI application with event handling using AWT controls.
24 Create a simple program to demonstrate the use of different collection interfaces (List, Set, Queue, and Map).

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDA2	MDM	Mobile Application for Agriculture	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Agriculture Informatics

Course Outcomes: At the end of the course, students will be able to:

CO1	Illustrate basic principles of mobile application development.
CO2	Develop user interfaces by using layouts and controls.
CO3	Make use of user interface components for android application development.
CO4	Construct android application with database.
CO5	Outline various mobile applications for development.
CO6	Design, develop, and deploy mobile applications tailored to agricultural needs.

Course Contents:

1.Android & its Tools Introduction of Android, Need of Android, Features of Android, Tools and software requires for developing an android applications, Operating system, Android SDK, Java SDK, Android development tools, android virtual devices, Steps to install and configure Android studio and SDK.	[6]
2.Components and Layouts Control flow, directory structure, components of screen, fundamental UI design, linear layout, absolute layout, frame layout, table layout, relative layout, text view, button, image button, toggle button, radio button, radio group, check box, and progress bar.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • DEPT. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3.Designing Interface with View List view, grid view, Image view, scroll view, custom toast alert, Time & date picker, Intent, intent filter, Android system architecture, Multimedia framework, Play audio and video, Text to speech, sensors, Audio capture, Camera, Bluetooth.	[6]
4.Multimedia with Database Animation, SQLite database, Necessity of SQLite, Creation and connection of the database, Extraction of values from cursor, transactions, SMS telephony, Location based services- displaying maps, getting location.	[6]
5.Security and Application Deployment Android security model, Declaring and using permissions, Creating small application, Signing of application, Deploying app on google play store, Become a publisher, Developer console.	[6]
6. Mobile App Development for Agriculture Data collection in agriculture, Managing and analyzing agricultural data on mobile devices, Principles of user interface (UI) design, Usability considerations for rural and low-tech environments, Designing for multilingual and low-literacy users, databases and local storage in mobile apps.	[6]
Textbooks:- 1. "Android Programming: The Big Nerd Ranch Guide" by Bill Phillips and Chris Stewart. 2. "Head First Android Development" by Dawn Griffiths and David Griffiths.	
Reference Books:- 1. "Professional Android" by Reto Meier. 2. "Android Cookbook" by Ian F. Darwin.	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDB2	MDM	Leadership and Team Effectiveness	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Entrepreneurship

Course Outcomes: At the end of the course, students will be able to:

CO1	Summarize leadership theories and their application in different context.
CO2	Develop skills for building, and maintaining effective teams.
CO3	Outline various insights into leadership challenges and opportunities in the IT sector.
CO4	Identify technological enhancement in leadership and decision making.
CO5	Develop technology for efficient team collaboration and productivity.
CO6	Demonstrate leadership and team work concepts to real world scenarios.

Course Contents:

Unit 1: Foundations of Leadership Introduction to Leadership - Defining leadership, Leadership styles (autocratic, democratic, laissez-faire), Leadership theories (Great Man, Trait, Behavioral, Situational), Leadership Ethics- Ethical dilemmas in leadership, Ethical decision-making frameworks, Corporate social responsibility, Leadership Skills- Communication and interpersonal skills, Problem-solving and decision-making, Time management and prioritization, Leadership Development - Self-awareness and reflection, Emotional intelligence, Building relationships and networks.	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 2: Team Dynamics and Collaboration Team Formation and Development- Stages of team development (forming, storming, norming, performing, adjourning), Team roles and responsibilities, Team building activities, Effective Communication - Verbal and nonverbal communication, Active listening, Feedback techniques, Conflict resolution styles, Collaboration and Teamwork - Building trust and cooperation, Collaborative problem-solving, Team decision-making processes, Virtual teamwork.	[6]
Unit 3: Leadership in the IT Industry Leadership Challenges in IT - Rapid technological change, Global teams, Ethical considerations in IT, Agile Leadership - Agile values and principles, Leadership roles in agile teams (Scrum Master, Product Owner), Servant leadership, Leadership and Innovation - Fostering a culture of innovation, Leadership for digital transformation, Innovation techniques (brainstorming, design thinking).	[6]
Unit 4: Leading with Technology Technology and Leadership Development - Online learning platforms, Leadership simulations, Data-driven decision making, Leadership in Virtual Teams - Challenges of virtual teams, Building trust and relationships remotely, Effective communication in virtual environments.	[6]
Unit 5: Team Effectiveness and Tools High-Performing Teams - Characteristics of high-performing teams, Building trust and collaboration, Team norms and values, Team Collaboration Tools - Overview of collaboration tools (Git, Jira, Slack, etc.), Effective use of collaboration tools, Version control basics, Diversity and Inclusion - Importance of diversity in teams, Overcoming biases, Creating an inclusive environment.	[6]
Unit 6: Practical Application and Case Studies Case Studies - Analysis of leadership and team success/failure, Identifying leadership lessons, Team Projects - Collaborative project to apply learned concepts, Project management and teamwork.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Textbooks:-

1. "Team Building: Proven Strategies for Improving Team Performance" by William G. Dyer, W. Gibb Dyer Jr., and Jeffrey H. Dyer.
2. "The Five Dysfunctions of a Team: A Leadership Fable" by Patrick Lencioni.
3. Crucial Conversations: Tools for Talking When Stakes Are High" by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler.
4. "The Wisdom of Teams: Creating the High-Performance Organization" by Jon R. Katzenbach and Douglas K. Smith.

Reference Books:-

1. "Emotional Intelligence 2.0" by Travis Bradberry and Jean Greaves.
2. "Communication in Small Groups: Theory, Process, and Skills" by John F. Cragan, David W. Wright, and Chris R. Kasch.
3. "Group Dynamics for Teams" by Daniel Levi.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDC2	MDM	Health Data Analysis and Machine Learning	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Medical Imaging and Image Processing

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline fundamentals of health data and its sources.
CO2	Illustrate application of machine learning techniques in the healthcare domain.
CO3	Develop skills in building unsupervised learning models for health-related outcomes.
CO4	Develop time series models for health-related problems.
CO5	Illustrate application of deep learning techniques in the healthcare domain.
CO6	Summarize ethical considerations and challenges in health data analysis with case studies.

Course Contents:

1.Introduction to Health Data Overview of health data types: Electronic Health Records (EHRs), genomic data, imaging data, Sources of health data: hospitals, research databases, public health data, Introduction to the importance of health data in machine learning, Handling missing data in health dataset, Dealing with imbalanced datasets. Data normalization and standardization, Feature engineering specific to health data.	[6]
2. Supervised Learning for Health Data Visualizing health data, Identifying patterns and anomalies, Understanding correlation and causation in health datasets, Application of classification algorithms (Logistic Regression, Decision Trees, and Random Forests), Introduction to regression models for predicting health outcomes, Evaluation metrics: accuracy, precision, recall, F1-score, ROC curves.	[6]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3. Unsupervised Learning for Health Data Clustering techniques: K-means, hierarchical clustering, DBSCAN, Dimensionality reduction techniques: PCA, Application in patient segmentation and disease classification.	[6]
4. Time Series Analysis in Healthcare Basics of time series data, Application in monitoring patient vitals and disease progression, Introduction to forecasting methods (ARIMA, Prophet).	[6]
5. Deep Learning in Healthcare Overview of neural networks, Application of Convolutional Neural Networks (CNNs) in medical imaging, Introduction to Recurrent Neural Networks (RNNs) for health data, Sentiment analysis in patient feedback.	[6]
6.Case Studies and Applications Privacy and confidentiality of health data, Bias and fairness in machine learning models, Legal and ethical implications of predictive analytics in healthcare, Predictive analytics in chronic disease management, AI in diagnostic systems,Personalized medicine and genomics.	[6]
Textbooks:- 1. "Health Data Science" by Ewen Harrison, Riinu Pius, and others. 2. "Machine Learning for Health Informatics" edited by Andreas Holzinger.	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23MILE01	**AEC**	**Marathi**	**2-0-0**	**2 Credits**

Teaching Scheme	**Examination Scheme**
Lecture:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop the knowledge of local language/mother tongue and relate the same to daily life and social media.
CO2	Make use of rhetoric and verb to form sentences in Marathi Language
CO3	Identity Infinitive compounds in the given Marathi sentence.
CO4	Make use of Phrases and proverbs and form a sentence and Solve Prose Assessment/Summary Writing
CO5	Model a letter to appropriate end user in Marathi Language
CO6	Identity writing type of Marathi stanza and write appropriate writing.

Course Contents:

अध्याय 01: भाषा परीचय भाषा आणि व्यक्तिमत्व सहसंबंध, भाषा, जीवनव्यवहार आणि नवमाध्यमे व समाजमाध्यमे, चिन्ह व्यवस्था-विरामचिन्हे, संवाद कौशल्य (तोंडी परीक्षा), सर्वनाम-पुरुषात्मक, दर्शक, संबंधी, प्रश्नार्थक, सामान्य व आत्मवाचक सर्वनाम, विशेषण-गुण विशेषण, संख्या विशेषण, सार्वनामीक विशेषण	[4]
अध्याय 02: मराठी व्याकरण नाम, सर्वनाम, विशेषणे, क्रियापद, क्रियाविशेषण अव्यय, शब्दयोगी अव्यय, उभयान्वयी अव्यय, केवलप्रयोगी अव्यय, विभक्ती व त्याचे प्रकार, काळ व प्रकार	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

अध्याय 03: अलंकार व क्रियापदे **अलंकार**-शब्दलांकर- अनुप्रास, यमक, श्लेष उदाहरणे, अर्थालंकार-उपमा, उत्प्रेक्षा, व्यक्तिरेक, अपदुनती, रूपक, व्यक्तिरेक, अननव्य, अतिशयोक्ती उदाहरणे **प्रयोग**-कर्तरी, कर्मणी, भावे **वाक्यप्रकार**-केवल वाक्य, मिश्रवाक्य, संयुक्तवाक्य **समास**-अव्ययीभाव, तत्पुरुष, द्वंद्व, बहूवृही **क्रियापदे**- कर्ता व कर्म, क्रियापदाचे प्रकार- अकर्मक, सकर्मक, उभयविध, संयुक्त, क्रियाविशेषण- कालवाचक, स्थळवाचक, रितीवाचक, संख्यावाचक, प्रश्नार्थक, निषेधार्थक	[4]
अध्याय 04: वाक्प्रचार व म्हणी व गद्य आकलन/सारांश लेखन अर्थ सांगून वाक्यात उपयोग करणे (कमीत कमी ३० वाक्य प्रचार व म्हणी), गद्य आकलन - अपठित गद्य उतारा व त्यावरील प्रश्न उत्तरे (कमीत कमी ०५ उतारे व त्यावरील प्रश्न उत्तरे), सारांश आकलन	[5]
अध्याय 05: लेखन प्रकार पत्रलेखन व त्याचे प्रकार-निमंत्रण, आभार, अभिनंदन, मागणी, कोटुंबिक, विनंती, तक्रार संधी-स्वरसंधी, व्यंजनसंधी, विसर्गसंधी, वृत्त लेखन, जाहिरात लेखन, कथा लेखन, अहवाल लेखन, आवेदन पत्र, अभिप्रायलेखन	[5]
अध्याय 05: कल्पनाविस्तार व मुलखात कल्पना विस्तार, मुलाखत कौशल्ये, मुलाखतीचे वैशिष्ट्ये, मुलाखतीचे स्वरूप, मुलाखत घेताना घ्यावयाची काळजी, मुलाखत देताना आवश्यक बाबी उदा.आत्मविश्वास, व्यक्तिमत्व विकास, भाषा कौशल्ये इ.	[4]

Text Books:

1. व्यावहारिक मराठी, डॉ.ल.रा.नसिराबादकर, फडके प्रकाशन, कोल्हापूर.
2. व्यावहारिक मराठी, डॉ.लीला गोविलकर, डॉ.जयश्री पाटणकर, स्नेहवर्धन प्रकाशन, पुणे
3. सुगम मराठी व्याकरण लेखन, मो.रा. वाळंबे, नितीन प्रकाशन पुणे

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Reference Books:

1. अनिवार्य मराठी व्याकरण, लेखन व आकलन, डॉ. प्रल्हाद लुलेकर, केदार काळवणे, Pearson पब्लिकेशन्स
2. मराठी व इंग्रजी अत्यावश्यक निबंध, प्रा.विजयकुमार वेधपाठक, K'Sagar पब्लिकेशन
3. उपयोजित लेखन, मराठी, प्राची शेंडे, सावली म्हात्रे, टार्गेट पब्लिकेशन्स

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23MILE02	**AEC**	**Hindi**	**2-0-0**	**2 Credits**

Teaching Scheme	Examination Scheme
Lecture:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop the awareness of Hindi language and relate the same to daily life and social media.
CO2	Identity Infinitive compounds in the given Marathi sentence.
CO3	Make use of Phrases and proverbs and form a sentence in Hindi language.
CO4	Identity the mistakes in grammar of Hindi language and corrections in it
CO5	Make use of rhetoric to form sentences in Hindi Language
CO6	Illustrate the prose and verse in the given literature

Course Contents:

अध्याय 01: हिंदी भाषा परीचय हिन्दी भाषा और उसका विकास, हिन्दी साहित्य का इतिहास, भाषा के विभिन्न मौखिक भाषा, लिखित भाषा, रूप-वर्णमाला, विराम चिन्ह, शब्द रचना, अर्थ, वाक्य रचना, वर्णो का उच्चारण और वर्गीकरण	[5]
अध्याय 02: समास समास, क्रियाएँ, अनेकार्थी शब्द, विलोम शब्द, पर्यायवाची शब्द,	[5]
अध्याय 03: मुहावरे एवं लोकोक्ति मुहावरे एवं लोकोक्ति, तत्सम एवं तद्भव, देशज, विदेशी, वर्तनी, अर्थबोध	[4]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

अध्याय 04: हिन्दी भाषा में प्रयोग होने वाली अशुद्धियाँ हिन्दी भाषा में प्रयोग होने वाली अशुद्धियाँ, अनेक शब्दों के लिए एक शब्द, रस	[5]
अध्याय 05: अलंकार अलंकार, छन्द, विशेषण और विशेष्य, भाषा-विज्ञान	[4]
अध्याय 06: भाषा-विज्ञान भाषा-विज्ञान, हिन्दी पद्य/गद्य रचना व रचनाकार, संज्ञा से अवयव तक, रिक्त स्थानों की पूर्ति, क्रमबद्धता.	[4]
Text Books: 1. हिंदी व्याकरण- पं कमताप्रसद गुरु, प्रकाशन संस्था, नई दिल्ली 2. हिंदी साहित्यिक का विद्ग्नानिक इतिहास-डॉ गणपतिचंद्र गुप्त, लोकभारती प्रकाशन, नई दिल्ली.	
Reference Books: 1. हिंदी भाषा शिक्षण - संपा हिंदी अध्ययन मंडल, सावित्रीबाई फुले पुणे विश्विद्यालय पुणे, राजकमल प्रकाशन	

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23HSSM03	VEC	Aptitude Skills- II	1-0-0	1 Credit

Teaching Scheme	Examination Scheme
Lecture:1 hr/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Basic Mathematics

Course Outcomes: At the end of the course, students will be able to:

CO1	Apply sentence formation rules to spot the error
CO2	Solve the questions based on the types of tenses
CO3	Solve the questions based on Direct/Indirect Speech and Passive/active voice and Substitution and Elimination
CO4	Make use of Proverbs, Idioms and phrases in sentence construction and the vocabulary

Course Contents:

Unit 1: Structure and Types of Sentences, Conditional Sentences	[3]
Unit 2: Present tense, Past tense, Future tense, Use of Tenses in Sentence forming	[3]
Unit 3: Direct and Indirect Speech, Active and Passive Voice, Use of Modal verbs in Sentence Forming, Substitution and Elimination	[3]
Unit 4: Use of Proverbs, Idioms and Phrases in Sentence Construction, Judgment and Inference Sentence, Vocabulary Building in Various Situations	[3]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Text Books : 1. Raymond Murphy, Essential English Grammar with Answers, Murphy. 2. Objective General English by R.S. Aggarwal, S Chand Publishing; Revised edition (15 March 2017)
Reference Books: 1. Rao and D,V,Prasada, Wren & Martin High School English Grammar and Composition 2. Murphy, Intermediate English Grammar with Answers, Cambridge University Press;Second edition

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23HSSM04	HSMC	Language Skill- II	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Language Skill I

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop programs using Functions.
CO2	Make use of Structures & Union to develop programs in C language
CO3	Make use of Pointers to develop programs in C language
CO4	Develop programs to perform various operations on files using File Handling.

Course Contents:

Experiment No.	Name of Experiment	
1	Develop programs on using different built-in functions.	[2]
2	Develop programs on using function without argument and without return category.	[2]
3.	Develop programs on using function with argument and without return category.	[2]
4	Develop programs on using function without argument and with return category.	[2]
5	Develop programs on using function with argument and with return category.	[2]
6	Develop programs using more than one used defined functions.	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

7	Develop programs on recursion.	[2]
8	Develop programs on Structure using various entities and size of structure.	[2]
9	Develop programs on array of structure.	[2]
10	Develop programs on structures and functions and compare structure and union.	[2]
11	Develop programs to display different data type of data and their addresses using pointer	[2]
12	Develop programs on pointer to array, pointer to structure, pointer to functions and pointer expressions.	[2]
13	Develop program to read, write and append data from a file.	[2]

Text Books :

1. C Programming Absolute Beginner's Guide, Que Publishing; 3rd edition (22 August 2013)
2. C Programming Language 2nd Edition, Peasrson Publication

Reference Books:

1. Programming in C Practical Approach by Ajay Mittal, Pearson
2. Let Us C, By Yashwat Kanetkar

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CS2407	CEP	Mini Project III	0-0-2	01 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	Continuous Assessment-I: - 25 Marks Continuous Assessment-II: -25 Marks

Pre-Requisites: Mini Project, Mini Project II

About Hackathon

The project is a part of addressing societal and industrial needs. Hackathon is one of the platforms where students will solve real world challenges. This Course focuses on the selection of methods/engineering tools/analytical techniques for problem solving.

Through this course, students will gain the understanding of engineering basics and ideas, gain practical experience, have the opportunity to display their skills and learn about teamwork, financial management, communication skills and responsibility

Course Outcomes: At the end of the course, students will be able to:

CO1	Select the appropriate method for solving the problem
CO2	Make use of various engineering techniques and tools to give a solution
CO3	Justify the methods /tools used to develop the solution
CO4	Design / simulate the model/ project work
CO5	Describe the solution with help of a project report and presentation
CO6	Conclude the outcomes of project.

Course Contents:

Week 1: Survey Design-1 • Ensure case study group students have made necessary communication and done a preparatory visit. • Watch the lecture on survey design and study the notes. • Prepare a questionnaire and try it out with your group members as mock.	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Week 2: Survey Design-2 • Review survey questionnaire prepared by case study groups. • Decide sampling strategy. • Prepare a detailed schedule for fieldwork	[2]
Week 3: Fieldwork • Data Collection: Collect quantitative data (e.g., statistics, usage metrics) and qualitative data (e.g., user stories, testimonials). • Use data collection tools like questionnaires, observation checklists, and digital analytics. • Ensure data accuracy and reliability through proper sampling and recording methods.	[2]
Week 4: Trails and Experimentation-1 • Initial Setup and Configuration • Concept Validation • Feasibility Testing	[2]
Week 5: Trails and Experimentation-2 • Prototyping • Functionality Testing	[2]
Week 6: Trails and Experimentation-3 • Bug Identification and Fixing • Integration Testing • Security Testing • 75% Presentation has to be conducted by mentor/guide based on above activity.	[2]
Week 7 : Results • Coordinator has to check and verify below points in term of result: • Functional Performance • Accuracy and Precision • Efficiency • Safety	[2]
Week 8: Validation • Coordinator has to check and verify below points in term of validation: • Testing and Verification	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

• Compliance with Standards	
Week 9: Integration Testing • Validate that the hardware integrates seamlessly with other systems or components as intended • Perform compatibility tests with software, other hardware, and network systems.	[2]
Week 10: Documentation and Reporting • Maintain comprehensive documentation of design, development, testing, and validation processes • Provide detailed reports on test results, issues found, and corrective actions taken.	[2]
Week 11: Final Presentation • 100% Presentation has to be conducted by mentor/guide based on above activity. • Prototype/Final Software solution is mandatory at the time of final presentation along with report	[2]
Week 12: Exhibition • Mini project exhibition will be schedule with interdepartmental evaluation.	[2]

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

Department: Computer Science Engineering **Rev:** Course Structure/01/NEP/2023-24

Class: S.Y. B.Tech. **Semester:** IV

Sr No	Course Code	Course Type	Course	Teaching Scheme				Evaluation Scheme					Credi
				L	T	P	Total Hrs.	CA1	CA2	MSE	ESE	Total	
1	23CS2401	PCC	Database Systems	3	-	-	3	10	10	30	50	100	3
2	23CS2402	PCC	Operating System	2	-	-	2	10	10	30	50	100	2
3	23CS2403	PCC	Java Programming	3	-	-	3	10	10	30	50	100	3
4	23CS2404	VSEC	Data Science and Visualization Laboratory	-	-	4	4	15	15	-	20	50	2
5	23CS2405	PCC	Database System Laboratory	-	-	2	2	15	15	-	20	50	1
6	23CS2406	PCC	Java Programming Laboratory	-	-	2	2	15	15	-	20	50	1
7	23CSMDXX	MDM	Multidisciplinary Minor	3	-	-	3	10	10	30	50	100	3
8	23OECS22	OE	Open Elective II	3	-	-	3	10	10	30	50	100	3
9	23MILEXX	AEC	Modern Indian Language	2	-	-	2	25	25	-	-	50	2
10	23HMSS03	VEC	Aptitude Skills-II	1	-	-	1	25	25	-	-	50	1
11	23HMSS04	VEC	Language Skills-II	-	-	2	2	25	25	-	-	50	1
12	23CS2407	CEP	Mini Project – III	-	-	2	2	25	25	-	-	50	1
Total				17	-	12	29	195	195	150	310	850	23

***Open Elective II**: Operating System

Note- Open Elective course will be offered to students of other programs and will not be offered to students of the same program.

Multidisciplinary Minor-

Basket	Agriculture	Management	Healthcare
Course Code, Name	Mobile Application for Agriculture (23CSMDA2)	Leadership & Team Effectiveness (23CSMDB2)	Health Data Analysis & Machine Learning (23CSMDC2)

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER ENGINEERING

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur.

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2401	PCC	Database Systems	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic database concepts of DBMS, applications, data models, schemas and instances.
CO2	Demonstrate the use of constraints and relational algebra operations for building applications
CO3	Make use of the basics of SQL and construct queries using SQL in database creation and interaction.
CO4	Construct different normalization techniques in databases.
CO5	Illustrate concepts of indexing and hashing
CO6	Choose different strategies for providing security, privacy, control, backup and recovery of data.

Course Contents:

1.Introduction Concept & Overview of DBMS, Database Languages, Database Users, Database Administrator, Three Schema architecture of DBMS ,Data Abstraction levels, database architecture, Data Models, The Entity-Relationship Model-Constraints, keys, E-R Diagrams. Weak Entity Sets, Extended E-R features.	[6]
2.Relational Model Structure of relational Databases, Database Schemas, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Calculus vs Algebra.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3.Introduction to SQL Introduction to SQL, Data types in SQL, Basic Structure of SQL Queries, Components of SQL, SQL Operators – Arithmetic operators, Comparison Operators, Logical Operators, Set Operators, pattern Matching operator like, Range searching operator between, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database, Join Expressions, Views, Integrity Constraints.	[6]
4.Relational Database Design The purposes of Normalization, Data Redundancies and Update Anomalies, Functional Dependencies- types of functional dependency, The Process of Normalization, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Fourth Normal Form, Fifth Normal Form.	[6]
5.File Organization Indexing and Hashing Overview of File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer. Basic Concepts of Indexing and Hashing, Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Multiple-Key Access, Static Hashing, Query Processing-Overview, and Measures of Query cost, Evaluation of relational algebra operations, Query optimization.	[6]
6.Transaction management and Concurrency control Transaction concept, A simple transaction model, ACID properties, serializability and, concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping model, Recovery systems-Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, checkpoint, Shadow paging.	[6]

Textbooks:-

1. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudarshan, 6thedition, McGraw- Hill.
2. "Database Systems - A Practical Approach to Design, Implementation and Management", Thomas Connolly, Carolyn Begg, 4th Edition,Addison Wesley.
3. "MySQL Cookbook", PaulDuBois, 3rd edition, O'REILLY.

Reference Books:-

1. "Fundamentals of Database Systems", Ramez, Elmasri, Shamkant B. Navathe, 6thEdition, AddisonWesley.
2. "Database Systems – Design, Implementation and Management", Rob & Coronel, 5thEdition, ThomsonCourse Technology.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2402	PCC	Operating System	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture:2 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic concept of operating system.
CO2	Illustrate the flow of process with its states and IPC Models
CO3	Apply Scheduling algorithms to calculate turnaround time and average waiting time .
CO4	Make use of the concept of deadlocks.
CO5	Distinguish various memory management techniques.
CO6	Examine the Disk and File structure.

Course Contents:

Unit 1:- Introduction to Operating System Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating system.	[4]
Unit 2:Process Management Process: Definition, Process Relationship, Process states, Process Control Block, Context switching, Inter-process Communication-Introduction, Shared memory system and message passing system, Dinning Philosopher Problem , Threads – Concept of multithreads, Benefits of threads.	[4]
Unit 3:CPU Scheduling and Algorithm Process Scheduling: Definition , Scheduling objectives ,Types of schedulers,	

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) Scheduling algorithms : Preemptive and Non-preemptive , FCFS , SJF, RR, Priority Algorithm.	
Unit 4: Deadlocks Definition, Deadlock characteristics, Deadlock Prevention, Deadlock Avoidance: banker's algorithm, Deadlock detection and Recovery.	[4]
Unit 6:Memory Management Basic Memory Management: Partitioning-Fixed and variable partition, Memory allocation: Contiguous Memory allocation, Internal and External fragmentation and Compaction, Paging and Segmentation. Virtual Memory: Basics of Virtual Memory, Page fault, Demand paging, Page Replacement policies: Optimal Page Replacement (OPT), First in First Out (FIFO), Least Recently Used(LRU)	[4]
Unit 6: Storage Management Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Management, RAID Level. File System: file Concept, File Operation, File Attribute, File Type, File Structure, Access Methods, and Directory.	[4]

Textbooks:-

1. Operating System –Concepts VIIIth Edition Silberschatz Galvin John Wiley and Sons
2. Operating System -William Stallings Pearson
3. Operating Systems – concepts and design –Milan Milenkovic (TMGH)

Reference Books:-

1. Operating System -Achyut S. Godbole Tata McGraw Hill 03
2. Modern Operating systems Andrew tanenbaum-3rd edition PHI

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2403	PCC	Java Programming	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline basic concepts of object oriented programming
CO2	Illustrate the concept of packages, classes and objects.
CO3	Elaborate the concept of strings, arrays and vectors
CO4	Implement the concept of inheritance and interfaces.
CO5	Implement the notion of exception handling and multithreading.
CO6	Develop Collection framework and GUI based application

Course Contents:

Unit 1: Fundamental Programming in Java Java features and java programming environment define class; create object and accessing members, java tokens, data types, constants. Variables dynamic initialization array string type casting etc. Operators, expression Operator precedence, evaluation of expression, mathematical functions. Decision making and looping – If, If-Else, nested If-Else. Switch case Conditional operator, While loop, do-while loop, for loop, Continue, return keywords, nesting loops.	[6]
Unit 2: Constructor and String Programming in Java Constructors and Methods, Types of constructors, Nesting of Methods, This keyword, command line argument. Garbage collection, finalize () method, object Class .Visibility control –private, public and protected. Friendly private protected access, default, Examples of visibility control, Arrays and Strings – types of arrays, String	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

classes and string buffers. Vectors, Wrapper classes and enumerated types	
Unit 3: Inheritance and Package level Programming in Java Inheritance and its types, Types of inheritance Operator overloading and operator overriding Dynamic method dispatch. Final variable and method Using super abstract methods and classes, static members Interfaces –define, implement, and access. Nested interfaces and examples Define package types of package naming and creating packages, accessing packages. Import statement, static import, adding class and interface to package.	[6]
Unit 4: Exception Handling Multithreading Programming in Java Errors and Exception, types of errors Try, catch, nested try catch Throws, finally statement, build in exception , creating own exception Examples of exception handling ,Multithreaded programming – Creating threads – using extending thread class and runnable interface, Thread life cycle – wait(),notify(),sleep(),suspend(),stop(). Thread exceptions, thread priority, methods Thread synchronization, thread communication, deadlock	[6]
Unit 5: Input Output Files Programming in Java Introduction and concept of stream, stream classes, Byte stream classes, input stream classes, output stream classes. Examples of file handling using stream classes Character stream classes Using File IO Class: IO exceptions, creation of files, reading and writing files Handling primitive data types Examples of handling primitive data types	[6]
Unit 6: Collection and Applet Programming in Java Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Introduction to applet-Applet, Applet Life Cycle. Example of Applet life cycle, html parameters and embedding Applet Graphics Programming – Classes, Line, Examples of graphic programming using Rectangles, circles, Examples of graphic programming using , arcs, polygons	[6]
Textbooks:- 1. Herbert Schildt, JAVA: The Complete Reference", Ninth Edition, Oracle Press.	
Reference Books:- 1. Ivor Horton, Beginning JAVA, Wiley India. 2. "Java: The Complete Reference" by Herbert Schildt 3. JAVA Programming, Black Book, Dreamtech Press	

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2404	VSEC	Data Science & Visualization Laboratory	0-4-0	2 Credits

Teaching Scheme	Examination Scheme
Practical:4 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Demonstrate the ability to perform statistical analysis
CO2	Experiment comprehensive exploratory data analysis,
CO3	Demonstrate the capability to integrate data science and visualization techniques
CO4	Develop interactive data dashboards using tools like Dash

Course Contents:

List of Experiment:

1. To study basics of data science. Load a dataset (e.g., CSV, Excel) and perform basic data exploration (head, tail, info, describe).
2. Handle missing data by applying different strategies (mean/mode/median imputation, dropping rows/columns).
3. Perform data normalization/standardization.
4. Perform data transformation (log transformation, one-hot encoding, etc.).
5. Compute basic statistical measures (mean, median, mode, standard deviation, and variance) for a given dataset.
6. Perform hypothesis testing (t-test, chi-square test) on a sample dataset.
7. Explore correlations between different features using a correlation matrix.
8. Create basic plots (line plot, bar chart, histogram) using Matplotlib/Seaborn.
9. Visualize distributions using box plots, violin plots, and pair plots.
10. Create a heatmap to visualize correlations between variables.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

11. Use Plotly or Bokeh to create interactive visualizations.
12. Perform a complete EDA on a real-world dataset (e.g., Titanic, Iris) using Pandas, Seaborn, and Matplotlib.
13. Perform Statistical Analysis and Matrix Operations Using NumPy.
14. Identify and visualize outliers using box plots and scatter plots.
15. Create a time-series plot and perform time-series decomposition.
16. Use Geopandas/Folium to create geographical visualizations.
17. Create a dashboard using Dash or Streamlit to visualize multiple aspects of a dataset.
18. Choose a real-world dataset and perform end-to-end data analysis, from data cleaning to visualization.
19. Analyze sentiment in text data (e.g., tweets, reviews) and visualize the sentiment distribution.
20. Develop a complete data science project using a dataset of your choice, including data preprocessing, exploratory data analysis, and final visualization. Present your findings in a detailed report or presentation.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2405	PCC	Database Systems Laboratory	0-2-0	1 Credits

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Explain the basic database concepts of DBMS, applications, data models, schemas andinstances.
CO2	Demonstrate the use of constraints and relational algebra operations for building applications
CO3	Make use of the basics of SQL and construct queries using SQL in database creation andinteraction.
CO4	Construct different normalization techniques in databases.
CO5	Illustrate concepts of indexing and hashing
CO6	Choose different strategies for providing security, privacy, control, backup and recovery of data.

Course Contents:

List of Experiment:

1. Study the basic concept of Database System and ER Model
2. Installation of MySQL/Oracle and practice DDL commands
    a. Create table • Alter table • Drop Table
3. Practice DML commands
    a. Insert • Update • Delete
4. Implement Structured Query Language
    a. Creating Database • Creating a Table •Specifying Constraints

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

5. Implement Aggregate Functions, Sub queries.
6. Perform Set operations, Join Queries,
7. Implement the concept of Normalization.
8. Implement views and index.
9. Study & Implementation of Database Backup & Recovery command by usingconcurrency control protocols
10. Perform DCL Commands.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2406	PCC	Java Programming Laboratory	0-2-0	1 Credits

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I: 15 Marks CA II: 15 Marks End Semester Exam: 20 Marks

Pre-Requisites: Basics of Programming

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline basic concepts of object oriented programming
CO2	Illustrate the concept of packages, classes and objects.
CO3	Elaborate the concept of strings, arrays and vectors
CO4	Implement the concept of inheritance and interfaces.
CO5	Implement the notion of exception handling and multithreading.
CO6	Develop Collection framework and GUI based application

Course Contents:

List of Experiment:

1. Program on various ways to accept data through keyboard and unsigned right shift operator.
2. Program on branching, looping, labelled break and labelled continue.
3. Program to create class with members and methods, accept and display details for single object.
4. Program on constructor and constructor overloading.
5. Program on method overloading.
6. Program on passing object as argument and returning object.
7. Program on creating user defined package.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

8. Program on 1D array.

9. Program on 2D array.

10. Program on String.

11. Program on String Buffer.

12. Program on Vector.

13. Program on single and multilevel inheritance (Use super keyword).

14. Program on abstract class.

15. Program on interface demonstrating concept of multiple inheritance.

16. Program on dynamic method dispatch using base class and interface reference.

17. Program to demonstrate try, catch, throw, throws and finally.

18. Program to demonstrate user defined exception.

19. Program on multithreading.

20. Program on concept of synchronization.

21. Program on passing parameters to applets.

22. Program to create GUI application without event handling using AWT controls.

23. Program to create GUI application with event handling using AWT controls.

24 Create a simple program to demonstrate the use of different collection interfaces (List, Set, Queue, and Map).

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CSMDA2	MDM	Mobile Application for Agriculture	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Agriculture Informatics

Course Outcomes: At the end of the course, students will be able to:

CO1	Illustrate basic principles of mobile application development.
CO2	Develop user interfaces by using layouts and controls.
CO3	Make use of user interface components for android application development.
CO4	Construct android application with database.
CO5	Outline various mobile applications for development.
CO6	Design, develop, and deploy mobile applications tailored to agricultural needs.

Course Contents:

1.Android & its Tools Introduction of Android, Need of Android, Features of Android, Tools and software requires for developing an android applications, Operating system, Android SDK, Java SDK, Android development tools, android virtual devices, Steps to install and configure Android studio and SDK.	[6]
2.Components and Layouts Control flow, directory structure, components of screen, fundamental UI design, linear layout, absolute layout, frame layout, table layout, relative layout, text view, button, image button, toggle button, radio button, radio group, check box, and progress bar.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER ENGINEERING

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3.Designing Interface with View List view, grid view, Image view, scroll view, custom toast alert, Time & date picker, Intent, intent filter, Android system architecture, Multimedia framework, Play audio and video, Text to speech, sensors, Audio capture, Camera, Bluetooth.	[6]
4.Multimedia with Database Animation, SQLite database, Necessity of SQLite, Creation and connection of the database, Extraction of values from cursor, transactions, SMS telephony, Location based services- displaying maps, getting location.	[6]
5.Security and Application Deployment Android security model, Declaring and using permissions, Creating small application, Signing of application, Deploying app on google play store, Become a publisher, Developer console.	[6]
6. Mobile App Development for Agriculture Data collection in agriculture, Managing and analyzing agricultural data on mobile devices, Principles of user interface (UI) design, Usability considerations for rural and low-tech environments, Designing for multilingual and low-literacy users, databases and local storage in mobile apps.	[6]
Textbooks:- 1. "Android Programming: The Big Nerd Ranch Guide" by Bill Phillips and Chris Stewart. 2. "Head First Android Development" by Dawn Griffiths and David Griffiths.	
Reference Books:- 1. "Professional Android" by Reto Meier. 2. "Android Cookbook" by Ian F. Darwin.	

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER ENGINEERING

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CSMDB2	MDM	Leadership and Team Effectiveness	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Entrepreneurship

Course Outcomes: At the end of the course, students will be able to:

CO1	Summarize leadership theories and their application in different context.
CO2	Develop skills for building and maintaining effective teams.
CO3	Outline various insights into leadership challenges and opportunities in the IT sector.
CO4	Identify technological enhancement in leadership and decision making.
CO5	Develop technology for efficient team collaboration and productivity.
CO6	Demonstrate leadership and team work concepts to real world scenarios.

Course Contents:

Unit 1: Foundations of Leadership Introduction to Leadership - Defining leadership, Leadership styles (autocratic, democratic, laissez-faire), Leadership theories (Great Man, Trait, Behavioral, Situational), Leadership Ethics- Ethical dilemmas in leadership, Ethical decision-making frameworks, Corporate social responsibility, Leadership Skills- Communication and interpersonal skills, Problem-solving and decision-making, Time management and prioritization, Leadership Development - Self-awareness and reflection, Emotional intelligence, Building relationships and networks.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Unit 2: Team Dynamics and Collaboration Team Formation and Development- Stages of team development (forming, storming, norming, performing, adjourning), Team roles and responsibilities, Team building activities, Effective Communication - Verbal and nonverbal communication, Active listening, Feedback techniques, Conflict resolution styles, Collaboration and Teamwork - Building trust and cooperation, Collaborative problem-solving, Team decision-making processes, Virtual teamwork.	[6]
Unit 3: Leadership in the IT Industry Leadership Challenges in IT - Rapid technological change, Global teams, Ethical considerations in IT, Agile Leadership - Agile values and principles, Leadership roles in agile teams (Scrum Master, Product Owner), Servant leadership, Leadership and Innovation - Fostering a culture of innovation, Leadership for digital transformation, Innovation techniques (brainstorming, design thinking).	[6]
Unit 4: Leading with Technology Technology and Leadership Development - Online learning platforms, Leadership simulations, Data-driven decision making, Leadership in Virtual Teams - Challenges of virtual teams, Building trust and relationships remotely, Effective communication in virtual environments.	[6]
Unit 5: Team Effectiveness and Tools High-Performing Teams - Characteristics of high-performing teams, Building trust and collaboration, Team norms and values, Team Collaboration Tools - Overview of collaboration tools (Git, Jira, Slack, etc.), Effective use of collaboration tools, Version control basics, Diversity and Inclusion - Importance of diversity in teams, Overcoming biases, Creating an inclusive environment.	[6]
Unit 6: Practical Application and Case Studies Case Studies - Analysis of leadership and team success/failure, Identifying leadership lessons, Team Projects - Collaborative project to apply learned concepts, Project management and teamwork.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Textbooks:-

1. "Team Building: Proven Strategies for Improving Team Performance" by William G. Dyer, W. Gibb Dyer Jr., and Jeffrey H. Dyer.
2. "The Five Dysfunctions of a Team: A Leadership Fable" by Patrick Lencioni.
3. Crucial Conversations: Tools for Talking When Stakes Are High" by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler.
4. "The Wisdom of Teams: Creating the High-Performance Organization" by Jon R. Katzenbach and Douglas K. Smith.

Reference Books:-

1. "Emotional Intelligence 2.0" by Travis Bradberry and Jean Greaves.
2. "Communication in Small Groups: Theory, Process, and Skills" by John F. Cragan, David W. Wright, and Chris R. Kasch.
3. "Group Dynamics for Teams" by Daniel Levi.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE & ENGINEERING

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

23CSMDC2	MDM	Health Data Analysis and Machine Learning	3-0-0	3 Credits

Teaching Scheme	Examination Scheme
Lecture:3 hrs/week	CA I: 10 Marks CA II: 10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Medical Imaging and Image Processing

Course Outcomes: At the end of the course, students will be able to:

CO1	Outline fundamentals of health data and its sources.
CO2	Illustrate application of machine learning techniques in the healthcare domain.
CO3	Develop skills in building unsupervised learning models for health-related outcomes.
CO4	Develop time series models for health-related problems.
CO5	Illustrate application of deep learning techniques in the healthcare domain.
CO6	Summarize ethical considerations and challenges in health data analysis with case studies.

Course Contents:

1.Introduction to Health Data Overview of health data types: Electronic Health Records (EHRs), genomic data, imaging data, Sources of health data: hospitals, research databases, public health data, Introduction to the importance of health data in machine learning, Handling missing data in health dataset, Dealing with imbalanced datasets. Data normalization and standardization, Feature engineering specific to health data.	[6]
2. Supervised Learning for Health Data Visualizing health data, Identifying patterns and anomalies, Understanding correlation and causation in health datasets, Application of classification algorithms (Logistic Regression, Decision Trees, and Random Forests), Introduction to regression models for predicting health outcomes, Evaluation metrics: accuracy, precision, recall, F1-score, ROC curves.	[6]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

3. Unsupervised Learning for Health Data Clustering techniques: K-means, hierarchical clustering, DBSCAN, Dimensionality reduction techniques: PCA, Application in patient segmentation and disease classification.	[6]
4. Time Series Analysis in Healthcare Basics of time series data, Application in monitoring patient vitals and disease progression, Introduction to forecasting methods (ARIMA, Prophet).	[6]
5. Deep Learning in Healthcare Overview of neural networks, Application of Convolutional Neural Networks (CNNs) in medical imaging, Introduction to Recurrent Neural Networks (RNNs) for health data, Sentiment analysis in patient feedback.	[6]
6.Case Studies and Applications Privacy and confidentiality of health data, Bias and fairness in machine learning models, Legal and ethical implications of predictive analytics in healthcare, Predictive analytics in chronic disease management, AI in diagnostic systems,Personalized medicine and genomics.	[6]

Textbooks:-

1. "Health Data Science" by Ewen Harrison, Riinu Pius, and others.
2. "Machine Learning for Health Informatics" edited by Andreas Holzinger.

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23MILE01	AEC	Marathi	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop the knowledge of local language/mother tongue and relate the same to daily life and social media.
CO2	Make use of rhetoric and verb to form sentences in Marathi Language
CO3	Identity Infinitive compounds in the given Marathi sentence.
CO4	Make use of Phrases and proverbs and form a sentence and Solve Prose Assessment/Summary Writing
CO5	Model a letter to appropriate end user in Marathi Language
CO6	Identity writing type of Marathi stanza and write appropriate writing.

Course Contents:

अध्याय 01: भाषा परीचय भाषा आणि व्यक्तिमत्व सहसंबंध, भाषा, जीवनव्यवहार आणि नवमाध्यमे व समाजमाध्यमे, चिन्ह व्यवस्था-विरामचिन्हे, संवाद कौशल्य (तोंडी परीक्षा), सर्वनाम-पुरुषात्मक, दर्शक, संबंधी, प्रश्नार्थक, सामान्य व आत्मवाचक सर्वनाम, विशेषण-गुण विशेषण, संख्या विशेषण, सार्वनामीक विशेषण	[4]
अध्याय 02: मराठी व्याकरण नाम, सर्वनाम, विशेषणे, क्रियापद, क्रियाविशेषण अव्यय, शब्दयोगी अव्यय, उभयान्वयी अव्यय, केवलप्रयोगी अव्यय, विभक्ती व त्याचे प्रकार, काळ व प्रकार	[4]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

अध्याय 03: अलंकार व क्रियापदे **अलंकार-**शब्दलांकर- अनुप्रास, यमक, श्लेष उदाहरणे, अर्थालंकार-उपमा, उत्प्रेक्षा, व्यक्तिरेक, अपदुनती, रूपक, व्यक्तिरेक, अननव्य, अतिशयोक्ती उदाहरणे **प्रयोग**-कर्तरी, कर्मणी, भावे **वाक्यप्रकार**-केवल वाक्य, मिश्रवाक्य, संयुक्तवाक्य **समास**-अव्ययीभाव, तत्पुरुष, द्वंद्व, बहूवृही **क्रियापदे**- कर्ता व कर्म, क्रियापदाचे प्रकार- अकर्मक, सकर्मक, उभयविध, संयुक्त, क्रियाविशेषण- कालवाचक, स्थळवाचक, रितीवाचक, संख्यावाचक, प्रश्नार्थक, निषेधार्थक	[4]
अध्याय 04: वाक्प्रचार व म्हणी व गद्य आकलन/सारांश लेखन अर्थ सांगून वाक्यात उपयोग करणे (कमीत कमी ३० वाक्य प्रचार व म्हणी), गद्य आकलन - अपठित गद्य उतारा व त्यावरील प्रश्न उत्तरे (कमीत कमी ०५ उतारे व त्यावरील प्रश्न उत्तरे), सारांश आकलन	[5]
अध्याय 05: लेखन प्रकार पत्रलेखन व त्याचे प्रकार-निमंत्रण, आभार, अभिनंदन, मागणी, कोटुंबिक, विनंती, तक्रार संधी -स्वरसंधी, व्यंजनसंधी, विसर्गसंधी, वृत्त लेखन, जाहिरात लेखन, कथा लेखन, अहवाल लेखन, आवेदन पत्र, अभिप्रायलेखन	[5]
अध्याय 05: कल्पनाविस्तार व मुलखात कल्पना विस्तार, मुलाखत कौशल्ये, मुलाखतीचे वैशिष्ट्ये, मुलाखतीचे स्वरूप, मुलाखत घेताना घ्यावयाची काळजी, मुलाखत देताना आवश्यक बाबी उदा.आत्मविश्वास, व्यक्तिमत्व विकास, भाषा कौशल्ये इ.	[4]
Text Books: 1. व्यावहारिक मराठी, डॉ.ल.रा.नसिराबादकर, फडके प्रकाशन, कोल्हापूर. 2. व्यावहारिक मराठी, डॉ.लीला गोविलकर, डॉ.जयश्री पाटणकर, स्नेहवर्धन प्रकाशन, पुणे 3. सुगम मराठी व्याकरण लेखन, मो.रा. वाळंबे, नितीन प्रकाशन पुणे	

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Reference Books:

1. अनिवार्य मराठी व्याकरण, लेखन व आकलन, डॉ. प्रल्हाद लुलेकर, केदार काळवणे, Pearson पब्लिकेशन्स
2. मराठी व इंग्रजी अत्यावश्यक निबंध, प्रा.विजयकुमार वेधपाठक, K'Sagar पब्लिकेशन
3. उपयोजित लेखन, मराठी, प्राची शेंडे, सावली म्हात्रे, टार्गेट पब्लिकेशन्स

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE & ENGINEERING

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23MILE02	AEC	Hindi	2-0-0	2 Credits

Teaching Scheme	Examination Scheme
Lecture:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Nil

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop the awareness of Hindi language and relate the same to daily life and social media.
CO2	Identity Infinitive compounds in the given Marathi sentence.
CO3	Make use of Phrases and proverbs and form a sentence in Hindi language.
CO4	Identity the mistakes in grammar of Hindi language and corrections in it
CO5	Make use of rhetoric to form sentences in Hindi Language
CO6	Illustrate the prose and verse in the given literature

Course Contents:

अध्याय 01: हिंदी भाषा परीचय हिन्दी भाषा और उसका विकास, हिन्दी साहित्य का इतिहास, भाषा के विभिन्न मौखिक भाषा, लिखित भाषा, रूप-वर्णमाला, विराम चिन्ह, शब्द रचना, अर्थ, वाक्य रचना, वर्णो का उच्चारण और वर्गीकरण	[5]
अध्याय 02: समास समास, क्रियाएँ, अनेकार्थी शब्द, विलोम शब्द, पर्यायवाची शब्द,	[5]
अध्याय 03: मुहावरे एवं लोकोक्ति मुहावरे एवं लोकोक्ति, तत्सम एवं तद्भव, देशज, विदेशी, वर्तनी, अर्थबोध	[4]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

अध्याय 04: हिन्दी भाषा में प्रयोग होने वाली अशुद्धियाँ हिन्दी भाषा में प्रयोग होने वाली अशुद्धियाँ, अनेक शब्दों के लिए एक शब्द, रस	[5]
अध्याय 05: अलंकार अलंकार, छन्द, विशेषण और विशेष्य, भाषा-विज्ञान	[4]
अध्याय 06: भाषा-विज्ञान भाषा-विज्ञान, हिन्दी पद्य/गद्य रचना व रचनाकार, संज्ञा से अवयव तक, रिक्त स्थानों की पूर्ति, क्रमबद्धता.	[4]
Text Books: 1. हिंदी व्याकरण- पं कमताप्रसद गुरु, प्रकाशन संस्था, नई दिल्ली 2. हिंदी साहित्यिक का विद्ज्ञानिक इतिहास-डॉ गणपतिचंद्र गुप्त, लोकभारती प्रकाशन, नई दिल्ली.	
Reference Books: 1. हिंदी भाषा शिक्षण - संपा हिंदी अध्ययन मंडल, सावित्रीबाई फुले पुणे विश्विद्यालय पुणे, राजकमल प्रकाशन	

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING • Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23HSSM03	VEC	Aptitude Skills- II	1-0-0	1 Credit

Teaching Scheme	Examination Scheme
Lecture:1 hr/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Basic Mathematics

Course Outcomes: At the end of the course, students will be able to:

CO1	Apply sentence formation rules to spot the error
CO2	Solve the questions based on the types of tenses
CO3	Solve the questions based on Direct/Indirect Speech and Passive/active voice and Substitution and Elimination
CO4	Make use of Proverbs, Idioms and phrases in sentence construction and the vocabulary

Course Contents:

Unit 1: Structure and Types of Sentences, Conditional Sentences	**[3]**
Unit 2: Present tense, Past tense, Future tense, Use of Tenses in Sentence forming	**[3]**
Unit 3: Direct and Indirect Speech, Active and Passive Voice, Use of Modal verbs in Sentence Forming, Substitution and Elimination	**[3]**
Unit 4: Use of Proverbs, Idioms and Phrases in Sentence Construction, Judgment and Inference Sentence, Vocabulary Building in Various Situations	**[3]**

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Text Books :

1. Raymond Murphy, Essential English Grammar with Answers, Murphy.
2. Objective General English by R.S. Aggarwal, S Chand Publishing; Revised edition (15 March 2017)

Reference Books:

1. Rao and D,V,Prasada, Wren & Martin High School English Grammar and Composition
2. Murphy, Intermediate English Grammar with Answers, Cambridge University Press;Second edition

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23HSSM04	HSMC	Language Skill- II	0-0-2	1 Credit

Teaching Scheme	Examination Scheme
Practical:2 hrs/week	CA I: 25 Marks CA II: 25 Marks

Pre-Requisites: Language Skill I

Course Outcomes: At the end of the course, students will be able to:

CO1	Develop programs using Functions.
CO2	Make use of Structures & Union to develop programs in C language
CO3	Make use of Pointers to develop programs in C language
CO4	Develop programs to perform various operations on files using File Handling.

Course Contents:

Experiment No.	Name of Experiment	
1	Develop programs on using different built-in functions.	[2]
2	Develop programs on using function without argument and without return category.	[2]
3.	Develop programs on using function with argument and without return category.	[2]
4	Develop programs on using function without argument and with return category.	[2]
5	Develop programs on using function with argument and with return category.	[2]
6	Develop programs using more than one used defined functions.	[2]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

7	Develop programs on recursion.	**[2]**
8	Develop programs on Structure using various entities and size of structure.	**[2]**
9	Develop programs on array of structure.	**[2]**
10	Develop programs on structures and functions and compare structure and union.	**[2]**
11	Develop programs to display different data type of data and their addresses using pointer	**[2]**
12	Develop programs on pointer to array, pointer to structure, pointer to functions and pointer expressions.	**[2]**
13	Develop program to read, write and append data from a file.	**[2]**

Text Books :

1. C Programming Absolute Beginner's Guide, Que Publishing; 3rd edition (22 August 2013)
2. C Programming Language 2nd Edition, Peasrson Publication

Reference Books:

1. Programming in C Practical Approach by Ajay Mittal, Pearson
2. Let Us C, By Yashwat Kanetkar

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCIENCE

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Shri Shamrao Patil (Yadravkar) Educational & Charitable Trust's

Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

NBA Accredited, Accredited by NAAC 'A' Grade, ISO 9001:2015 Certified

23CS2407	CEP	Mini Project III	0-0-2	01 Credit

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	Continuous Assessment-I: - 25 Marks Continuous Assessment-II: -25 Marks

Pre-Requisites: Mini Project, Mini Project II

About Hackathon

The project is a part of addressing societal and industrial needs. Hackathon is one of the platforms where students will solve real world challenges. This Course focuses on the selection of methods/engineering tools/analytical techniques for problem solving.

Through this course, students will gain the understanding of engineering basics and ideas, gain practical experience, have the opportunity to display their skills and learn about teamwork, financial management, communication skills and responsibility

Course Outcomes: At the end of the course, students will be able to:

CO1	Select the appropriate method for solving the problem
CO2	Make use of various engineering techniques and tools to give a solution
CO3	Justify the methods /tools used to develop the solution
CO4	Design / simulate the model/ project work
CO5	Describe the solution with help of a project report and presentation
CO6	Conclude the outcomes of project.

Course Contents:

Week 1: Survey Design-1 • Ensure case study group students have made necessary communication and done a preparatory visit. • Watch the lecture on survey design and study the notes. • Prepare a questionnaire and try it out with your group members as mock.	[2]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

Week 2: Survey Design-2 • Review survey questionnaire prepared by case study groups. • Decide sampling strategy. • Prepare a detailed schedule for fieldwork	[2]
Week 3: Fieldwork • Data Collection: Collect quantitative data (e.g., statistics, usage metrics) and qualitative data (e.g., user stories, testimonials). • Use data collection tools like questionnaires, observation checklists, and digital analytics. • Ensure data accuracy and reliability through proper sampling and recording methods.	[2]
Week 4: Trails and Experimentation-1 • Initial Setup and Configuration • Concept Validation • Feasibility Testing	[2]
Week 5: Trails and Experimentation-2 • Prototyping • Functionality Testing	[2]
Week 6: Trails and Experimentation-3 • Bug Identification and Fixing • Integration Testing • Security Testing • 75% Presentation has to be conducted by mentor/guide based on above activity.	[2]
Week 7 : Results • Coordinator has to check and verify below points in term of result: • Functional Performance • Accuracy and Precision • Efficiency • Safety	[2]
Week 8: Validation • Coordinator has to check and verify below points in term of validation: • Testing and Verification	[2]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur

• Compliance with Standards	
Week 9: Integration Testing • Validate that the hardware integrates seamlessly with other systems or components as intended • Perform compatibility tests with software, other hardware, and network systems.	[2]
Week 10: Documentation and Reporting • Maintain comprehensive documentation of design, development, testing, and validation processes • Provide detailed reports on test results, issues found, and corrective actions taken.	[2]
Week 11: Final Presentation • 100% Presentation has to be conducted by mentor/guide based on above activity. • Prototype/Final Software solution is mandatory at the time of final presentation along with report	[2]
Week 12: Exhibition • Mini project exhibition will be schedule with interdepartmental evaluation.	[2]

SHARAD INSTITUTE OF TECHNOLOGY COLLEGE OF ENGINEERING Dept. of COMPUTER SCI. & ENGG.

Head of the Department
Computer Science & Engineering
SHARAD INSTITUTE OF TECHNOLOGY
COLLEGE OF ENGINEERING
Yadrav (Ichalkaranji) Dist. Kolhapur