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			
1ICPC201	Discrete Mathematics and Theory of Computation	3	1	-	4	40	16	30	30	24	100	40	-	-	-	-	-	100
1ICPC202	Data Structures	3	-	2	4	40	16	30	30	24	100	40	50	50*	20	100	40	200
1ICPC203	Database Management System	3	-	2	4	40	16	30	30	24	100	40	50	-	-	50	20	150
1ICPC204	Operating System	3	-	2	4	40	16	30	30	24	100	40	50	-	-	50	20	150
1ICHS205	Psychology	2	-	-	2	50	20	-	-	-	50	20	-	-	-	-	-	50
1ICHS206	Constitution of India	1	-	-	1	25	10	-	-	-	25	10	-	-	-	-	-	25
1ICVS207	Java Programming Laboratory	2	-	2	3	-	-	-	-	-	-	-	50	50*	20	100	40	100
1ICCC208	Aptitude and Reasoning Part – I	-	-	2	1	-	-	-	-	-	-	-	50	-	-	50	20	50
		17	1	10	23													825
	Total Contact Hours	28																

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Annasaheb Dange College of Engineering and Technology, Ashta
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Department of Computer Science & Engineering

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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			Total	Min	ISE	ESE		Total	Min	
		L	T	P	Credits	Max	Min	MSE	ESE	Min				Max	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	Environment 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														
	Total Contact Hours	27			22													850

Minor Course - I

Course Code	Course Name	L	T	P	Credits
1ICIC212	**Introduction to Internet of Things**	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	Basic Mathematics
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	**Explain** Discrete mathematics concept. (K2)
1ICPC201_2	**Understand** concepts of set theory algebraic structures. (K2)
1ICPC201_3	**Apply** concepts of set theory algebraic structures. (K3)
1ICPC201_4	**Evaluate** Finite Automata and Regular Languages. (K4)
1ICPC201_5	**Analyze** Formal Grammars and Computational Models. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	**Mathematical logic:** Statements & Notations, Connectives, Statement Formulas & truth table, Well formed formulas, Tautologies , Equivalence of formulas, Duality law, Tautological Implications, Functionally complete set of connectives, Other connectives, Normal Forms, Theory of Inference for statement calculus.	8
Unit 2	**Set theory and Relations & Functions** Basic concepts of set theory, Operations on Sets, Ordered pairs & n-tuples, Cartesian Product Relations. Properties of binary relations. Matrix & Graph Representation of Relation., Partition & covering of Set, Equivalence Relations. , Composition of Binary Relation., POSET&Hasse Diagram, Functions, Types of Functions, Composition of functions.	7
Unit 3	**Algebraic systems:** Algebraic Systems: Examples & general Properties, Semi groups & Monoids, Groups: Definitions & Examples, Subgroup & Homomorphism.	5

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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	1st	2007
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.	SemyourLipschutz, MarcLipson	Tata Mc Graw Hill	3rd	2012
3	Introduction to theory of computations	Michael Sipser	Cengage Learning	3rd	2012

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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	**Explain** the fundamental concepts of structuring, managing and organizing the data using linear and non-linear data structures with ADTs, write recursive algorithms and explain various searching and sorting techniques (K2)
1ICPC202_2	**Choose** suitable data structure to be used and apply it to solve the various problems. (K3)
1ICPC202_3	**Implement** data structures, searching and sorting methods based on inherent properties of data structures and the complexity of algorithms. (K3)
1ICPC202_4	**Compare and Analyze** various algorithms, searching and sorting methods based on inherent properties of data structures and the complexity of algorithms. (K4, K5)
1ICPC202_5	**Design** a solution for a problem using suitable searching and sorting methods based on inherent properties of data structures. (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	6
Unit 2	**Lists** Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.	7
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.	7

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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.	6
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, Applications of 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, Application of graphs.	6

Course Contents:	
Expt. No.	**Title of Experiment**
1	Implement Programs based on array, function, pointer, structures.
2	Implement Singly Linked List
3	Implement Doubly Linked List
4	Implement Circular Linked List
5	Implement Stack ADT – Static and Dynamic
6	Implement Queue ADT – Static and Dynamic
7	Implement Stack application, circular and double ended queue.
8	Implement Searching – Linear, Binary and Hashing
9	Implement Sorting – Bubble, Selection, Insertion
10	Implement Sorting – Merge and Quick
11	Implement Binary Search Tree, Traversal of Trees
12	Implement Graph using adjacency list and traversal

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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	1st	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	1st	2003
2	Understanding Pointers in C	Yashavant Kanetkar	BPB Publication	1st	2009

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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 fundamentals of database management systems. (K2)
1ICPC203_2	**Apply** the principles and practices of good database design like functional dependency and normalization. (K3)
1ICPC203_3	**Apply** concepts transaction processing and concurrency control to improve the security and system performance using transaction management, concurrency control and recovery techniques. (K4)
1ICPC203_4	**Demonstrate** concepts of indexing, concurrency protocols and recovery algorithms to solve real world problems. (K5)
1ICPC203_5	**Identify** and Formulate the queries to perform the create, delete, extract and update operations on the database using structured query language. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	**Introduction to databases** Introduction to database, Traditional file system v/s DBMS, views of data, instance and schema, Data Models – Relational and ER model, Keys, Database design process, Schema diagram, Extended E-R Features- Specialization, Generalization and Aggregation, Database system structure, Database users. Relational algebra, Tuple relational calculus, Domain relational calculus.	8
Unit 2	**Structured Query Language (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.	6
Unit 3	**Functional Dependency and Normalization** Integrity constraints – domain constraints, referential integrity, Pitfalls in Relational-Database Design, Functional dependency, types of functional dependency, closure of set of functional dependency, Closure of Attribute Sets, canonical cover. Normalization – Purpose of normalization, First Normal Form (1NF), Second	6

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	Normal Form (2NF), Third Normal Form (3NF), Boyce-Codd Normal Form (BCNF), Fourth Normal Form (4NF), Fifth Normal Form (5NF)	
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	6
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.	7
Unit 6	**Deadlock Handling and Data Recovery** Deadlock Handling – Deadlock prevention, deadlock detection and deadlock recovery. Data Recovery – Failure Classification, Storage, Log based recovery, checkpoints, Recovery Algorithm, Buffer Management, Failure with loss of non- volatile Storage	6

Exp. No.	Title of Experiment
1.	Drawing an E-R Diagram for any organization and convert into Relational Tables
2.	Installation and Demonstration of DBMS Oracle/MySQL/SQLServer/PostgreSQL etc.
3.	Study and Implementation of Data Definition Language (DDL) Queries (eg. create, alter and drop tables).
4.	Study and Implementation of Data Manipulation Language (DML) Queries (eg insert, delete, update and select statements).
5.	Study and Implementation of Basic SQL SELECT statement for displaying/extracting data from single table or multiple tables,
6.	Study and implementation of SQL constructs for aggregating data, use of group by, having clauses.
7.	Study and implementation of nested sub-queries, complex queries, views and Joins.
8.	Study and Implementation of Triggers
9.	Study and Implementation of Functions and Stored Procedures.
10.	Implementation of Database connectivity with object oriented language (Java).
11.	Creating Indices for the tables, implementing static hashing.
12.	Study of Transaction processing and concurrency control techniques.

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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

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	1ICES151-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 fundamental concepts of operating systems, including their types and the services they provide. (K2)
1ICPC204_2	**Apply** scheduling algorithms to solve numerical problems related to process scheduling.(K3)
1ICPC204_3	**Develop** appropriate solution to solve critical section problem by using accurate operating system algorithm.(K6)
1ICPC204_4	**Apply** and implement suitable deadlock avoidance algorithms through programming to prevent and handle deadlock situations in operating systems (K3)
1ICPC204_5	**Implement** programs related to the process Scheduling, memory allocation techniques for the given problem.(K3)

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
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

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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	**Storage Management & System Security** File System: Access methods, directory and disk structure, file sharing. System Protection: Goals, Principles, Domain of protection, Access matrix. **System security**: Security problem, Program threats.	6

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

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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Operating System Concepts	Silberschatz, Galvin,	John Wiley	8th	2009
2	Operating systems concepts and design	Dhananjay M Dhamdhere	Tata McGraw Hill	2nd	2006
3	Operating Systems - A Concept Based approach	Dhananjay M Dhamdhere	Tata McGraw Hill	3rd	2007

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

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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	2
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.	6

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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.	02
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.	02
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.	02
Unit 4	**Fundamental Duties and Compliments** Directive Principles-Definition and Meaning, 42nd Constitutional Amendment Act, List and Importance of Fundamental Duties.	02
Unit 5	**Regulation to Information & IPR** 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	03
Unit 6	**Government of The Union and States:** 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.	02

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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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Course Details:

Class	S. Y. B. Tech, Sem-III
Course Code and Course Title	1ICVS207- **Java Programming Laboratory**
Prerequisite/s	1ICPC114-Object Oriented Programming
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 exception 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 (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, Creating and using objects, Access Modifiers, Static Fields and Methods, this keyword	4
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.	5
Unit 3	**Exception and LO Streams** Exception: Definition, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions, finally clause, Streams: Streams, Text input and output, character streams, Reading and writing binary data in to a file.	4

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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. Layout Management: Border Layout, Flow Layout, Grid Layout Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Key Events, Mouse Events.	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, 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 Database Programming** Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Database Programming: The Design of JDBC, The Structured Query Language, JDBC Installation, Basic JDBC Programming Concepts.	4

Exp. No.	Title of Experiment
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 inheritance using Interface.
4	Program based on concept of Polymorphism and overloading
5	Program based on the 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 event handling.
10	Program based on multithreading concept
11	Program based on collections in java.
12	Program based on JDBC Connections.

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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

Reference Books:					
Sr. No	**Title**	**Author**	**Publisher**	**Edition**	**Year of Edition**
1	Java 2 Complete Reference	Herbert Schildt	TMGH	9th	2014
2	A Programmer's guide to JAVA SCJP Certification	Khaleed Mughal and Rolf W. Rasmussen	Addison Wesley	3rd	2008

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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: ISE	50

Course Outcomes (COs) : The students 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 Hrs
Unit 2	Average, Ages	2 Hrs
Unit 3	Speed Time Distance, Equations	2 Hrs
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	3 Hrs
Unit 5	Percentage, Profit and Loss	2 Hrs
Unit 6	Spot the Error, Jumbled Para	2 Hrs
	Self-Study Module	

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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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Course Details:

Class	S.Y. B. Tech, Sem - IV
Course Code and Course Title	1ICPC209- **Fundamentals of Blockchain**
Prerequisite/s	1ICPC113 - Computer Networks
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme(Theory) : ISE /MSE/ ESE	40/30/30

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:	
1ICPC209_1	**Understanding** the basic concepts of Blockchain Technology. (K2)
1ICPC209_2	**Explore** the Bitcoin and Ethereum protocol – to lay down the foundation for developing distributed applications with smart contracts (K2)
1ICPC209_3	**Apply** immutable distributed ledger and trust model for real time applications. (K3)
1ICPC209_4	**Illustrate** the essential components of a blockchain platform (K4)
1ICPC209_5	**Evaluate** the different types of consensus algorithms. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	**Basics:** Introduction, Origin of Blockchain, Components of Blockchain,Types of Blockchain,The Double-Spend Problem, Byzantine Generals' Computing Problems, Distributed Systems, Distributed Consensus.	6
Unit 2	**Cryptography in Blockchain :** Blockchain Data Structure/ Merkle Tree, Distributed Ledger Technologies (DLT), Transaction Methods, Public-Key Cryptography, Hashing Methods, Digital Signature	7
Unit 3	**Bitcoin:** Introduction, Cryptocurrency basics,Types of Cryptocurrency, The emergence of bitcoin,Bitcoin Mining, Value of Bitcoin Ethereum Blockchain: Ethereum Structure, Operations, Solidity and Smart Contracts, Consensus Model, Incentive Model. DApp Structure and Applications	7

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Unit 4	**Hyperledger Platforms:** Hyperledger Fabric: Components of Hyperledger Fabric, Chaincodes,Channels, Fabric Java SDK, Other Platforms: Truffle: Features of Truffle, Initializing Truffle, Interaction with the contract, Implementing DApp in Truffle.	8
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, PAXOS, RAFT	5
Unit 6	**Web3.0 and Blockchain Use Case:** Introducing Web3, Implementation of Web3. Use-Case:Supply Chain Management, Banking & Finance, Healthcare, Energy and Utilities.	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology	Chandramouli subramanian	Universities Press	-	-
2	Essentials of Bitcoin and Blockchain	Kiran kalyan Kulkarni	Packt Publishing.	-	-
3	Block Chain & Crypto Currencies	Anshul Kaushik	Khanna Publishing House	-	-
4	Mastering Ethereum	Andreas.M.Antonopoulos.	O'Reilly Media, Inc	1rst	2018

Reference 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	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.	-	-	-

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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	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	**Understand** the concept of Cyber security, cyber forensics and issues and challenges associated with it. (K2)
1ICPC210_2	**Understand** information theory and data leakage principals. (K2)
1ICPC210_3	**Illustrate** different secrecy metrics and security techniques (K3)
1ICPC210_4	**Demonstrate** various cryptography techniques. (K3)
1ICPC210_5	**Compare and analyze** various cryptography techniques (K4)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.	7
Unit 2	Shannon's foundation of Information theory, Random variables, Probability distribution factors, Uncertainty/entropy information measures, Leakage, Quantifying Leakage and Partitions.	7
Unit 3	Secrecy, Authentication, Secret sharing, Optimistic results on perfect secrecy, Secret key agreement, Unconditional Security, Secrecy metrics: strong, weak, semantic security, partial secrecy, Semantic Security.	6
Unit 4	Symmetric and Asymmetric encryption, Masking techniques, Information theoretic security and cryptography, DES, AES, and side-channel attacks.	6

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SY - IoT - 23/42

Unit 5	Public Key Infrastructure, Basic introduction to Diffie-Hellman, Elliptic Curve Cryptography, Lightweight cryptography, Quantum Cryptography.	6
Unit 6	Cyber Forensics: Introduction to Digital Forensics, Definition and types of cybercrimes, electronic evidence and handling, electronic media, collection, searching and storage of electronic media, introduction to internet crimes, hacking and cracking, credit card and ATM frauds, web technology, cryptography, emerging digital crimes and modules.	7

Exp. No.	Experiment List
1.	Perform Basic commands of Computer Network - Ipconfig, Tracert, Ping, ARP, Netstat, Nslookup, Hostname, Nbstat, Getmac, Systeminfo
2.	Perform Basic commands Operating system - Sudo, find, last, whoami, pwd, ls, cd, touch, cat, nano, operators, mv and cp, mkdir, rm and rmdir, stat, echo, grep
3.	Study and perform basic User Creation, assigning roles, password creation, testing vulnerabilities of access control.
4.	Study and perform basic Firewall Setting, wi-fi access setting and testing vulnerabilities.
5.	Prototype implementation of Basic symmetric encryption and decryption techniques using c/c++
6.	Perform Masking techniques using steghide tool.
7.	Implement a prototype for Data encryption standard using c/c++
8.	Implement a prototype for Advanced encryption Standards using c/c++
9.	Implement an algorithm of Diffie-Hellman Algorithm for key exchange using c/c++
10.	Perform Network Scanning using NMAP and Wireshark Tool.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Introduction to Cyber Security	Chwan-Hwa(john) Wu,J. David Irwin	CRC Press Inc	1st	2013
2.	Information Theory and Coding,	Muralidhar Kulkarni, K S Shivaprakasha,	John Wiley & Sons	1st	2015

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3	Fundamentals in information theory and coding	Monica Borda	Springer	1st	2011
4.	"Computer Forensics and Cyber Crime: An Introduction"	Marjie T Britz,	Pearson Education	2nd	2008

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Information Theory, Coding and Cryptography.	R Bose	Tata McGraw Hill	2nd	2002

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Course Details:

Class	S.Y. B. Tech, Sem - IV
Course Code and Course Title	1ICPC211- **Introduction to Internet of Things**
Prerequisite/s	1ICPC113-Computer Networks, 1ICES103-Analog / Digital Electronics
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:	
1ICPC211_1	**Describe** the significance of IoT in various domains, such as healthcare, agriculture, and smart cities. (K2)
1ICPC211_2	**Analyze** the functionalities and use cases of RFID, ZigBee, and Bluetooth technologies in various applications.(K4)
1ICPC211_3	**Design** IoT applications that effectively utilize different types of sensors and actuators for specific tasks.(K6)
1ICPC211_4	**Evaluate** the features and services of commercial cloud platforms and compare them with open source IoT platforms. (K5)
1ICPC211_5	**Develop** IoT-based solutions for real-world applications. (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 and Smart Living	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
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:**	

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	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.	Title of Experiment
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 weather monitoring system using Arduino Board.
9.	Connect soil moisture sensor to Arduino and send data at regular intervals.
10.	Implement Vehicle tracking system using GSM and Global Positioning System (GPS).

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.	1st	2017

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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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Course Details:

Class	S.Y. B. Tech, Sem - IV
Course Code and Course Title	1ICIC212 – **Minor Course - I : Introduction to Internet of Things**
Prerequisite/s	1ICPC113-Computer Networks, 1ICES103-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	**Describe** the significance of IoT in various domains, such as healthcare, agriculture, and smart cities. (K2)
1ICIC212_2	**Analyze** the functionalities and use cases of RFID, ZigBee, and Bluetooth technologies in various applications.(K4)
1ICIC212_3	**Design** IoT applications that effectively utilize different types of sensors and actuators for specific tasks.(K6)
1ICIC212_4	**Evaluate** the features and services of commercial cloud platforms and compare them with open source IoT platforms. (K5)
1ICIC212_5	**Develop** IoT-based solutions for real-world applications. (K6)

Course Contents:

Unit No.	Unit Name	Contact Hours
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 and Smart Living .	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
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

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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

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.	1st	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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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: 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
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.	4

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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.	7
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

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

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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	1ICPC114- Object Oriented Programming
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme: ISE / ESE	50 / 50

Course Outcomes (COs) Upon successful completion of the course students will be able to:	
1ICVS214_1	**Apply** various fundamentals concept of python programming to solve real world problems by using IDLE.
1ICVS214_2	**Apply** modular approach like OOP, functions, Exception handling, file handling to solve various real world scenarios using Python IDE.
1ICVS214_3	**Apply** various inbuilt functions of NumPy Library for efficient storage and data operations by using IDE.
1ICVS214_4	**Analyze** the data using different in built functions of Pandas by using IDE.
1ICVS214_5	**Design and develop** micro project to solve real world problems by using python programming.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	**Introduction of Python:** Python Installation and Working of it, Data types in python, Operators in python, Input and Output, detail study of python blocks.	4
Unit 2	**Basics of Python Programming:** Control statements, Branching statements, String and Character in python, List and Tuples, Dictionaries, Arrays in python, Functions, Lambda Functions.	5
Unit 3	**File Handling** Files in Python, Directories, Building Modules, Packages, Text Processing, Regular expression in python.	4
Unit 4	**OOP Concepts in Python**: Procedural and Object-Oriented Programming, Objects, class, Method overloading, Polymorphism, Inheritance.	4
Unit 5	**Advanced Python:** Introduction to Django, Installation, Creation of local server, projects and apps using Django, database connectivity in Django, Introduction to tkinter for GUI	5

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Unit 6	**Python Libraries:** Introduction to python libraries like NumPy, Pandas, Matplotlib	4

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

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

Experiments List:

1	Exploring basics of python like datatypes, input output and strings.
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.	Implementation of functions and lambda function
5.	Program on File handling
6.	Implementation of classes and objects, constructors and destructors
7.	Implementation of inheritance, polymorphism.
8.	Creating application using Django web framework to demonstrate functionality of user login and its validation using regular expression
9.	Implementation of Array operations using Numpy.
10.	Implementation of data Operation in Pandas.
11.	Implementations of Different graphs in Matplotlib.

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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: ISE-I /ISE-II	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. (K^2)
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. (K^2)
1ICHS215_3	**Predict** impact of contemporary issues (Population Explosion, Climate change, Environmental pollution) on the environment. (K^2)
1ICHS215_4	**Classify and analyze** different types of environmental pollution, understand their causes and effects, and propose control measures. (K^4)
1ICHS211_5	**Prepare** a technical report highlighting importance of environment in human life by using techniques like survey, case studies, mini project. (K^4)

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
Unit 2	**Energy and Natural Resources**	4

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	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.	
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.	**4**
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	**4**
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**

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

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Reference Books / Handbooks					
Sr. No	**Title**	**Author**	**Publisher**	**Edition**	**Year of Edition**
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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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: 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.	3

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	Jonny Schneider	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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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: ISE	50

Course Outcomes (COs) : The 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	4
Unit 3	Clocks, Cubes, Puzzles,	4
Unit 4	Ratio Proportion, Partnership	4
Unit 5	Confidence Building, Time Management	4
Unit 6	Allegation, Divisibility and Number Theory	4
	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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