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Annasaheb Dange College of Engineering and Technology, Ashta

(An Autonomous Institute)

Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Teaching and Evaluation Scheme

S. Y. B. Tech Semester III

Course Code	Course Name	Teaching Scheme				THEORY							PRACTICAL						GRAND TOTAL
						ISE		MSE+ ESE			Total	Min	ISE	ESE		Total	Min		
		L	T	P	Credits	Max	Min	MSE	ESE	Min				Max	Min				
IICPC201	Discrete Mathematics and Theory of Computation	3	1	-	4	40	16	30	30	24	100	40	-	-	-	-	-	100
IICPC202	Data Structures	3	-	2	4	40	16	30	30	24	100	40	50	50*	20	100	40	200
IICPC203	Database Management System	3	-	2	4	40	16	30	30	24	100	40	50	-	-	50	20	150
IICPC204	Operating System	3	-	2	4	40	16	30	30	24	100	40	50	-	-	50	20	150
IICHS205	Psychology	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	50
IICHS206	Constitution of India	1	-	-	1	25	10	-	-	-	25	10	-	-	-	-	-	25
IICVS207	Java Programming Laboratory	2	-	2	3	-	-	-	-	-	-	-	50	50*	20	100	40	100
IICCC208	Aptitude and Reasoning Part – I	-	-	2	1	-	-	-	-	-	-	-	50	-	-	50	20	50
		17	1	10	23													825
	Total Contact Hours	28																

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Teaching and Evaluation Scheme

S. Y. B. Tech Semester IV

Course Code	Course Name	Teaching Scheme				THEORY							PRACTICAL					GRAND TOTAL
						ISE		MSE+ESE					ISE	ESE				
		L	T	P	Credits	Max	Min	MSE	ESE	Min	Total	Min		Max	Min	Total	Min	
1ICPC209	Fundamentals of Block Chain	3	-	-	3	40	16	30	30	24	100	40	-	-	-	-	-	100
1ICPC210	Information Theory for Cyber Security	3	-	2	4	40	16	30	30	24	100	40	50	50*	20	100	40	200
1ICPC211	Introduction to Internet of Things	3	-	2	4	40	16	30	30	24	100	40	50	-	-	50	20	150
1ICIC212	Minor Course - I	2	-	-	2	40	16	30	30	24	100	40	-	-	-	-	-	100
1ICHS213	Universal Human Values	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	50
1ICVS214	Python Programming Laboratory	2	-	2	3	-	-	-	-	-	-	-	50	50*	20	100	40	100
1ICHS215	Environmental Studies	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	50
1ICEL216	Innovation / Prototype	-	-	2	1	-	-	-	-	-	-	-	50	-	-	50	20	50
1ICCC217	Aptitude and Reasoning Part-II	-	-	2	1	-	-	-	-	-	-	-	50	-	-	50	20	50
		17	0	10	22													850
Total Contact Hours		27																

Minor Course - I

Course Code	Course Name	L	T	P	Credits
1ICIC212	IoT Sensing and Actuator Devices	2	-	-	2

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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	1ICPC201- **Discrete Mathematics and Theory of Computation**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/1/0
Credits:	4
Evaluation Scheme: ISE/MSE/ESE	40/30/30

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC201_1	**Identify** and distinguish between permutations and combinations, demonstrating a basic understanding of their definitions and purposes (K2)
1ICPC201_2	**Apply** relevant formulas and laws to solve problems by using principles of mathematical logic and set theory. (K3)
1ICPC201_3	**Apply** appropriate conversion methods to construct the finite state machines for regular languages and expressions. (K3)
1ICPC201_4	**Analyze** and solve real world problems using Finite Automata.(K4)
1ICPC201_5	**Evaluate** the given context-free grammars and accurately convert them to Chomsky Normal Form (CNF). (K5)
1ICPC201_6	**Develop** Turing Machines for specific languages or functions over a provided alphabet and tape symbols. (K6)

Course Contents:		
Unit No.	**Unit Name**	**Contact Hours**
Unit 1	**Permutations, Combinations and Discrete Probability:** Permutations and Combinations: rule of sum and product, Permutations, Combinations, Discrete Probability, Conditional Probability, Bayes' Theorem	6
Unit 2	**Mathematical logic:** Introduction, statements and notations, connectives – negation,	6

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	Conjunction, disjunction, conditional, bi-conditional, 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.		
Unit 3	**Set theory and Algebraic systems:** Basic concepts of set theory, operations on sets, ordered pairs, Cartesian Product, relation, properties of binary relations, graph theory terminologies, matrix and graph representation of binary relations, partition and covering of set, equivalence relation, composition of relations, POSET and Hasse diagram, Function – definition, types Algebraic Systems, homomorphism, Semigroups and Monoids, properties and examples, Groups: Definition and examples.	8	
Unit 4	**Mathematical Induction, Regular Languages & Finite Automata** Regular expressions and corresponding regular languages, examples and applications, Finite automata-definition and representation, Non-deterministic F.A.NFA with null transitions, Equivalence of FA's , NFA's and NFA's with null transitions.	6	
Unit 5	**Grammars and Languages** Types of Languages, Derivation and ambiguity, Union, Concatenation and *'s of CFLs, Eliminating production & unit productions from CFG, Eliminating useless variables from a context Free Grammar. CNF Notation.	6	
Unit 6	**Push Down Automata and Turing Machines** PDA Definition, Deterministic PDA & types of acceptance, Equivalence of CFG's & PDA's. TM- Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM.	7	

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematical Structures with application to Computer Science (Unit 2,3)	J. P. Tremblay & R. Manohar	Tata MGH International	-	2007

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2	Elements of Discrete Mathematics (Unit 1)	C. L. Liu and D. P. Mohapatra	SiE Edition, TataMcGraw- Hill	4th	2013
3	Introduction to languages & theory of computations (Unit 4,5,6)	John C. Martin	Tata McGraw Hill Edition	3rd	2007
4	Introduction to Automata Theory, Languages and computation	John E. Hopcraft, Rajeev Motwani, Jeffrey D. Ullman	Pearson Edition	3rd	2006

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematics and its Applications	Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)	Tata Mc Graw Hill	7th	2012
2	Discrete Mathematics, Schaum's outlines.	Semyour Lipschutz, MarcLipson	Tata Mc Graw Hill	3rd	2012
3	Introduction to theory of computations	Michael Sipser	Cengage Learning	3rd	2012
4	Theory of Computation- A problem solving Approach	Kavi Mahesh	Wiley India	1st	2005

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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code & Course Title	1ICPC202- **Data Structures**
Prerequisite/s	1ICPC106 - Problem Solving Using C
Teaching Scheme: Lecture/Tutorial/Practical	3/0/2
Credits	4
Evaluation Scheme (Theory) : ISE/MSE/ESE **Evaluation Scheme (Practical)** : ISE/ESE	40/30/30 50/50

Course Outcomes (COs) :	
Upon successful completion of this course, the student will be able to:	
1ICPC202_1	**Identify** the components and operations associated with each data structure (K2)
1ICPC202_2	**Implement** data structures like stacks, queues, trees, and graphs using pointers and dynamic memory allocation (K3)
1ICPC202_3	**Implement** sorting and searching algorithms using relevant data structures (K3)
1ICPC202_4	**Demonstrate** the knowledge of data structure in solving real world problems (K4)
1ICPC202_5	**Evaluate** the implications of graph properties on algorithm design and problem-solving approaches. (K5)
1ICPC202_6	**Design** algorithms using Tree and Graph structure using various string matching algorithms to solve the real-life problems (K6)

Course Contents:		
Unit No	**Unit Name**	**Contact Hours**
Unit 1	**Basics of Data Structures:** Algorithm, ADT, Space and Time Complexity, Direct and Indirect recursion, analysis of recursive functions e.g. Towers of Hanoi	4
Unit 2	**Lists** Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.	8
Unit 3	**Stack and Queue** Stacks as ADT, operations, representation using static and dynamic structures, applications of stack Queue as ADT, operations, representation using static and dynamic structures, circular queue, priority queue, double ended queue.	8

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Unit 4	**Searching and Sorting Techniques** Linear search, binary search, Internal and External Sorts, bubble sort, selection sort, insertion sort, merge sort, quick sort, radix sort, heap sort. Hashing – Definition, hash functions, overflow, collision, Collision resolution techniques, Open addressing, Chaining.	7
Unit 5	**Trees** Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, Heaps- Operations and their applications, Introduction to M-way trees.	7
Unit 6	**Graphs** Basic concept of graph theory, storage representation: adjacency matrix, adjacency list, adjacency multi-lists, graph traversal techniques- BFS and DFS	5

Expt. No.	Experiment List
1	Write a C program to store employee details using the concept of structures
2	Write a C program to construct and implement linked list for inserting and deleting node at first and at the end and at the middle of the linked list and perform the search operation at specified node a. Singly Linked List b. Doubly Linked List c. Circular Singly Linked List d. Circular Doubly Linked List
3	Write a C program to construct and implement a Stack and perform Push and Pop operations a. using Array b. using Linked List
4	Write a C program to construct and implement a Queue and perform Enqueue and Dequeue operations a. using Array b. using Linked List
5	Write a C program to perform infix to postfix conversion using stack.
6	Write a C program to perform linear and binary search for a class of student's mark.
7	Write a C program to implement the Hash table and perform the search operation for a class of student name with roll no.
8	Write a C program to implement and perform for a series of 10 numbers a. insertion sort

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	b. quick sort c. bubble sort d. selection sort e. merge sort
9	Write a C program to construct and implement a Binary Search Tree and perform the traversals operations on the tree
10	Write a program to construct and implement the graph using the Adjacency List and performs the traversal operations on the graph

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzon	Cengage Learning	2nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	Reema Thareja	Oxford	2nd	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall Of India Pvt. Limited	-	2003
2	Understanding Pointers in C	Yashavant Kanetkar	BPB Publication	1st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	Yashavant Kanetkar	BPB Publication	15th	2016

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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	1ICPC203- **Database Management System**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/2
Credits	4
Evaluation Scheme (Theory)　: ISE/MSE/ESE **Evaluation Scheme (Practical)　: ISE**	40/30/30 50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC203_1	**Explain** the fundamental principles of data normalization and its importance in database design. (K2)
1ICPC203_2	**Apply** transaction management techniques to ensure data consistency and integrity. (K3)
1ICPC203_3	**Analyze** the performance of a database system by examining query execution plans and optimizing SQL queries. (K4)
1ICPC203_4	**Critique** and assess the design and implementation of real-world database systems, considering factors like scalability, security, and data redundancy (K5)
1ICPC203_5	**Evaluate** encryption algorithms and key management practices for their suitability in specific database security contexts (K5)
1ICPC203_6	**Design** and implement a multi-table database with complex relationships and constraints. (K6)

Course Contents:		
Unit No.	Unit Name	Contact Hours
Unit 1	**Introduction to databases and ER Model** Introduction: Introduction to database, advantages and applications, Database View - Levels of data abstraction, Data models, Database languages, Database System Architecture, Database users ER Model: Entity concept, Entity set and its types, attributes, Relationship sets, Relationship types, Keys- primary key, super key, foreign key, Features of ER Model -Generalization, Specialization, aggregation	6
Unit 2	**Relational Model and SQL** Relational Model:Relational model concept, Relational Database structure, Conversion of ER model into Relational schemas, Schema-instance distinction, Referential integrity and foreign keys, Relational algebra example queries **SQL:** Introduction to SQL, Data definition statements with constraints, Insert, Update and Delete, Set operations, Group by and having aggregate functions, clauses, Nested Queries, Views, Complex Queries, Joins.	7

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Unit		Hrs
Unit 3	**Functional Dependency and Normalization** Importance of a good schema, Motivation for normalization forms, Atomic domains and 1NF, Dependency- functional dependencies, closure of a set of FD's, Concepts of 2NF, 3NF and BCNF and 4NF, Decomposition algorithms and desirable properties of decomposition, Multivalued dependencies, Join dependencies, Temporal Functional Dependences.	7
Unit 4	**Data Storage & Indexing** Data storage, types of data storage, file organization, organization of records into files, Data Dictionary, Database Buffer **Indexing:** Concept, Ordered Indices-Primary, Secondary, Multilevel, B+ Tree Index, hashing, Hash Indices, Dynamic hashing, Bitmap Indices	5
Unit 5	**Transaction Management & Concurrency Control** **Transaction Processing:** Transaction processing concept, ACID properties, Transaction states, Implementation of atomicity, isolation and durability, Serializability, Serializability testing. **Concurrency Control:** Lock-based protocols, Timestamp - based Protocols, Validation -based Protocols, B+ tree protocols, Deadlock handling.	7
Unit 6	**Recovery System and Database Security** Recovery System :Failure classification, Storage structure, Implementation of stable and Atomicity, Log based recovery, Checkpoints, Shadow paging, crash recovery. **Database Security:**Security issues, Security methods and techniques, Security analysis tools	7

Exp. No.	Experiment List
1.	Drawing an E-R Diagram for any organization.
2.	Converting E-R diagram into Relational Tables.
3.	Installation and Demonstration of DBMS Oracle / MySQL / SQL Server / PostgreSQL etc.
4.	Study and Implementation of Data Definition Language (DDL) Queries (e.g. create, alter and drop tables).
5.	Study and Implementation of Data Manipulation Language (DML) Queries (e.g. insert, delete, update and select statements).
6.	Study and Implementation of Basic SQL SELECT statement for displaying / extracting data from single table or multiple tables.
7.	Study and implementation of SQL constructs for aggregating data, use of group by, having clauses.
8.	Study and implementation of nested sub-queries, complex queries, views and Joins.
9.	Study and Implementation of Triggers.
10.	Study and Implementation of Functions and Stored Procedures.
11.	Implementation of Database connectivity with object oriented language (Java).
12.	Few aspects of authorization such as creating and managing users, roles, granting and revoking of privileges etc.

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13.	Creating Indices for the tables, implementing static hashing.	
14.	Study of Transaction processing and concurrency control techniques.	

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6th	2011
2	Database Systems - Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5th	2008
3	Database Systems- A practical approach to Design, Implementation	Thomos Connolly, Carolyn Begg	Pearson Education	4rd	2009
4	Database Systems- A practical approach to Design, Implementation and Management	Thomos Connolly, Carolyn Begg	Pearson Education.	4th	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database Systems: Design, Implementation and Management	Peter Rot'. Carlos Coronel	Cengage Learning	7th	2014
2	Fundamentals of Database Systems	Ramez Elmasri and Shamkant Navathe	Pearson Education	4th	2007
3	Principles of Database System	J. D. Ullman	Galgotia Publications	1st	2011

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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	1ICPC204- Operating System
Prerequisite/s	1ICPC106 - Problem Solving Using C
Teaching Scheme: Lecture/Tutorial/Practical	3/0/2
Credits	4
Evaluation Scheme (Theory) : ISE/MSE/ESE Evaluation Scheme (Practical) : ISE	40/30/30 50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC204_1	**Explain** the basic concepts of operating system, process scheduling and resource management using scheduling algorithms. (K2)
1ICPC204_2	**Develop** programs related to the process Scheduling, memory allocation techniques for specific problems. (K3)
1ICPC204_3	**Apply** suitable algorithm to handle deadlock situation in Operating system. (K3)
1ICPC204_4	**Analyze** the performance of an OS by evaluating factors like CPU scheduling algorithms, memory management, and I/O system efficiency. (K4)
1ICPC204_5	**Compare and contrast** different scheduling algorithms and apply suitable algorithms to handle deadlock situations in the Operating system.(K5)
1ICPC204_6	**Create** innovative solution to solve critical section problem by using semaphores.(K6)

Course Contents:		
Unit No.	Unit Name	Contact Hours
Unit 1	**Overview** Introduction to Operating Systems, what operating systems do, Computer System organization, Operating System Architecture, Operating System Structure, Operating System operations, Types of Operating Systems, Operating System Services, System calls, Types of system Calls, Kernel, Types of kernel.	6
Unit 2	**Process Management** Process concept: Operations on processes, Inter-process communication, Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms.	7

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Unit		Hrs
Unit 3	**Process Synchronization** Background, the critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of Synchronization.	7
Unit 4	**Deadlock** System model, deadlock characterization, methods for handling deadlocks, deadlock preventions, deadlock avoidance, deadlock detection, deadlock recovery.	6
Unit 5	**Memory Management** Memory Management Strategies: Background, swapping, contiguous memory allocation, paging, structure of the page table, Segmentation, demand paging, page replacement	7
Unit 6	**I/O Systems & System Security** I/O Hardware, Polling, Interrupts, Direct memory access, Kernel I/O Subsystem, I/O Scheduling, Spooling and Device reservation, System Protection: Goals, Principles, Domain of protection. **System security**: Security problem, Program threats.	6

Exp. No.	Experiment List
1	Installation of Multiple Operating System.
2	Study and demonstration of basics of Linux/UNIX commands.
3	Develop a program based on various I/O System calls of UNIX operating System.
4	Develop a program based on CPU Scheduling Algorithms.
5	Develop a program to demonstrate critical section and mutual exclusion.
6	Develop a program to simulate producer-consumer problem using semaphores.
7	Develop a program to simulate deadlock in a system.
8	Develop a program based on Bankers algorithm for Deadlock Avoidance.
9	Develop a program based on Page Replacement Policies.
10	Develop a program to simulate Paging technique of memory management.

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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Operating System Concepts [Unit 2-6]	Silberschatz, Galvin,	John Wiley	8th	2009
2	Operating systems concepts and design [Unit 1]	Dhananjay M Dhamdhere	Tata McGraw Hill	2nd	2006
3	Operating Systems - A Concept Based approach	Dhananjay M Dhamdhere	Tata McGraw Hill	3rd	2007
4	Understanding Operating System	Understanding Operating System	Ann McHoes & Ida M. lynn,(Thomson)	6th	2014

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Operating System A Design Oriented Approach	Charles Crowley	Tata McGraw Hill	1st	2001
2	Operating System with Case Studies in Unix, Netware and Windows NT	Achyut S. Godbole	Tata McGraw Hill	5th	2007
3	Operating Systems: Internals and Design Principles	William Stallings	Pearson Education International	8th	2014
4	The design of Unix Operating System	Maurice J. Bach	(PHI)	1st	2006

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Department of Computer Science & Engineering
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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	**1ICHS205- Psychology**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme: ISE	50

Course Outcomes (COs):

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

1ICHS205_1	**Explain** using psychology theories, the necessity and significance of various parts of psychology.
1ICHS205_2	**Describe** importance of psychology in the organization and human nature that takes place in a group or individually within an organization.
1ICHS205_3	**Apply** emotional intelligence, time management, and stress management techniques in their daily activities.
1ICHS205_4	**Analyze** different case studies that use different leadership styles and approaches.

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	**Psychology** – Introduction and Need of psychology in the organization, What is Organizational Behavior	3
Unit 2	**Emotional Intelligence (EI)** – Definition of EI, components of EI, Activities	4
Unit 3	**Time Management**– Need and importance of Time management for an individual, Effective steps of Time Management, role of procrastination in Time management, Types of Procrastination, Effects of Procrastination, Techniques to stop procrastination, activities	6
Unit 4	**Leadership** – importance of leadership, styles of leadership, The Leader Trait Approach, The Behavior Approach, Path-Goal Theory: How Leaders Motivate Followers, Leader and Mood, Gender and Leadership, Ethical Leadership	6
Unit 5	**Attitude and Job Satisfaction** – Components of Attitude, Relationship between Attitude and Behavior, Job attitude, Causes of Job satisfaction, outcomes of Job satisfaction, Impact of Job dissatisfaction, activities	2
Unit 6	**Stress Management** – meaning of stress, sources and consequences of stress nature of stressors, Stress Management Techniques, activities.	5

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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Organizational Behavior- An Evidence-Based Approach	Fred Luthan	McGraw-Hill/Irwin	12th	2011
2	Essentials of Organizational Behavior	Stephen P. Robbins Timothy A. Judge Katherine E. Breward	Pearson	-	2018
3	Essentials of organizational Behavior	Stephen P. Robbins	Prentice Hall	7th	2002
4	Understanding and Managing Organizational Behavior	Jennifer M. George Gareth R. Jones	Pearson	6th	2012
5	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3rd	2006

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3rd	2006
2	Positive Psychology Applications in Work, Health and Well-being	Updesh Kumar Archana Vijay Parkash	Pearson India Education	-	2016

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Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	**1ICHS206 - Constitution of India**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial /Practical	1 /0/0
Credits	1
Evaluation Scheme: ISE	25

Course Outcomes (COs): After successful completion of this course, the student will be able to:	
1ICHS206_1	**Explain** the meaning, important acts and history related to Indian constitution.
1ICHS206_2	**Illustrate** the features of Indian constitution and interpretation of Preamble.
1ICHS206_3	**Interpret** fundamental rights and duties of the Indian Citizen to inculcate morality and their social responsibilities.
1ICHS206_4	**Identify** different laws and regulations based upon Information Acts.
1ICHS206_5	**Distinguish** the functioning of Indian parliamentary system and legislative system at the centre and state level.

Course Contents:		Hrs
Unit 1	**Constitution: Basic Structure** Meaning of the constitution law and constitutionalism, Historical perspective of the constitution of India, Government of India Act of 1935 and Indian Independence Act of 1947.	2
Unit 2	**Making of Indian Constitution :** Enforcement of the Constitution, Meaning and importance of Constitution, Making of Indian Constitution – Sources, Salient features of Indian Constitution, Preamble.	2
Unit 3	**Fundamental Rights:** Fundamental Rights – Features and characteristics, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies.	2
Unit 4	**Fundamental Duties and Compliments** Directive Principles-Definition and Meaning, 42nd Constitutional Amendment Act, List and Importance of Fundamental Duties.	2

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Unit 5	**Regulation to Information & IPR**	3
	Introduction, Right to Information Act:2005, Information Technology Act 2000, Electronic Governance in India, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Limitations of an Information Technology Act	
Unit 6	**Government of The Union and States:**	2
	President of India – Election and Powers, Prime Minister of India - Election and Powers, Loksabha - Structure, Rajyasabha – Structure, Governor of State, Chief Minister and Council of Ministers in a state.	

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Indian Polity	M.Laxmikanth	Mc Graw Hill Publications Delhi	7th	2023
2	The Constitution of India	P.M. Bakshi	Lexis Nexis	19th	2023
3	Introduction to the Constitution of India	Durga Das Basu	Lexis Nexis	26th	2022
4	Governance in India	M. Laxmikanth	Mc Graw Hill Publications Delhi	3rd	2021

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Constitution of India	V.N.Shukla	EBC	14th	2022
2	The Constitutional Law of India,	J.N. Pandey	Allahabad; Central Law Agency	59th	2022
3	Constitution of India	V.N.Tripathi	Premier Publishing Company	9th	2021
4	India's Constitution	M.V.Pylee	S. Chand Publications New Delhi	18th	2020

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Department of Computer Science & Engineering
(Internet of Things and Cyber security including Block Chain Technology)

Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code and Course Title	**1ICVS207- Java Programming Laboratory**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme (Practical) : ISE/ESE	50/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICVS207_1	**Explain** the principles of object-oriented programming (OOP) and how they apply in Java. (K2)
1ICVS207_2	**Apply** exception handling techniques to gracefully handle runtime errors and exceptions in Java programs.(K3)
1ICVS207_3	**Examine** and troubleshoot concurrency issues in multi-threaded Java programs.(K5)
1ICVS207_4	**Design** and implement reusable Java libraries or components for specific functionality.(K6)
1ICVS207_5	**Develop** Java GUI applications using frameworks like JavaFX or Swing, considering user interface design principles.(K6)
1ICVS207_6	**Design** and develop micro projects to solve real world problems by using JAVA programming. (K6)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	**Fundamental Programming in Java** Object-Oriented Programming Concepts, JVM, JIT Compiler, Byte Code,, A Simple Java Program, Source File Declaration Rules, Comments, Data Types, Variables, Operators, Strings, Input and Output, Arrays- Jagged Array. Objects and Classes: Declaring Classes, Declaring Member Variables, Defining Methods, Constructor, Passing Information to a Method or a Constructor, Creating and using objects, Access Modifiers, Static Fields and Methods, this keyword.	5

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Unit 2	**Inheritance, Interface and Packaging** Inheritance: Definition, Types of Inheritance, Polymorphism, Overriding and Hiding Methods, Super keyword, Final Classes and Methods, Abstract Classes and Methods, casting, finalization and garbage collection. Interfaces: Defining an Interface, Implementing an Interface, Using an Interface as a Type. Packages: Class importing, Creating a Package, Naming a Package, Using Package Members, Developing and deploying (executable) Jar File.	4
Unit 3	**Exception and I/O Streams** Exception: Definition, Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions, finally clause, I/O Streams: Byte Stream – Input Stream, Output Stream, Data Input Stream, Data Output Stream, File Input Stream, File Output Stream, Character Streams, Buffered Stream, File, Random Access File.	4
Unit 4	**Graphical User Interfaces using Swing:** Introduction to the Swing, Swing features, Swing Top Level Containers-Creating a Frame, Positioning a Frame, Displaying Information in a Panel, The Model-View-Controller Design Pattern, The JComponent Class – Jlabel, JTextField, JButton etc. Layout Management: Border Layout, Flow Layout, Grid Layout Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Key Events, Mouse Events, Introduction to JApplet.	5
Unit 5	**Networking and Multithreading** Multithreading: Processes and Threads, Runnable Interface and Thread Class , Defining and Starting a Thread, Thread States, Thread Properties, Networking: Overview of Networking, Networking Basics, Reading from and Writing to a URL Connection, Sockets, Reading from and Writing to a Socket, Writing a Datagram Client and Server.	4
Unit 6	**Collection and Hibernate** Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Introduction to Hibernate, Exploring Architecture of Hibernate, Object Relation Mapping(ORM) with Hibernate, Hibernate Query Language (HQL), CRUD Operation using Hibernate API.	4

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Exp. No.	Experiment List
1	Program based on fundamental concepts of java.
2	Program based on concept of Class and Object.
3	Program based on concept of Inheritance like single inheritance, multilevel inheritance, hierarchical inheritance Multiple inheritances using Interface.
4	Program based on concept of Polymorphism and overloading.
5	Program based on concept of Package and sub packages.
6	Program based on concept of Exception Handling and Custom Exception Handling
7	Program based on file to read and write.
8	Program to develop GUI using AWT and Swing.
9	Program based on events concept for Key event and Mouse event.
10	Program based on Distributed Algorithms using multithreading.
11	Program based on collections in java.
12	Program based Object Relation Mapping (ORM) with Hibernate.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Core Java- Volume I and II Fundamentals	Cay Horstmann	Pearson	8th	2011
2	Let Us Java	Yashavant Kanetkar	BPB Publication	3rd	2017

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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Java 2 Complete Reference	Herbert Schildt	TMGH	9th	2014
2	JAVA HOW TO PROGRAM	Deitel Paul , Deitel Harvey	PHI Learning	10th	2016
3	Thinking in Java	Bruce Eckel	Prentice Hall	4th	2006
4	A Programmer's guide to JAVA SCJP Certification	Khaleed Mughal and Rolf W. Rasmussen	Addison Wesley	3rd	2008

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Department of Computer Science & Engineering
(Internet of Things and Cyber security including Block Chain Technology)

Course Details:

Class	S.Y, B. Tech, Sem-III
Course Code & Course Title	1ICCC208- **Aptitude and Reasoning Part- I**
Prerequisite/s	-
Teaching Scheme (Lecture/Tutorial/ Practical)	0/0/2
Credits	1
Evaluation Scheme (Practical) : ISE	50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICCC208_1	**Solve** problems based on Vedic Mathematics, Calendar, Average, Age
1ICCC208_2	**Solve** problems based on Speed Time distance and equations
1ICCC208_3	**Solve** problems based on Blood Relations, Directions, Time Rate Work, Pipes and Tanks, Percentage, Profit and Loss
1ICCC208_4	**Solve** Problems based on Spot the Error and Jumbled Para

Course Contents:		
Unit No	**Unit Name**	**Contact Hours**
Unit 1	Vedic Mathematics, Calendar national problem, agriculture, traffic, social perspective, disaster recovery, innovative center for cross multi	2
Unit 2	Average, Ages	2
Unit 3	Speed Time Distance, Equations	2
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	3
Unit 5	Percentage, Profit and Loss	2
Unit 6	Spot the Error, Jumbled Para	2
	Self-Study Module	6

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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R.S.Agarwal	S Chand	-	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R.S.Agarwal	S Chand	-	2010
3	Wren & Martin (Verbal, Grammar)	P.C.Wren	S Chand	-	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	-	2017
2	Wiley (Quantitative Aptitude)	P.A.Anand	Maestro	-	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	-	2020

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	1ICPC209- **Fundamentals of Blockchain**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE /MSE/ ESE	40/30/30

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC209_1	**Explain** the basic concepts of Blockchain Technology. (K2)
1ICPC209_2	**Apply** Bitcoin and Ethereum protocol – to lay down the foundation for developing distributed applications and smart contracts. (K3)
1ICPC209_3	**Apply** immutable distributed ledger and trust model for real time applications (K3)
1ICPC209_4	**Evaluate** the different types of consensus algorithms. (K5)
1ICPC209_5	**Build and deploy** block chain application for on premise and cloud based architecture (K6)

Course Contents:		
Unit No.	**Unit Name**	**Contact Hours**
Unit 1	**Basics:** The Double-Spend Problem, Byzantine Generals' Computing Problems, Public-Key Cryptography, Hashing, Distributed Systems, Distributed Consensus.	6
Unit 2	**Technology Stack:** Blockchain, Protocol, Currency. **Bitcoin Blockchain:** Structure, Operations, Features, Consensus Model, Incentive Model.	7

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Unit 3	**Ethereum Blockchain:** Smart Contracts, Ethereum Structure, Operations, Consensus Model, Incentive Model.	7
Unit 4	**Tiers of Blockchain Technology:** Blockchain 1.0, Blockchain 2.0, Blockchain 3.0, Types of Blockchain: Public Blockchain, Private Blockchain, Semi-Private Blockchain, Sidechains.	7
Unit 5	**Types of Consensus Algorithms:** Proof of Stake, Proof of Work, Delegated Proof of Stake, Proof Elapsed Time, Deposite-Based Consensus, Proof of Importance, Federated Consensus or Federated Byzantine Consensus, Practical Byzantine Fault Tolerance.	8
Unit 6	**Blockchain Use Case:** Supply Chain Management, Banking & Finance, Healthcare, Logistics etc.	4

Text Books:					
Sr. No	**Title**	**Author**	**Publisher**	**Edition**	**Year of Edition**
1	Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks	Imran Bashir	Packt Publishing	-	2017
2	Essentials of Bitcoin and Blockchain	Kiran kalyan Kulkarni	Packt Publishing.	-	-
3	Blockchain: Ultimate guide to understanding Blockchain, bitcoin, cryptocurrencies, smart contracts and the future of money	Mark Gates	Create Space Independent Publishing Platform		

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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain for Dummies	Tiana Laurence	John Wiley & Sons.	2nd	2019
2	Blockchain: Blueprint for a New Economy	Melanie Swan	Shroff Publisher O'Reilly Publisher Media	1st	2015
3	Mastering Bitcoin: Programming the Open Blockchain	Andreas Antonopoulos.	-	-	-
4	Block Chain & Crypto Currencies	Anshul Kaushik	Khanna Publishing House	-	-

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	**1ICPC210- Information Theory for Cyber Security**
Prerequisite/s	1ICPC113 - Computer Networks
Teaching Scheme: Lecture/Tutorial/Practical	3/0/2
Credits:	4
Evaluation Scheme (Theory) : ISE/MSE/ESE **Evaluation Scheme (Practical): ISE/ESE**	40/30/30 50/50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC210_1	**Explain** the principles and applications of information theory. (K2)
1ICPC210_2	**Apply** information theory concepts to assess the entropy of data sources and quantify their unpredictability. (K3)
1ICPC210_3	**Analyze the** information security measures for critical applications. (K4)
1ICPC210_4	**Analyze** the security of cryptographic systems by evaluating their resilience to attacks and vulnerabilities.(K4)
1ICPC210_5	**Evaluate** the effectiveness of different encryption algorithms and key management strategies. (K5)
1ICPC210_6	**Create** threat models and risk assessments to identify potential vulnerabilities and recommend security measures.(K6)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Shannon's foundation of Information theory, Random variables, Probability distribution factors, Uncertainty/entropy information measures, Leakage, Quantifying Leakage and Partitions, Lower bounds on key size: secrecy, authentication and secret sharing. provable security, computationally-secure, symmetric cipher	7
Unit 2	Secrecy, Authentication, Secret sharing, Optimistic results on perfect secrecy, Secret key agreement, Unconditional Security, Quantum Cryptography, Randomized Ciphers, Types of codes: block codes, Hamming and Lee metrics, description of linear block codes, parity check Codes, cyclic code, Masking techniques	7

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Unit 3	Information-theoretic security and cryptography, basic introduction to Diffie-Hellman,AES, and side-channel attacks	6
Unit 4	Secrecy metrics: strong, weak, semantic security, partial secrecy, Secure source coding:rate-distortion theory for secrecy systems, side information at receivers, Differential privacy, Distributed channel synthesis	6
Unit 5	Digital and network forensics, Public Key Infrastructure, Lightweight cryptography, Elliptic Curve Cryptography and applications.	7
Unit 6	**Case Study:** Secure software development infrastructure, Health care and forensic analysis, SOC-as-a-platform (SOCaaP), Cyber Security Threat Hunting.	6

Exp. No.	Experiment List
1.	Using library functions to use RSA, AES, SHA-256 and show the results of encryption and hashing.
2.	Perform 2 factor authentication and also perform privilege escalation.
3.	Perform vulnerable application for buffer overflow, integer overflow and format string vulnerability testing.
4.	Perform DVWA based command injection, SQL injection, XSS and CSRF.
5.	Perform the installation Wazuh and monitor host.
6.	Perform the installation snort and monitor a network on their local network.
7.	Automated Attack and Penetration Tools Exploring N-Stalker, a Vulnerability Assessment Tool.
8.	Defeating Malware i) Building Trojans ii) Rootkit Hunter
9.	TCP Scanning Using NMAP

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Information Theory and Coding,	Muralidhar Kulkarni, K S Shivaprakasha,	John Wiley & Sons	-	2015
2	Communication Systems: Analog and digital	Singh and Sapre	Tata McGraw Hill	2nd	2009
3	Fundamentals in information theory and coding	Monica Borda	Springer	-	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Information Theory, Coding and Cryptography.	R Bose	Tata McGraw Hill	2nd	2002
2	Multi-media System Design,	Prabhat K Andleigh and Kiran Thakrar.	Pearson education	1st	2015

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Annasaheb Dange College of Engineering and Technology, Ashta

(An Autonomous Institute)

Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	1ICPC211- **Introduction to Internet of Things**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/2
Credits	4
Evaluation Scheme (Theory) : ISE/MSE/ESE	40/30/30
Evaluation Scheme (Practical): ISE	50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICPC211_1	**Describe** the significance of IoT in various domains, such as healthcare, agriculture, and smart cities. (K2)
1ICPC211_2	**Configure** and program IoT devices to collect data, transmit it over networks, and control remote actuators. (K3)
1ICPC211_3	**Utilize** IoT platforms and tools for data visualization, analysis, and reporting.(K3)
1ICPC211_4	**Synthesize** knowledge of IoT hardware and software components to design IoT solutions for specific applications. (K4)
1ICPC211_5	**Design** innovative projects based on IoT for industry related scenarios. (K6)
1ICPC211_6	**Create** IoT-based sensor networks that integrate data from multiple sources to provide meaningful insights.(K6)

Course Contents:		
Unit No.	Unit Name	Contact Hrs
Unit 1	**Introduction to IoT:** Introduction to Internet of Things (IoT), Functional Characteristics, Recent Trends in the Adoption of IoT, Role of cloud in IoT, Societal Benefits of IoT:- Health Care, Machine to Machine (M2M), Smart Transportation, Smart Living and Smart Cities	7
Unit 2	**Communication Principles:** RFID, ZigBEE, Bluetooth, Internet Communication- IP Addresses - MAC Addresses , IEEE 802 Family of Protocols , I/O interfaces Software Components	7

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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Unit 3	**Sensing and Actuation:** Definition of Sensor, Sensor features, Different types of sensors, Actuator, Different types of Actuators, purpose of Sensors and Actuators in IoT	6
Unit 4	**IoT Application Development:** Frame work for IoT Applications-Implementation of Device integration, Data acquisition and Integration, Device data storage on cloud/local server, Authentication, authorization of Devices	7
Unit 5	**Cloud computation :** Evolution of Cloud Computation, Commercial clouds and their features, open source IoT platforms, cloud dashboards, Interfacing and data logging with cloud: Thing speak, platforms.	6
Unit 6	**IoT Case Studies:** IoT Case studies based on industrial Automation, Transportation, Smart cities, smart supply chain, Remote site monitoring .	6

Exp. No.	Experiment List
1.	Understand the basics of Internet of Things: Sensors, Actuators, IoT architecture and Gateway
2.	Study of IoT Networking: Connectivity technologies, Protocols and Interoperability in IoT.
3.	Develop a program to blink LED using Arduino Board.
4.	Develop a program to ON and OFF bulb based on LDR using Arduino Board.
5.	Temperature and Humidity monitoring using Arduino Board
6.	Interfacing and programming of actuators.
7.	To detect occupancy of an area using PIR sensors
8.	Implement the weather station using Cloud
9.	Connect the temperature sensor to the Arduino, and send temperature data to the IoT platform at regular intervals.
10.	Implement Vehicle tracking using Global Positioning System (GPS).

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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Designing The Internet of Things.	Adrian Mcewen, Hakin Cassimally	Wiley	1st	2014
2	Internet of Things: Architecture and Design	Raj Kamal	McGraw Hil	2nd	2022
3	The Internet of Things Enabling Technologies, Platforms, and Use Cases	Pethuru Raj, Anupama C. Raman	Taylor and Francis group.	-	2017

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3	Peter Waher	Packt Publishing	1st	2018
2	Internet of Things A Hands-On- Approach	Vijay Madisetti, Arshdeep Bahga	-	-	2014
3	The Internet of Things: Enabling Technologies and Solutions for Design and Test	Keysight Technologies	Application Note	-	2016.

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	1ICIC212 - (Minor course- I) IoT Sensing and Actuator Devices
Prerequisite/s	1ICPC113 - Computer Networks 1ICES103/1ICES112 - Analog / Digital Electronics
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme: ISE /MSE / ESE	40/30/30

Course Outcomes:	
Upon successful completion of this course, the student will be able to:	
1ICIC212_1	**Identify** sensors, actuators, Micro sensors and Micro actuators to solve a problem using Sensor fundamentals and its characteristics. (K2)
1ICIC212_2	**Use** Microsensors and Microactuators to solve the problems in different scenarios using Arduino IDE. (K3)
1ICIC212_3	**Connect** sensors and actuators with ESP32 to solve a problem using pin description of ESP32 microcontroller.(K3)
1ICIC212_4	**Analyze** various sensors system for real world applications using Raspberry Pi. (K4)
1ICIC212_5	**Design** a solution for given specific problem using sensors and ESP32 with Arduino IDE. (K6)

Course Contents:		
Unit No.	**Unit Name**	**Contact Hours**
Unit 1	**Sensor fundamentals and Characteristics** Introduction, Basic principles of sensor, sensor classification, Understanding various sensors, sensor selection and characteristics: Range, resolution, sensitivity, error, precision, repeatability, linearity and accuracy, Performance measures of sensors.	3
Unit 2	**Types of sensors and their applications** Temperature sensor, Proximity sensors, Infrared sensor, Ultrasonic sensor, Light sensor, Smoke and Gas sensor, Alcohol sensor, Humidity sensor, automobile sensor, home appliance sensors. Real time application of sensors, Technologies related to sensors: Metal detector, Global Positioning system,	5

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

	Blood Glucose monitoring, Photoelectric sensor.		
Unit 3	**Actuators** Definition, Working principle of actuators, Linear actuators, Rotary actuators, Logical and continuous actuators, Pneumatic actuator, Hydraulic actuators-control valves, Electrical actuating system: solid state switched, solenoids, DC motors, AC motors, Synchronous motors , Stepper motors.		5
Unit 4	**Micro Sensors and Micro Actuators** Micro Sensors: Force and pressure micro sensors, chemical sensors, biosensors, temperature micro sensors and flow micro sensors. Micro Actuators: Actuation principle, shape memory effects-one way, two way and pseudo elasticity. Types of micro actuators- Electrostatic, Magnetic and Fluidic		5
Unit 5	**Introduction to ESP32 and Raspberry Pi** Overview of ESP32 and its features, Block diagram of ESP32, Pin description for ESP32, Understanding concepts of Arduino, Introduction to Raspberry Pi.		5
Unit 6	**Case Studies** Sensors and actuators in Smart cities, Agriculture, Health Care and Weather monitoring system.		3

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Sensors and Actuators in Mechatronics, Design and Applications	Andrzej M. Pawlak	CRC Press, Taylor & Francis group	1st	2007
2	Hand Book of Modern Sensors: Physics, Designs and Application	Jacob Fraden	Springer	5th	2016
3	Sensors and Transducers	Patranabis.D	Wheeler publisher	4th	1994

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Annasaheb Dange College of Engineering and Technology, Ashta
(An Autonomous Institute)
Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mechatronic systems, Sensors and Actuators Fundamentals and Modelling	Robert H. Bishop	Taylor & Francis Group	1st	2006
2	Micro actuators Electrical, Magnetic, thermal, optical, mechanical, chemical and smart structures	Massood Tabib and Azar	Kluwer academic publishers, Springer	1st	1997
3	Microsystem Technology and Microbotics	Sergej Fatikow and Ulrich Rembold	Springer	1st	1997
4	ESP32 web server with Arduino IDE, step –by-step project guide	Rui Santos and Sara Santos	-	-	-

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(An Autonomous Institute)

Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Block Chain Technology)

Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	1ICHS213 - Universal Human Values
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme (Theory) : ISE	50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICHS213_1	**Integrate** the process of self-exploration to achieve Harmony in the human being's based on Holistic perspective of value education.
1ICHS213_2	**Understanding** Harmony in human being, family, society and nature /existence, based on methods to fulfill human aspiration.
1ICHS213_3	**Apply** the human values for maintaining the relationships with oneself and others using the principals of harmony.
1ICHS213_4	**Adopt** the methods of maintaining harmony with the society, nature, and its existence by utilizing the human order systems.

Course Contents:		
Sr. No.	Unit Name	Contact Hours
Unit 1	**Human rights, ethics and integrity** **Introduction to Value Education** Introduction , Need, Purpose and motivation for the course, recapitulation from Universal Human Values-I **Self-Exploration**–what is it? - Its content and process; 'Natural Acceptance' and **Experiential Validation**- as the process for self-exploration. **Continuous Happiness and Prosperity**- A look at basic Human Aspirations, **Right understanding**, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority.	4

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NDCET

Department of Computer Science & Engineering
(Internet of Things and Cyber Security including Block Chain Technology)

Unit 2	**Understanding Happiness and Prosperity** Understanding Happiness and Prosperity correctly, **Prevailing sources of happiness,** Prosperity and its implications Method to fulfil the human aspirations: understanding and living in harmony at various levels.	3
Unit 3	**Understanding Harmony in the Human Being - Harmony in Myself** **Understanding human** being as a co-existence of the sentient 'I' and the material 'Body', **Understanding the needs of Self ('I') and 'Body'** - happiness and physical facility **Understanding the Body as an instrument of 'I'** (I being the doer, seer and enjoyer) **Understanding the characteristics and activities of 'I' and harmony in 'I'** **Understanding the harmony of I with the Body:** Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health.	6
Unit 4	**Understanding Harmony in the Family - Harmony in Human-Human Relationship** **Understanding values in human-human relationship;** meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; **Trust and Respect** as the foundational values of relationship **Understanding the meaning of Trust;** Difference between intention and competence **Understanding the meaning of Respect,** Difference between respect and differentiation; **Peer Pressure** the Concerns and its Resolution the other salient values in relationship.	6
Unit 5	**Understanding Harmony in the Society** **Understanding the harmony in society:** Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals **Human order systems** and dimensions	4
Unit 6	**Understanding Harmony in the Nature and Existence** **Understanding the harmony in the Nature,** Inter-connectedness and mutual fulfilment among the four orders of nature, recyclability and self-regulation in nature	3

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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Human Being, Nature and Existence Comprehensively	UHV Team	UHV	1st	2022
2	A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R Asthana,G P Bagaria	Excel Books	2nd	2019
3	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R Asthana, G P Bagaria	Excel Books	2nd	2019
4	Human Values	A.N Tripathy	New Age International	2nd	2006

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria	Excel Books	3rd	2010
2	Indian Ethos and Modern Management: Amalgam of the Best of the Ideas from the East and the West	B.L. Bajpai	New Royal Book	1st	2004
3	Small Is Beautiful	E. FSchumacher.	Hartley & Marks	1st	1999
4	An Introduction to Ethics	William Lilly	Allied	1st	1967

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Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	1ICVS214- **Python Programming Laboratory**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme (Practical): ISE/ESE	50/50

Course Outcomes (COs)	
Upon successful completion of the course students will be able to:	
1ICVS214_1	**Explain** the role of Python in various application domains, such as web development, data analysis, and automation. (K2)
1ICVS214_2	**Apply** different Python libraries to manipulate and analyze data, including parsing and cleaning data from various sources.(K3)
1ICVS214_3	**Analyze** and debug Python code to identify and rectify logical errors, runtime issues, and memory leaks.(K4)
1ICVS214_4	**Examine** and troubleshoot issues related to Python packages and dependencies.(K4)
1ICVS214_5	**Develop** Python-based solutions for solving domain-specific problems or automating tasks(K6)
1ICVS214_6	**Create** Python projects that involve multiple modules and demonstrate architectural skills and design considerations. (K6)

Course Contents:		
Unit No.	Unit Name	Contact Hours
Unit 1	**Basics of Python** Introduction to Python - Why Python? - Essential Python libraries - Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators. Decision Control Statement: if statement, if, elif else statement Repetitive Control Statement: While loop, for loop, The range statement Selection Control Statement: Break & continue, Else clause	5
Unit 2	**Modular Programming** Object Oriented Programming: Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live	5

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	projects, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes **Function:** What is function, Define a function, Pass arguments, Arguments with default values, Arbitrary arguments, Local and global variables, Return a value from function, Mathematical functions, Random number functions, Mathematical constants, Recursive functions	
Unit 3	**Exception Handling, File Handling** Errors, Exception handling with try, handling multiple exceptions, writing your own exception **File Handling**: File handling modes, reading files, writing snd spending to files, Handling file exceptions, The with statement.	3
Unit 4	**Introduction To Numpy and scikit learn** NumPy Basics: Arrays and Vectorized Computation- The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes. Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods-Sorting. Introduction scikit learn libraries.	6
Unit 5	**Data Manipulation with Pandas** Introduction to pandas Data Structures: Series, DataFrame, Essential Functionality: Dropping Entries- Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking. Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.	4
Unit 6	**Data Cleaning, Preparation and Visualization (Pyporcs)** Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String Manipulation: Vectorized String Functions in pandas. **Plotting with pandas:** Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.	3

Experiment List:	
1	Implement basic Python programs to demonstrate fundamental concepts by reading input from console.
2	Implement Python programs to demonstrate decision control and looping statements.
3	Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem
4.	Implement OOP concepts like Data hiding and Data Abstraction.
5.	Create user-defined functions with different types of function arguments

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6.	Perform File manipulations operations- open, close, read, write, append and copy from one file to another.
7.	Handle Exceptions using Python Built-in Exceptions
8.	Implement various in built functions of NumPy library.
9.	Create Pandas Series and DataFrame from various inputs.
10.	Import any CSV file to Pandas DataFrame and perform the following: (a) Visualize the first and last 10 records (b) Get the shape, index and column details (c) Select/Delete the records(rows)/columns based on conditions. (d) Perform ranking and sorting operations. (e) Do required statistical operations on the given columns. (f) Find the count and uniqueness of the given categorical values. (g) Rename single/multiple columns.
11.	Import any CSV file to Pandas DataFrame and perform the following: (a) Handle missing data by detecting and dropping/ filling missing values. (b) Transform data using apply() and map() method. (c) Detect and filter outliers. (d) Perform Vectorized String operations on Pandas Series. (e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to computing and Problem Solving with Python	Jeeva Jose and SojanLal	Khanna Book Publishing Co. (P) Ltd	1	2016
02	Programming Python	Mark Lutz	O'reilly	2	2001
03	Introduction to Programming using Python"	Y. Daniel Liang	Pearson	--	2012
04	Python Data Science Handbook: Essential Tools for Working with Data	JakeVanderPlas	O'Reilly	--	2017

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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Core Python Programming	Wesley J. Chun	Prentice Hall	--	2006
02	Learning Python	Mark Lutz,	O'reilly	4th	2009

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Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	**1ICHS215- Environmental Studies**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme (Theory) : ISE	50

Course Outcomes (COs):	
Upon successful completion of this course, the student will be able to:	
1ICHS215_1	**Comprehend** the concepts and principles of sustainable development and its importance in environmental preservation. (K2)
1ICHS215_2	**Explain** ethical and legal responsibility of an engineer and his role in effective implementation of sustainable activities through EIA and EMS in the corporate sector. (K2)
1ICHS215_3	**Predict** impact of contemporary issues (Population Explosion, Climate change, Environmental pollution) on the environment. (K2)
1ICHS215_4	**Classify and analyze** different types of environmental pollution, understand their causes and effects, and propose control measures. (K4)
1ICHS211_5	**Prepare** a technical report highlighting importance of environment in human life by using techniques like survey, case studies, mini project. (K4)

Course Contents:

The main objective of the course is to infuse an understanding of the various environmental concepts on scientific basis in the functional area of Engineering and technology. The course will provide a foundation to critically assess the approaches to pollution control, environmental and resource management, sustainable development, cleaner technologies, Environmental Legislation based on an understanding of the fundamental, environmental dimensions. The course will help to explore the modern concept of green industry and the impact of excess human population, globalization, and climate change on the environment.

Unit No.	Title	Hrs.
Unit 1	**Environment and concept of Sustainable Development** Natural and Built Environment, Environmental Education: Definition, Scope, Objectives and importance. Components of the Environment: Atmosphere, Hydrosphere, Lithosphere and Biosphere. Biological Diversity: Introduction, Values of biodiversity, Threats to biodiversity, Conservation of biodiversity. Sustainable development goals, pillars of sustainable development.	4

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Unit 2	**Energy and Natural Resources** Energy Scenario: Future projections of Energy Demand, Utilization of various Energy Sources, Conventional Energy Sources and Non- Conventional Energy Sources, Urban problems related to energy. Natural Resources: Food, Water, Forest, Geological, Equitable Use of Resources for Sustainable lifestyle. Concept of life cycle analysis, Case studies.	4
Unit 3	**Global environmental issues, Impact of modernization** Climate change: Global warming, Ozone depletion, Acid Rain etc. Environmental Impact: Impact of Modern agriculture on the Environment, Impact of Mining on the Environment, Impact of Large dams on the Environment. Environmental pollution: Air, Water, Soil, Noise, Marine, classification of pollutants, their causes, effects and control measures. Forest environment Case studies.	5
Unit 4	**Environmental Pollution** Definition: Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Solid waste Management: Causes, effects and control measures of urban and industrial wastes. E waste management. Role of an individual in prevention of pollution.	4
Unit 5	**Environmental Management and Legislation** Environmental ethics: Introduction, Ethical responsibility, issues and possible solutions. Environmental Management: Introduction to Environmental Impact Assessment, Environmental Management System: ISO 14001Standard, Environmental Auditing, National and International Environmental protection agencies pertaining to Environmental Protection. Introduction to Environmental Legislation. Environmental act – water 1974 law	5
Unit 6	**Cleaner Technology:** Consumerism and Waste Products, Green buildings, Green products, Minimization of Hazardous Products, Reuse of Waste, By-products, Rainwater Harvesting, Translocation of trees. Some Success Stories. Role of Information Technology in Environment protection. **Sustainability and Analysis :**	4

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Assessment methods:
01. Mini Project: **25 marks**
02. Seminar : **25 Marks**
    Topic should be from the content of the course.

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Studies	Anindita Basak	PEARSON	First edition	2017
02	Environmental Studies	N.K Uberoi,	Excel Books Publications New Delhi,	First edition	2005.
03	Environmental Studies from crisis to cure	R. Rajagopalan,	Oxford university press,	Second edition	2011

Reference Books / Handbooks

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Environmental Science: A Global Concern	William Cunningham and Barbara Woodworth Saigo	WCB/McGraw Hill publication	Fifth Edition	1999
02	Peter. H. Raven, Linda. R. Berg, George. B. Johnson	Environment	McGraw Hill publication	Second edition	1998
03	Adaptive Environmental Management	Catherine Allan & George H. Stanley (Editors),	Springer Publications.	--	2009.
04	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006

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Department of Computer Science & Engineering
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Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code and Course Title	**1ICEL216- Innovation/Prototype**
Prerequisite/s	1ICES108 - Design Thinking
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme (Practical) : ISE	50

Course Outcomes (COs)	
Upon successful completion of the course students will be able to:	
1ICEL216_1	**Proficiently** Apply the innovative thinking techniques to empathize the customer through arranging survey and/or interview
1ICEL216_2	**Accurately** Identify and Formulate the solution for real world problem using innovative technique
1ICEL216_3	**Proficiently** Create and Exhibit Prototype, for defined real world problem using innovative approach
1ICEL216_4	**Accurately** Comply & Test developed prototype for defined real world problem to meet user's requirements
1ICEL216_5	**Routinely** Adapt professional skills and ethical practices to provide a reliable solution for defined real world problem through participating in team activities

Unit No.	Unit Name	Hours
Unit 1	**Design thinking for innovation** Introduction of design thinking process, innovation and their role, Process of thinking in right direction, Incubation, Final ideation , Brain Storming, Psychological aspect of creativity.	3
Unit 2	**Human and Culture Centered Design** Design for Society, Better existing design, Design for change Cultural change, social change, Life style change	2
Unit 3	**Visual communication and sketching** Anyone can sketch, expression of thinking and problem solving through sketch and graphic design.	2
Unit 4	**Prototyping & Fabrication** Process of Prototype design, Problems of different stages in prototype design, refines Prototype, Finalize Prototype	2

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Unit 5	**Engineering aspect of design** Electrical, Mechanical, Design, Material, Aspect, Safety and Reliability aspect	2
Unit 6	**Introduction of Startup with entrepreneurship approach:** What is entrepreneurship, being an entrepreneurship, Challenges and possibilities of Entrepreneurship? How to Start up, Start-up Fundamental, Being Successful.	2

Experiments:

8-10 experiments based on above topics will be conducted

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Design Thinking, Lean, and Agile		O'Reilly	--	2017
2	Engineering Design	John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson	Cengage learning	2nd	2013
3	Design for How People Think	John Whalen	O'Reilly	--	2019

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Creative Confidence: Unleashing the Creative Potential Within Us All	Kelley, D. & Kelley, T	New York: William Collins	--	2014
2	The Design of Business: Why Design Thinking is the Next Competitive Advantage	Roger Martin	Harvard Business Press	--	2009
3	Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School	Idris Mootee	John Wiley & Sons	--	2013

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Course Details:

Class	S.Y, B. Tech, Sem - IV
Course Code & Course Title	**1ICCC217 - Aptitude and Reasoning Part- II**
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme (Practical) : ISE	50

Course Outcomes (COs)	
Upon successful completion of the course students will be able to:	
1ICCC217_1	**Solve** problems based on HCF, LCM, Interest, Clock, Cubes and Puzzles
1ICCC217_2	**Solve** problems based on Coding and Decoding, Seating Arrangements and Venn diagrams.
1ICCC217_3	**Solve** problems based on Ratio Proportion, Partnership, Allegation, Divisibility and Number Theory
1ICCC217_4	**Demonstrate** presentations using concepts delivered on confidence building and time management skills.

Course Contents:		
Unit No	**Unit Name**	**Contact Hours**
Unit 1	HCF LCM, Simple Interest, Compound Interest	4
Unit 2	Coding- Decoding, Seating Arrangement Venn Diagrams	5
Unit 3	Clocks, Cubes, Puzzles,	4
Unit 4	Ratio Proportion, Partnership	4

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Unit 5	Confidence Building, Time Management	5
Unit 6	Allegation, Divisibility and Number Theory	4
	Self-Study Module	

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R.S.Agarwal	S Chand	-	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R.S.Agarwal	S Chand	-	2010
3	Wren & Martin (Verbal, Grammar)	P.C.Wren	S Chand	-	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	-	2017
2	Wiley (Quantitative Aptitude)	P.A.Anand	Maestro	-	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	-	2020

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