SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318201: Discrete Mathematics and Logic

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: --	**Practical: --**		**ESE:50**
Prerequisite : Basic Mathematics		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To gain knowledge and to formulate and solve problems with sets and propositions.
2. To understand basic concepts of Predicate Logic.
3. To understand Graph and Tree terminologies and models to be applied in real life problems.
4. To recognize types of relation, formulate and solve problems with relations and functions.
5. To understand and solve counting problems by applying elementary counting techniques
6. To understand the various types' algebraic structures and its applications.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Formulate and apply formal proof techniques and solve the problems with logical reasoning.

CO2: Analyze and evaluate the combinatorial problems by using probability theory.

CO3: Analyze types of relations and functions to provide solution to computational problems.

CO4: Apply the concepts of graph theory to devise mathematical models.

CO5: Identify techniques of number theory and its application.

CO6: Identify fundamental algebraic structures.

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S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318201: Discrete Mathematics and Logic

Course Content

Unit 1: Sets, Proof Templates, and Induction **7hrs**	**CO**
Basic Definitions – Describing Sets Mathematically, Set Membership, Equality of Sets, Finite and Infinite Sets, Relations Between Sets, Venn Diagrams. Operations on Sets- Union and Intersection, Set Difference, Complements, and DeMorgan's Laws, Power Sets and Products, Lattices and Boolean Algebras. The Principle of Inclusion-Exclusion, Finite Cardinality, Principle of Inclusion-Exclusion for Two Sets, Principle of Inclusion-Exclusion for Three Sets, Principle of Inclusion-Exclusion for Finitely Many Sets, Mathematical Induction, Strong Form of Mathematical Induction.	CO1
Unit 2: Introduction to Propositional Logic **7hrs**	CO2
Truth and Logical Truth, Tautologies, Substitutions into Tautologies, Logically Valid Inferences, Combinatorial Networks, Substituting Equivalent Subformulas, Simplifying Negations. Normal Forms-Disjunctive Normal Form, Application: DNF and Combinatorial Networks, Conjunctive Normal Form, Application: CNF and Combinatorial Networks. Predicates and Quantification-Predicates, Quantification, Restricted Quantification, Nested Quantifiers, Negation and Quantification, Quantification with Conjunction and Disjunction, Application: Loop Invariant Assertions.	
Unit 3: Relations and Functions **7hrs**	CO3
Binary Relations-n-array Relations, Operations on Binary Relations- Inverses, Composition, Special Types of Relations, Reflexive and Irreflexive Relations ,Symmetric and Antisymmetric Relations ,Transitive Relations, Reflexive, Symmetric, and Transitive Closures. Equivalence Relations, Partitions, Comparing Equivalence Relations, Ordering Relations- Partial Orderings, Linear Orderings, Comparable Elements, Optimal Elements in Orderings. Functions-Basic Definitions, Functions as Rules, Functions as Sets, Recursively Defined Functions, Graphs of Functions, Equality of Functions, Restrictions of Functions, Partial Functions,1-1 and Onto Functions ,Operations on Functions- Composition of Functions, Inverses of Functions, Other Operations on Functions, Sequences and Subsequences, The Pigeon-Hole Principle.	
Unit 4: Graph Theory **7hrs**	CO4
Definitions, Trees-Properties of Trees, Rooted Trees, Spanning Trees, Planar Graphs, on-planar Graphs, Polyhedra, Coloring, Coloring in General, Coloring Edges, Euler Paths and Circuits, Hamilton Paths, Matching in Bipartite Graphs, Generating Functions. Trees: Tree Terminologies, Rooted Trees, Path Length in Rooted Trees, Prefix Codes, Spanning Trees, Fundamental Cut Sets and Circuits, Max flow –Min Cut Theorem (Transport Network). Applications of Graph Theory.	
Unit 5:Counting **7hrs**	
Counting-The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients and Identities, Generalized Permutations and Combinations, Generating Permutations and Combinations .	CO5

Unit 6: Discrete Probability **7hrs**	
An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance. Algebraic Structures: Introduction Semigroup, Monoid, Group, Abelian Group, Permutation Groups, Cosets, Normal Subgroup, Codes and Group Codes, Ring, Integral Domain, Field. Applications of Algebraic Structures.	CO6

Text Books

1. Discrete Mathematics for Computer Science, by Gary Haggard,John Schlipf,Sue Whitesides,Thomson BROOKS/COLE.
2. Discrete Mathematics,An Open Introduction,Oscar Levin-3rd Edition.
3. Discrete Mathematics and Its Applications,Seventh Edition-Kenneth H.Rosen.

Reference Books

1. Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, "Discrete mathematical structures", 6th Edition, Prentice Hall of India.
2. Edgar G. Goodaire, Michael M. Parmenter, "Discrete Mathematics with Graph Theory", 3rd Edition,Pearson Education.
3. Tremblay J. S., "Discrete mathematical structures with application", 3rdEdition, Tata McGraw Hill.
4. Lipschutz Seymour, "Discrete mathematics", 4th Edition, Tata McGraw-Hill.
5. Johnsonbaugh Richard, "Discrete Mathematics", 7th edition, Pearson.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318202: Data Structure and Algorithm

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical:	**Practical:**		**ESE:50**
Prerequisite : Problem Solving & Programming		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. The course is intended to provide the foundations of the practical implementation and usage of Data Structures and Algorithms to ensure that the learner evolves into a competent programmer capable of designing and analyzing implementations of data structures and algorithms for different kinds of problems.
2. To understand the standard and abstract data representation methods.
3. To acquaint with the structural constraints and advantages in usage of the data.
4. To understand various data structures, operations on it and the memory requirements
5. To understand various data searching and sorting methods.
6. To understand various algorithmic strategies to approach the problem solution.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.

CO2: Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution. Study linear data structure.

CO3: Demonstrate use of sequential data structures- Linked lists to store and process data. Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.

CO4: Understand, Implement and apply principles of data structures-stack and queue to solve computational problems

CO5: Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.

CO6: Apply non-linear data structures for solving problems of various domain.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318202: Data Structure and Algorithm

Course Content	
Unit 1: Introduction to Data Structure & Algorithm **7hrs**	**CO**
Introduction: From Problem to Program (Problem, Solution, Algorithm, Data Structure and Program. Data Structures: Data, Information, Knowledge, and Data structure, Abstract Data Types (ADT), Data Structure Classification **Algorithms:** Problem Solving, Introduction to algorithm, Characteristics of algorithm, Algorithm design tools: Pseudo-code and flowchart. **Complexity of algorithm:** Space complexity, Time complexity, Asymptotic notation- Big-O, Theta and Omega, finding complexity using step count method, Analysis of programming constructs-Linear, Quadratic, Cubic, Logarithmic.	CO1
Unit 2:Sequential Searching & Sorting Algorithms **9hrs**	CO2
Concept of Sequential Organization, Overview of Array, Array as an Abstract Data Type, Operations on Array, Merging of two arrays, Storage Representation and their Address Calculation: Row major and Column Major, Multidimensional Arrays: Two-dimensional arrays, n-dimensional arrays. **Searching:** Search Techniques-Sequential Search/Linear Search, Variant of Sequential Search- Sentinel Search, Binary Search **Sorting:** Types of Sorting-Internal and External Sorting, Comparison Based Sorting Methods- Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Shell Sort, Non-comparison Based Sorting Methods-Radix Sort, Counting Sort, and Bucket Sort	
Unit 3: Linked Lists **6hrs**	CO3
Introduction to Static and Dynamic Memory Allocation, **Linked List:** Introduction of Linked Lists, Realization of linked list using dynamic memory management, Operations **Types of Linked List:** singly linked, linear and Circular Linked Lists, Doubly Linked List Primitive Operations on Linked List-Create, Traverse, Search, Insert, Delete	
Unit 4: Stack & Queue **7hrs**	CO4
Stack: Basic concept, Representation of Stacks Using Sequential Organization, stack operations Applications of Stack- Expression Evaluation and Conversion, Polish notation and expression conversion, Need for prefix and postfix expressions, Postfix expression evaluation. **Queue :** Basic concept, Representation of Queue using Sequential organization, Queue Operations, Circular Queue and its advantages, Multi-queues, Linked Queue and Operations**.** **Deque**-Basic concept, Input restricted and Output restricted, Priority Queue	
Unit 5: Graphs **7hrs**	
Basic Concepts, Storage representation, Adjacency matrix, adjacency list, adjacency multi list, inverse adjacency list. **Traversals**-depth first and breadth first, Minimum spanning Tree, Greedy algorithms for computing minimum spanning tree- Prims and Kruskal Algorithms, Dikjtra's Single source shortest path, All pairs shortest paths- Flyod-Warshall Algorithm Topological ordering	CO5
Unit 6: Trees **6hrs**	

Tree- basic terminology, General tree and its representation, Binary tree- Traversals (recursive and non-recursive)- Inorder, Preorder, Post order, Depth first and breadth first.Binary Search Tree (BST), BST operations.	

Text Books

1. Horowitz, Sahani, Dinesh Mehata, "Fundamentals of Data Structures in C++"‖, Galgotia Publisher, ISBN: 8175152788, 9788175152786.
2. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", Wiley Publication, ISBN: 978-1-118-29027-9

Reference Books

1. 1. Steven S S. Skiena, "The Algorithm Design Manual", Springer, 2nd ed. 2008 Edition, ISBN-13: 978-1849967204, ISBN-10: 1849967202.
2. Allen Downey, Jeffery Elkner, Chris Meyers, "How to think like a Computer Scientist: Learning with Python", Dreamtech Press, ISBN: 9789351198147.
3. M. Weiss, "Data Structures and Algorithm Analysis in C++", 2nd edition, Pearson Education,2002, ISBN-81-7808-670-0.
4. Brassard and Bratley, "Fundamentals of Algorithmic", Prentice Hall India/Pearson Education,ISBN 13-9788120311312.
5. Yashwant Kanetkar & A. Kanetkar, "Let us Python", BPB Publisher, ISBN: 9789389845006

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318203: Object Oriented Programming

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**CIA: 25**
Practical: --	**Practical: -**		**ESE:50**
Prerequisite : Students Should Have Knowledge of Basic Programming Language.		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To teach the student the concepts of object oriented and procedure programming
2. To differentiate between functions, classes and objects
3. To learn to overload functions and operators
4. To design applications using dynamic memory management techniques

Course Outcomes:

On completion of the course, learner will be able to–

CO1: To differentiate object oriented programming and procedural programming.

CO2: To construct classes, functions and objects

CO3: To implement the constructors, destructors and inheritance.

CO4: To develop programs using dynamic memory management techniques

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318203: Object Oriented Programming

Course Content	
Unit 1: Principal of Object-Oriented Programming **7hrs**	**CO**
Object Oriented Programming Paradigm, Basic Concept of OOP, Benefits of OOP, Application of OOP, Structure of C++ Program, Tokens, Keywords, Identifiers, Constant, Basic Data Types, Operators, Operator Overloading, Call by Reference	CO1
Unit 2: Classes and Object **7hrs**	CO2
Specifying Classes, Defining Member Function, Nesting of Member function, Private Member function, Arrays within a class, Static Data Members, Arrays of Object, Friendly Function, Object as Function arguments	
Unit 3: Constructor and Object Overloading **7hrs**	CO3
Constructors, Parameterised Constructor, Multiple Constructor, Dynamic Initialization, Copy Constructor, Destructors, Operator Overloading, Overloading Unary Operator, Overloading Binary Operator, Data Conversion	
Unit 4: Inheritance and Pointer **7hrs**	CO4
Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Pointers, Pointer Expression and Arithmetic, Pointers and Function, Pointers to Object, Virtual Function, Basic I/O Functions.	

Text Books

1. Object Oriented Programming with C++, by E. Balagurusamy, McGraw-Hill Publication
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

Reference Books

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Edu.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

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Sem-III

2318204: Object Oriented Programming Laboratory

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory:	**Th:**	**Theory**	**CIA:**
Practical: --2hrs/week	**Practical: --01**		**ESE:**
Prerequisite : Students Should Have Knowledge of Basic Programming Language.		**Pract:**	**--50**
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Apply concepts of object-oriented paradigm.
2. Design and implement models for real life problems by using object-oriented programming.
3. Develop object-oriented programming skills.
4. Design applications using dynamic memory management techniques

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Differentiate various programming paradigms..

CO2: Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems

CO3: Identify relationship among objects using inheritance and polymorphism

CO4: Handle different types of exceptions and perform generic programming

CO5: Use file handling for real world application

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S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318204: Object Oriented Programming Laboratory

List Of Experiment		CO
Expt. No 1	Study of C++ Standard library functions	CO1
Expt. No 2	Write a C++ program to find the sum of individual digits of a positive integer.	CO2
Expt. No 3	Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.	
Expt. No 4	Write a C++ program to find both the largest and smallest number in a list of integers	CO3
Expt. No 5	Program to illustrate default constructor, parameterized constructor and copy constructors	
Expt. No 6	Write a Program to Demonstrate Friend Function and Friend Class.	CO4
Expt. No 7	Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.	
Expt. No 8	Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members	CO4

Text Books

Object Oriented Programming with C++, by E. Balagurusamy, McGraw-Hill Publication

1. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

Reference Books

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Edu.

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318205:Data Structure and Algorithm Laboratory

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory:	**Th:**	**Theory**	**CIA:**
Practical: 2hrs/week	**Practical: 01**		**ESE:**
Prerequisite : Problem Solving & Programming		**Pract:**	--
		Oral:	25
		Termwork	--

Course Objectives: The student should be able to

To understand basic techniques and strategies of algorithm analysis, the memory requirement for various datastructures like array, linked list, stack, queue, graph ,tree etc using concepts of python programming language

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Use algorithms on various linear data structure using sequential organization to solve real life problems.

CO2: Analyze problems to apply suitable searching and sorting algorithm to various applications.

CO3: Analyze problems to use variants of linked list and solve various real life problems.

CO4: Designing and implement data structures and algorithms for solving different kinds of problems.

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S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318205:Data Structure and Algorithm Laboratory

List Of Experiment		CO
Expt. No 1	In second year computer engineering class, group A student's play cricket, group B students play badminton and group C students play football. Write a Python program using functions to compute following: - 1.List of students who play both cricket and badminton 2.List of students who play either cricket or badminton but not both 3.Number of students who play neither cricket nor badminton 4.Number of students who play cricket and football but not badminton.	CO1
Expt. No 2	Write a Python program to store marks scored in subject "Fundamental of Data Structure" by N students in the class. Write functions to compute following: a) The average score of class b) Highest score and lowest score of class c) Count of students who were absent for the test d) Display mark with highest frequency	CO2
Expt. No 3	Write a Python program to compute following computation on matrix: a)Addition of two matrices B) Subtraction of two matrices c) Multiplication of two matrices d) Transpose of a matrix	
Expt. No 4	Write a Python program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using a) Selection Sort b) Bubble sort and display top five scores	CO3
Expt. No 5	Write a Python program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using quick sort and display top five scores.	
Expt. No 6	Queues are frequently used in computer programming, and a typical example is the creation of a job queue by an operating system. If the operating system does not use priorities, thenthe jobs are processed in the order they enter the system. Write Python program for simulating job queue. Write functions to add job and delete job from queue	CO4
Expt. No 7	Implement Python program for expression conversion as infix to postfix and its evaluation using stack based on given conditions: 1. Operands and operator, both must be single character. 2. Input Postfix expression must be in a desired format. 3. Only '+', '-', '*' and '/ ' operators are expected.	
Expt. No 8	Write a Python program to implement a binary tree	CO6

Text Books

1. Horowitz, Sahani, Dinesh Mehata, "Fundamentals of Data Structures in C++"‖, Galgotia Publisher, ISBN: 8175152788, 9788175152786.

2. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", Wiley Publication, ISBN: 978-1-118-29027-9

Reference Books

1. Steven S S. Skiena, "The Algorithm Design Manual", Springer, 2nd ed. 2008 Edition, ISBN-13: 978-1849967204, ISBN-10: 1849967202.
2. Allen Downey, Jeffery Elkner, Chris Meyers, "How to think like a Computer Scientist: Learning with Python", Dreamtech Press, ISBN: 9789351198147.
3. M. Weiss, "Data Structures and Algorithm Analysis in C++", 2nd edition, Pearson Education, 2002, ISBN-81-7808-670-0.
4. Brassard and Bratley, "Fundamentals of Algorithmic", Prentice Hall India/Pearson Education, ISBN 13-9788120311312
5. Yashwant Kanetkar & A. Kanetkar, "Let us Python", BPB Publisher, ISBN: 9789389845006

Open Elective I

<table>
<tr><td colspan="4">SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE
S.Y. B. Tech(AIDS) (2023 Pattern)
Sem-III
2318206A: Deep Learning</td></tr>
<tr><td>Teaching Scheme:</td><td>Credits</td><td colspan="2">Examination Scheme</td></tr>
<tr><td>Theory: 3hrs/week</td><td>Th:03</td><td rowspan="2">Theory</td><td>CIA: 50</td></tr>
<tr><td>Practical: --</td><td>Practical: --</td><td>ESE:50</td></tr>
<tr><td colspan="2" rowspan="4">Prerequisite : Nil</td><td>Pract:</td><td>--</td></tr>
<tr><td>Oral:</td><td>--</td></tr>
<tr><td>Termwork</td><td>--</td></tr>
<tr><td colspan="4">Course Objectives: The student should be able to
1. To introduce the theoretical foundations, algorithms, methodologies, and application of neural networks and deep learning.
2. To design and develop an application-specific deep learning model.
3. To provide the practical knowledge handling and analyzing real world applications.</td></tr>
<tr><td colspan="4">Course Outcomes:
On completion of the course, students will be able to–
CO1. Understand the theoretical foundations, algorithms, and methodologies of Deep Learning.
CO2. Apply the concepts of Convolution Neural Networks and use of popular CNN architectures. CO3. Compare Feed Forward Neural Network and Recurrent Neural Network and learn modeling the time dimension using RNN and LSTM.
CO4. Elaborate unsupervised deep learning algorithms like Autoencoders.
CO5. Explore Representation Learning and Transfer Learning techniques using variants of CNN architecture.
CO6. Evaluate the performance of deep learning algorithms and to provide solutions for various real-world applications.</td></tr>
</table>

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318206A: Deep Learning

Course Content	
Unit 1: Fundamentals of Deep Learning **7hrs**	**CO**
What is Deep Learning?, Multilayer Perceptron ,Feed forward neural, Back propagation, Gradient descent, Vanishing gradient problem. **Activation Functions:** RELU, LRELU, ERELU, Optimization Algorithms. **Hyper parameters:** Layer size, Magnitude , Regularization.	CO1
Unit 2: Convolutional Neural Network **7hrs**	CO2
Introduction to CNN, Convolution Operation, Parameter Sharing, Equivariant Representation, Pooling, Variants of the Basic Convolution Function, The basic Architecture of CNN, Popular CNN Architecture – AlexNet.	
Unit 3: Recurrent Neural Networks **7hrs**	CO3
Recurrent Neural Networks: Types of Recurrent Neural Networks, Feed-Forward Neural Networks vs Recurrent Neural Networks, Long Short-Term Memory Networks (LSTM), Encoder Decoder architectures, Recursive Neural Networks	
Unit 4: Autoencoders **7hrs**	CO4
Undercomplete Autoencoders, Regularized Autoencoders-Sparse Autoencoders, Stochastic Encoders and Decoders, Denoising Autoencoders, Contractive Autoencoders, Applications of Autoencoders.	
Unit 5: Representation Learning **7hrs**	CO5
Greedy Layer Wise Pre-training, Transfer Learning and Domain Adaption, Distributed Representation, Variants of CNN: DenseNet.	
Unit 6:Applications of Deep Learning **7hrs**	CO6
Overview of Deep Learning Applications: Image Classification, Social N/w/ analysis, Speech Recognition, Recommender system, Natural Language Processing.	

Text Books

1. Josh Patterson, Adam Gibson "Deep Learning: A Practitioner's Approach", O'Reilly Media, 2017
2. Ian Goodfellow, YoshuaBengio and Aaron Courville, “Deep Learning”, MIT Press, 2017.
3. Nikhil Buduma, "Fundamentals of Deep Learning Designing Next-Generation Machine Intelligence Algorithms" O'Reilly

Reference Books

1. Umberto Michelucci “Applied Deep Learning. A Case-based Approach to Understanding.
2. Deep Neural Networks” Apress, 2018.
3. Kevin P. Murphy "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012.
4. Giancarlo Zaccone, Md. Rezaul Karim, Ahmed Menshawy "Deep Learning with TensorFlow: Explore neural networks with Python", Packt Publisher, 2017.
5. Antonio Gulli, Sujit Pal "Deep Learning with Keras", Packt Publishers, 2017.
6. Francois Chollet "Deep Learning with Python", Manning Publications, 2017.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318206B:Human Computer Interaction

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**CIA: 50**
Practical: --	**Practical: --**		**ESE:50**
Prerequisite : Basic Computer Knowledge		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To understand the importance of HCI design process in software development.
2. To learn fundamental aspects of designing and implementing user interfaces.
3. To study HCI with technical, cognitive and functional perspectives.
4. To acquire knowledge about a variety of effective human-computer-interactions.
5. To co-evaluate the technology with respect to adapting to changing user requirements in interacting with computers.

Course Outcomes:

On completion of the course, learners should be able to

CO1: To design effective Human-Computer-Interfaces for all kinds of users

CO2: To apply and analyze the user-interface with respect to golden rules of interface

CO3: To analyze and evaluate the effectiveness of a user-interface design

CO4: To implement the interactive designs for feasible data search and retrieval

CO5: To analyze the scope of HCI in various paradigms like ubiquitous computing, virtual reality ,multi-media, World wide web related environments

CO6: To analyze and identify user models, user support, and stakeholder requirements of HCI systems

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-III 2318206B:Human Computer Interaction

Course Content	
Unit 1: Introduction and Foundation of HCI **7hrs**	**CO**
Foundation: Human Memory. **Thinking:** reasoning and problem solving, Emotion, Individual Difference, Psychology and design of Interactive systems, The Computer-Text Entry Device, Positioning, Pointing, Display devices, Devices for virtual reality and 3D Interaction, The Interactions-Models of Interaction. **Importance of User Interface:** Defining user Interface, Brief History of Human Computer Interface, Good and Poor Design- Importance of good design.	CO1
Unit 2: Human Perspective in Interaction Design Process **7hrs**	CO2
Know your user/client: Understanding how people interact with computers, Important human characteristics in Design, Human considerations in design of Business systems, Human Interaction speeds, Performance versus Preference, Methods of gaining an understanding of users, Miller's Law. **Design Guidelines:** Navigating the interface, Organizing the display, Getting user's attention, Facilitating data entry.	
Unit 3: Interaction Styles and HCI in Software Process **7hrs**	CO3
Design, Process of Interaction Design. **Interaction styles:** Command line, Menu Selection, Form fill-in, Direct Manipulation. **Graphical User Interface:** Popularity of Graphics, Concept of direct manipulation. **Web User Interface:** Principles for user interface design, Software life cycle.	
Unit4:Usability Evaluation and Universal Design **7hrs**	CO4
User interface design process: Designing for People: Seven commandments, Usability Assessment in the Design process, Common Usability problems, Practical and Objective measures of Usability, Formative and Summative evaluation, Usability specifications for evaluation. **Evaluation framework:** Paradigms and techniques. **Decide**: a framework to guide evaluation, Universal design principles.	
Unit 5: HCI Paradigms **7hrs**	CO5

Paradigms for Interaction: Time sharing, Video display units, Programming toolkits, Personal computing, The metaphor, Direct manipulation, Hypertext, Computer-supported cooperative work, Agent based interfaces. **Pattern Recognition:** Introduction, Examples, Role of Machine Learning, Pattern Recognition Process, Pattern Recognition in HCI.	
Unit 6: HCI For Mobile And Handheld Devices **7hrs**	CO6
Designing for Mobile and other devices: Anatomy of a Mobile app, Mobile form factors, Handheld format apps, Tablet format apps, Mini-tablet format apps, Mobile Navigation, Content, and control idioms- browse controls, Navigation and toolbars, Drawers, Tap-to-reveal and direct manipulation, Searching, Sorting and Filtering,	

Text Books

1. Alan J, Dix. Janet Finlay, Rusell Beale, "Human Computer Interaction", Pearson Education, 3rd Edition, 2004, ISBN 81-297-0409-9.
2. Jenny Preece, Rogers, Sharp, "Interaction Design-beyond human-computer interaction", WILEY-INDIA, ISBN 81-265-0393-9.
3. Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs, "Designing the User Interface: Strategies for Effective Human- Computer Interaction", 6th Edition,Pearson Education Limited. ISBN 987-1-292-03701-1.

Reference Books

1. Alan Cooper, Robert Reiman, David Cronin, Christopher Noessel, "About Face: The Essentials of Interaction Design", 4 th edition, WILEY, ISBN 978-1-118-76658-3
2. Mary Beth Rosson and John M. Carroll, "Usability Engineering: Scenario-Based Development of Human-Computer Interaction", Morgan Kaufmann Publishers, ISBN 978-1- 558-60712-5
3. Wibert O. Galitz,"The Essential Guide to User Interface Design", WILEY India, ISBN: 978- 1-265-0280-6.
4. Jenifer Tidwell, "Designing Interfaces", O'REILLY, ISBN: 978-1-449-37970-4.
5. Julie A. Jacko (Ed), "The Human-Computer Interaction Handbook", 3rd edition, CRC Press, 2012.
6. Zou J., Nagy G. (2006) "Human-Computer Interaction for Complex Pattern Recognition Problems". 7. Basu M., Ho T.K. (eds) "Data Complexity in Pattern Recognition. Advanced Information and Knowledge Processing", Springer, London

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300201: Principles of Management

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2 hrs/week	**Th:02**	**Theory**	**CIA: 25**
			ESE:50
Prerequisite : Basic Computer Knowledge		**Pract:**	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Comprehend the nature and characteristics of management, its scope, and various functional areas.
2. Recognize the importance of ethical values in managerial decision-making and actions.
3. Explore the concepts of authority, delegation, decentralization, and their impact on organizational structure.
4. Analyze the techniques of coordination in managing complex organizational tasks.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Inculcate the ability to apply multifunctional approach to organizational objective.

CO2: Apply process based thinking and risk based thinking for managing and improving the functioning of an organization

CO3: Examine the inter-relationships between the planning and organising, directing and communicating, controlling and coordinating etc.

CO4: Develop skills for corrective action management and continual improvement project management.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300201: Principles of Management

Course Content	
Unit 1:Introduction to Management 7hrs	**CO**
Definition and scope of management, Evolution of management theories, Functions of management: planning, organizing, leading, and controlling, Managerial roles and skills, Challenges and opportunities in contemporary management, Management As A Science, Art Or Profession; Management And Administration; Difference Between management And Administration. Significance Of Values And Ethics In Management	CO1
Unit 2: Planning, Organizing and Decision Making 7hrs	CO2
Nature, Scope, Objective And Significance Of Planning, Elements And Steps Of Planning, Decision Making Organizing Principles, Span Of Control, Line And Staff Relationship, Authority, Delegation And Decentralization. Effective Organizing, Organizational Structures, Formal And Informal Organizations, Staffing, Importance of planning in achieving organizational goals, Types of plans: strategic, tactical, operational, Process of decision making, Decision-making models and techniques, Setting objectives and formulating strategies	
Unit 3:Organizing and Organizational Structure, Leading and Managing Human Resources 7hrs	CO3
Principles of organizing, Types of organizational structures, Departmentalization and delegation of authority, Coordination and integration of activities, Formal and informal organization, The role of leadership in management, Leadership styles and their impact on organizational culture, Recruitment,Selection,Placement,Promotion,Separation,Performance Appraisal, Meaning And Nature Of Direction, Motivation theories and their application in the workplace, Communication and its importance in effective leadership, Managing diversity and fostering inclusivity.	
Unit 4: Communicating, Controlling And Coordinating 7hrs	CO4
Communication - Meaning And Importance, Communication Process, Barriers To Communication, Steps To Overcome Communication Barriers, Types Of Communication; Motivation Theories – Maslow's Need Hierarchy Theory, Herzberg's Two Factor Theory. **Leadership** – Meaning, Formal And Informal Leadership, Characteristics Of Leadership; Leadership Styles – Autocratic Style, Democratic Style, Participative Style, Laissez Faire Leadership Styles, Transition Leadership, Charismatic Leadership Style, Elements Of Managerial Control, Control Systems, Management Control Techniques, Effective Control Systems. Coordination Concept, Importance, Principles And Techniques Of Coordination, Concept of Managerial Effectiveness.	

Text Books

1. Principles of Management" by P. C. Tripathi and P. N. Reddy

2. Fundamentals of Management" by R. S. Dwivedi
3. "Management: Theory and Practice" by Kris Cole
4. "Principles of Management" by V. S. Ramaswamy and S. Namakumari
5. Essentials of Management" by Harold Koontz and Heinz Weihrich (Indian adaptation by A. Aryasri)

Reference Books

1. Management: Tasks, Responsibilities, Practices" by Peter F. Drucker
2. The Practice of Management" by Peter F. Drucker
3. "Management: Text and Cases" by V. S. P. Rao
4. Management: Concepts and Practices" by Tim Hannagan
5. Management: Principles and Practice" by S. K. Chakraborty and D. Chatterjee
6. Modern Management: Concepts and Skills" by Samuel C. Certo and S. Trevis Certo
7. Management: A Global and Entrepreneurial Perspective" by Heinz Weihrich, Mark Cannice, and Harold Koontz

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300202:Industrial Psychology

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2 hrs/week	**Th:02**	**Theory**	**CIA: 25**
			ESE:50
		Pract:	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Develop an awareness of the major perspectives underlying the field of Industrial Psychology.
2. Apply the principles of human psychology to the corporate field and familiarize them with the current practices in the corporate. .
3. Develop an understanding of group dynamics, norms, and cohesiveness, enabling them to build and lead effective teams within the organization.
4. Familiarize with the field of occupational psychology and its applications in selection, placement, counseling, and training of employees.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: learn about theories of motivation and group behavior.

CO2: Understanding of key concepts, theoretical perspectives, and trends in industrial psychology.

CO3: Analyze and interpret the role of motivation & Morale in behavior modification.

CO4: Analyze the impact of human engineering and physical environment on job performance and employee well-being**.**

CO5: Apply psychological principles in addressing work-related challenges**...**

CO6: Design the role of psychologists in industrial settings and appreciate their impact on employee well-being and organizational performance**.**

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300202:Industrial Psychology

Course Content	
Unit 1:Introduction **6hrs**	**CO**
The role of the psychologist in industry, the field of occupational Psychology: Study of behavior in work situation and applications of Psychological principles to problems of selection, Placement, Counseling and training	CO1
Unit 2: Design of Work Environments **7hrs**	CO2
Human engineering and physical environment techniques of job analysis, Social environment: Group dynamics in Industry Personal psychology, Selection, training, placement, promotion, counseling, job motivations, job satisfaction. Special study of problem of fatigue, boredom and accidents	
Unit 3: Individual and Group Behavior **7hrs**	CO3 ,CO 4
Introduction, Objectives, Individual Behavior,Individual Differences: Meaning, Nature, Dimensions and Values, Factors Influencing Individual Behavior, Group Behavior: Introduction, Objectives, Meaning, Definition and Advantages of Groups, Types of Groups, Group Dynamics, Group Norms Group Cohesiveness	
Unit 4: Morale, Motivation& Counseling **8hrs**	CO5 ,CO 6
Morale: Meaning, Types and Aspects, Characteristics of High and Low Morale and Essential and Psychological Requirements for High Morale, Introduction, Objectives, Meaning, Importance and Types of Motivation in Industry, Monetary and Non-Monetary Incentives, Fatigue, Boredom and Monotony: Meaning, Causes and Remedies, Introduction, Objectives, Counseling: Meaning, Significance, Types and Process, Employee Health, Safety and Security, Industrial Accidents: Accident Proneness and Prevention	

Text Books

1. Tiffin, J and McCormic E.J., Industrial Psychology, Prentice Hall, 6th Edn., 1975.
2. McCormic E.J., Human Factors Engineering and Design, McGraw Hill, 4th Edn.,1976.
3. Mair, N.R.F., Principles of Human relations
4. Gilmer, Industrial Psychology
5. Ghiselli & Brown, Personnel and Industrial Psychology.
6. Myer, Industrial Psychology.
7. Dunnete, M.D., Handbook of Industrial and Organizational Psychology.
8. Blum & Taylor, Industrial Psychology

Reference Books

1. Miner J.B. (1992) Industrial/Organizational Psychology. N Y : McGraw Hill.
2. Blum & Naylor (1982) Industrial Psychology. Its Theoretical & Social Foundations CBSPublication.
3. Aamodt, M.G. (2007) Industrial/Organizational Psychology : An Applied Approach (5 th edition)
4. Wadsworth/Thompson : Belmont, C.A.Blum M.L. Naylor J.C., Horper& Row, Industrial Psychology, CBS Publisher, 1968
5. Luthans, Organizational Behaviour, McGraw Hill, International, 1997
6. Morgan C.t.,King R.A.,JohnRweisz&JohnSchoples, Introduction to Psychology, McHraw Hill, 1966
7. Schermerhorn J.R.Jr., Hunt J.G &Osborn R.N., Managing, Organizational Behaviour, John Willy

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300203: Design Thinking

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 1hrs/week	**Th:01**	**Theory**	**CIA: 25**
Practical: 2 hrs/week	**Practical: 01**		**ESE:50**
		Pract:	**25**
		Oral:	**25**
		Termwork	**--**

Course Objectives:

The student should be able to

1. Learn design thinking concepts and principles
2. Use design thinking methods in every stage of the problem
3. Learn the different phases of design thinking
4. Apply various methods in design thinking to different problems

Course Outcomes:

On completion of the course, learner will be able to

CO1. Define key concepts of design thinking

CO2. Practice design thinking in all stages of problem solving

CO3. Apply design thinking approach to real world problems

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2300203: Design Thinking

Course Content	
Unit 1 Introduction, Understand, Observe and Define The Problem 7hrs	**CO**
Why Design? - Four Questions, Ten Tools - Principles of Design Thinking - The process of Design Thinking - How to plan a Design Thinking project. Search field determination - Problem clarification - Understanding of the problem - Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design - Point-of-View Phase - Characterization of the target group - Description of customer needs	CO1
Unit 2 Ideation, Prototyping, Testing and Implementation 7hrs	CO2
Ideate Phase - The creative process and creative principles - Creativity techniques - Evaluation of ideas - Prototype Phase - Lean Startup Method for Prototype Development - Visualization and presentation techniques. Test Phase - Tips for interviews - Tips for surveys - Kano Model - Desirability Testing - How to conduct workshops - Requirements for the space - Material requirements - Agility for Design Thinking	

Text Books

1. Christian Mueller-Roterberg, Handbook of Design Thinking - Tips &Tools for how to design thinking.
2. Designing for Growth: a design thinking tool kit for managers By Jeanne Liedtka and Tim Ogilvie.
3. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation by Tim Brown.

Reference Books

1. Johnny Schneider, “Understanding Design Thinking, Lean and Agile”, O'Reilly Media, 2017.
2. Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.
3. HassoPlattner, ChristophMeinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011
4. http://ajjuliani.com/design-thinking-activities/
5. https://venturewell.org/class-exercises

LIST OF EXPERIMENTS:

1. Case study on understanding of the design thinking problems.
2. Case study on observations of the parameters of design thinking problems.
3. Case study on defining design thinking problems.
4. Case study on description of customer needs of the parameters of design thinking problems.
5. Case study of ideation phase of solving design thinking problems

6. Case study of prototyping phase of solving design thinking problems
7. Case study of testing phase of solving design thinking problems
8. Case study of implementation phase of solving design thinking problems

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) (2023 Pattern)

Sem-III

2300204 : Community Engagement Project

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	**Th:02**	**Theory**	**CIA: --**
Practical: 4 hrs/week			**End-Sem:--**
		Pract:	25
		Oral:	25
		Termwork	--

Course Objectives: The student should be able to

1. sensitize the students to the living conditions of the people in the surroundings.
2. bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability.
3. make students aware of their inner strength and help them to find new /out of box solutions to the social problems.
4. make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
5. help students to initiate developmental activities in the community in coordination with public and government authorities.
6. develop a holistic life perspective among the students by making them to study culture, traditions, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Survey for the development of the community.
CO2: Interpret the social issues that confront the vulnerable / marginalized sections of the society.
CO3: Build team for societal change.
CO4: Create an opportunity to familiarize themselves with urban / rural community they live in.
CO5: plan activities based on the focused groups.
CO6: implement the ways of transforming the society through systematic programme implementation.

PROCEDURE

Students in a group (Maximum 5) can take up a planned community work for minimum of 50 hours. Evaluation of student's work will be based on the planning, execution and documentation of work, and a viva-voce by Departmental panel.

A group of students could be assigned for a particular habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, so as to enable them to commute from their residence and return back by evening or so.

The Community Service Project is a twofold one

i. First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. For ex., a student of Arts will focus on socio-economic conditions, social survey and about the Government's social security schemes. This should not be viewed as a duplication of work by the Village or Ward volunteers; rather, it could be another primary source of data.
ii. Secondly, the student/s could take up a project work related to following domains.

a. Agriculture
b. Health
c. Marketing and Cooperation
d. Animal Husbandry
e. Horticulture
f. Fisheries
g. Sericulture
h. Revenue and Survey
i. Natural Disaster Management
j. Irrigation
k. Law & Order
l. Excise and Prohibition
m. Mines and Geology
n. Energy

The assessment is to be conducted for 50 marks. The number of credits assigned is 2. Later as per the present practice the marks are converted into grades and grade points to include finally in the SGPA and CGPA.

The weightings shall be:

Project Report	50%
Presentation	50%

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

2318701: PC Repairing Course

Teaching Scheme:	**Credits**	**Examination Scheme:**
		CIA :
PR : 02 Hrs./Week	**Practical: 02**	**ESE :**
		TW :

Course Objectives:-

The student should be able to

1. Understand different power transmitting elements.
2. Learn about Basic Hardware and their Working of a Computer System.

Course Outcomes:-

On completion of the course, learner will be able to

- CO1: Illustrate and elaborate different power transmitting elements.
- CO2: To Identify and Fix the Problem in PC
- CO3: To Study various Hardware Parts of Computer System

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-III 2318701: PC Repairing Course

Practical List

Module 1	Introduction to Computer, Hardware, Block Diagram Detail, Parts of Computer.	CO1
	Motherboard Parts : Identification of Ports, Chip, Slot, Connector, etc.	
	SMPS: SMPS Pin Detail, SMPS Voltage, SMPS Checking.	
Module 2	Hard Disk: Types, Identification, CD / DVD Drive: Types Identification UPS : Types, Identification & Testing.	CO2
	Computer Assembling & Dissembling.	
	Windows Installation (win 7, 8, & 10) without data lost.	
Module 3	Dual Booting & Multi Booting, Driver Installation (offline / online)	CO3
	Software Installation, Antivirus Installation, Bios Setting	
	Windows Shortcut key & Run Command, Control Panel setting	
	Data recovery from Hard Disk, Memory Car & Pen Drive etc., Make Bootable Pen Drive, Password Breaking	

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-III VAC181 - Advanced Python Programming

Teaching Scheme: **TH :** **PR : 02 hrs./week**	**Credits** **Th:** **Practical: 01**	**Examination Scheme:** **CIA :** **ESE :** **TW : 25**

Course Objectives:-

1. To learn how to design object-oriented programs with Python classes.
2. To learn about reading, writing and implementing other operation on files in Python.
3. To implement threading concept and multithreading on Python
4. To design GUI Programs and implement database interaction using Python.
5. To know about use of regular expression and handling exceptions for writing robust python programs.

Course Outcomes:-

On completion of the course, learner will be able to

CO1: To implement OOP concepts in Python including Inheritance and Polymorphism

CO2: to work with files and perform operations on it using Python.

CO3: Ability to implement regular expression and concept of threads for developing efficient program

CO4: Ability to implement exception handling in Python applications for error handling.

CO5: Knowledge of working with databases, designing GUI in Python and implement networking in Python

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-III

VAC181 - Advanced Python Programming

Sr. no.	Practical Title	CO
1	Write a program to Python program to implement concepts of OOP such as a. Types of Methods b. Inheritance c. Polymorphism	CO1
2	Write a program to Python program to implement concepts of OOP such as a. Abstract methods and classes b. Interfaces	CO1
3	Write a program to Python program to implement various file operations.	CO2
4	Write a program to Python program to demonstrate use of regular expression for suitable application.	CO3
5	Write a Program to demonstrate concept of threading and multitasking in Python	CO3
6	Write a Python Program to demonstrate different types of exception handing.	CO4
7	Write Python Program to create application which uses date and time in Python	CO4
8	Write a Python program to create server-client and exchange basic information	CO5
9	Write a Python Program to work with databases in Python to perform operations such as a. Connecting to database b. Creating and dropping tables c. Inserting and updating into tables	CO5
10	Write a GUI Program in Python to design application that demonstrates a. Different fonts and colors b. Different Layout Managers c. Event Handling	CO5
Books & Other Resources		
Text Books:-		

1. Paul Gries , Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 3rd Edition, 2018
2. Programming through Python, M. T Savaliya, R. K. Maurya, G M Magar, Revised Edition, Sybgen Learning India, 2020

Reference Books:-

1. Advanced Python Programming, Dr. Gabriele Lanaro, Quan Nguyen, SakisKasampalis, Packt Publishing, 2019
2. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018
3. Python: The Complete Reference, Martin C. Brown, McGraw Hill, 2018
4. Beginning Python: From Novice to Professional, Magnus Lie Hetland, Apress, 2017
5. Programming in Python 3, Mark Summerfield, Pearson Education, 2nd Ed, 2018

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318207 Computer Architecture and Organization

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**In-Sem: 50**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Fundamentals of Programming Languages-I & II and Basics of Electronics Engineering		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To understand the structure, function and characteristics of computer systems.
2. To understand the design of the various functional units and components of digital computers.
3. To identify the elements of modern instructions sets and explain their impact on processor design.
4. To explain the function of each element of a memory hierarchy, identify and compare different methods for computer I/O.
5. To compare simple computer architectures and organizations based on established performance metrics.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.

CO2:Analyze the principles of computer architecture using examples drawn from commercially available computers.

CO3:Evaluate various design alternatives in processor organization.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318207 Computer Architecture and Organization

Course Content	
`Unit 1: Computer Evolution and Performance **7hrs**	**CO**
Computer Organization and Architecture, Structure and Function, Evolution of computers, **Computer function and interconnection** Computer Components, Computer Function, Interconnection structure, bus interconnection. **Computer Arithmetic** The Arithmetic and Logic Unit, addition and subtraction of signed numbers. **Floating point representation and operations** IEEE standard, arithmetic operations.	CO1
Unit 2: Computer Memory System **7hrs**	
Characteristics of memory system, The memory hierarchy. **Cache Memory**- Cache memory principles, Elements of cache design- cache address, size, mapping functions. **Internal Memory**- semiconductor main memory, advanced DRAM organization. **External Memory**- Hard Disk organization.	CO2
Unit 3: Input and Output System **7hrs**	
I/O modules- Module function and I/O module structure. **Programmed I/O** overview, I/O commands, I/O instructions, Interrupt driven I/O- interrupt processing, design issues. **Direct Memory Access**- drawbacks of programmed and interrupt driven I/O, DMA functions.	CO3
Unit 4: Instruction Sets **7hrs**	
Characteristics and Functions- machine instruction characteristics, types of operands. **Types of operations**- data transfer, arithmetic, logical, conversion, input-output, system control, and transfer of control. **Addressing modes and Formats**- Addressing modes- immediate, direct, indirect, register, register indirect, displacement and stack.	CO4
Unit 5:Processor Organization **7hrs**	
Processor organization, Register organization- user visible registers, control and status registers. **Instruction Cycle**- The machine cycle and Data flow. **Instruction Pipelining**- Pipelining Strategy, pipeline performance, pipeline hazards, dealing with branches.	CO5

Design Issues- instruction level and machine parallelism, Instruction issue policy.	
Unit 6:Basic Processing Unit **7hrs**	
Fundamental Concepts- register transfer, performing arithmetic or logic operations, fetching a word from memory, storing a word in memory. **Hardwired control, Micro-programmed control**- micro instructions, microprogram sequencing, wide branch addressing.	CO6

Text Books

1. W. Stallings, Computer Organization and Architecture: Designing for performance‖, Pearson Education/ Prentice Hall of India, 2003, ISBN 978-93-325-1870-4, 7 th Edition.
2. Zaky S, Hamacher, Computer Organization‖, 5th Edition, McGraw-Hill Publications, 2001, ISBN- 978-1-25-900537-5, 5th Edition.

Reference Books

1. John P Hays, Computer Architecture and Organization‖, McGraw-Hill Publication, 1998, ISBN:978-1-25-902856-4, 3rd Edition.
2. Miles Murdocca and Vincent Heuring, Computer Architecture and Organization- an integrated approach, Wiley India Pvt. Ltd, ISBN:978-81-265-1198-3, 2nd Edition
3. A. Tanenbaum, Structured Computer Organization‖, Prentice Hall of India, 1991 ISBN: 81 – 203 – 1553 – 7, 4th Edition
4. Patterson and Hennessy, Computer Organization and Design‖, Morgan Kaufmann Publishers In, ISBN 978-0-12-374750-1, 4th Edition.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318208: Theory of Computation

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 3hrs/week	**Th:03**	**Theory**	**In-Sem: 50**
Practical:	**Practical:**		**End-Sem:50**
Prerequisite : Discrete Mathematics		**Pract:**	**--**
		Oral:	
		Termwork	**--**

Course Objectives: The student should be able to

1. To know the applicability of the model of computation to different problems using format languages.
2. To understand in detail the relationship among formal languages, formal grammars and Automata by context free sense.
3. To learn the design of Finite Automata, Pushdown Automata and Turing Machine for processing of formal languages.
4. To study the theory of computability and complexity for algorithm design using decidability

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Construct finite automata and its variants to solve theory of computing problems.

CO2: Write regular expressions for the regular languages and finite automata.

CO3: Identify types of grammar, design and simplify Context Free Grammar.

CO4: Construct Pushdown Automata machine for the Context Free Language.

CO5: Design and analyze Turing machines for formal languages.

CO6: Understand decidable and undecidable problems, analyze complexity classes.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318208: Theory of Computation

Course Content	
Unit 1: Finite Automata and the Languages They Accept 7hrs	**CO**
Finite Automata: Examples and Definitions, Accepting the Union, Intersection, or Difference of Two Languages , Distinguishing One String from Another , The Pumping Lemma, How to Build a Simple Computer, Using Equivalence Classes, Minimizing the Number of States in a Finite Automaton. Finite State Machine with output: Moore and Mealy machines - Definition, Construction, Inter-Conversion.	CO1
Unit 2: Regular Expressions, Nondeterminism, and Kleene's Theorem 7hrs	CO2
Regular Languages and Regular Expressions ,Nondeterministic Finite Automata , The Nondeterminism in an NFA Can Be Eliminated ,Kleene's Theorem, Part 1, Kleene's Theorem, Part 2. **Regular Expressions (RE) :** Definition and Identities of RE, Operators of RE, Equivalence of two regular expressions, Equivalence of regular expressions and regular languages (RL), Conversion of RE to FA using direct method, Conversion of FA to RE using Arden's theorem, Pumping lemma for RLs, Closure properties of RLs, Applications of Regular Expressions.	
Unit 3: Context-Free Languages 7hrs	CO3
Formal definition of a context-free grammar, Examples of context-free grammars, Designing context-free grammars ,Ambiguity, Chomsky normal form, Pushdown Automata, Formal definition of a pushdown automaton ,Examples of pushdown automata, Equivalence with context-free grammars, on-Context-Free Languages ,The pumping lemma for context-free languages ,Deterministic Context-Free Languages ,Properties of DCFLs ,Deterministic context-free grammars ,Relationship of DPDAs and DCFGs ,Parsing and LR(k) Grammars.	
Unit 4: Pushdown Automata (PDA) 7hrs	CO4
Definitions and Examples, Deterministic Pushdown Automata and Nondeterministic PDA, A PDA from a Given CFG, A CFG from a Given PDA, Parsing. Post Machine (PM): Definition and construction of Post Machine.	
Unit 5: Turing Machines 7hrs	
A General Model of Computation , Turing Machines as Language Acceptors ,Turing Machines That Compute, Partial Functions ,Combining Turing Machines , Multitape Turing Machines ,The Church-Turing Thesis ,Nondeterministic Turing Machines ,Universal Turing Machines.	CO5
Unit 6: Decidability and Reducibility 7hrs	
Decidable Languages-Decidable problems concerning regular languages, Decidable problems concerning context-free languages Undecidability-The diagonalization method, An undecidable language, A Turing-unrecognizable language. Undecidable Problems from Language Theory-Reductions via computation histories , A Simple Undecidable Problem ,Mapping Reducibility -Computable functions, Formal definition of mapping reducibility.	CO6
Text Books	

1. John C. Martin ,Introduction to Languages and The Theory of Computation, Fourth Edition.
2. Michael Sipser, Introduction to the Theory of Computatio, 3rd Edition ISBN- 13:978-81-315-2529-6.

Reference Books

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, Introduction to Automata Theory
    a. Languages and Computation, Addison-Wesley, ISBN 0-201-44124-1.
2. K.L.P Mishra, N. Chandrasekaran, Theory of Computer Science: Automata, Languages and Computation, Prentice Hall India, 2nd Edition.
3. Daniel Cohen, “Introduction to Computer Theory”, Wiley & Sons, ISBN 97881265133454.
4. Kavi Mahesh, “Theory of Computation: A Problem-Solving Approach”, Wiley India, ISBN-1081265331106.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318209 :Data Base Management System

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**In-Sem: 25**
Practical: --	**Practical: -**		**End-Sem:50**
Prerequisite : Discrete Mathematics , Data Structures and Algorithms		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To understand the fundamental concepts of Database Management Systems
2. To acquire the knowledge of database query languages and transaction processing
3. To understand systematic database design approaches
4. To acquire the skills to use a powerful, flexible, and scalable general-purpose databases to handle Big Data
5. To be familiar with advances in databases and applications

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Analyze and design Database Management System using ER model

CO2: Implement database queries using database languages

CO3: Normalize the database design using normal forms

CO4: Apply Transaction Management concepts in real-time situations

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318209 :Data Base Management System

Course Content	
Unit 1: Introduction to Database Management Systems and ER Model 7hrs	**CO**
Introduction, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models. **Database Design and ER Model**: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity-Relationship Model, ER Diagram, Design Issues, Extended E-R Features, converting ER and EER diagram into tables	CO1
Unit 2: SQL ,PL/SQL 8hrs	CO2
SQL: Characteristics and Advantages, SQL Data Types and Literals, DDL, DML, DCL, TCL, SQL Operators. **Tables**: Creating, Modifying, Deleting, Updating. **SQL DML Queries**: SELECT Query and clauses, Index and Sequence in SQL. **Views**: Creating, Dropping, Updating using Indexes, Set Operations, Predicates and Joins, Set membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions, SQL Functions, Nested Queries.**PL/SQL**: Concept of Stored Procedures and Functions, Cursors, Triggers, Assertions, Roles and Privileges.	
Unit 3: Relational Database Design 7hrs	CO3
Relational Model: Basic concepts, Attributes and Domains, CODD's Rules. **Relational Integrity**: Domain, Referential Integrities, Enterprise Constraints. **Database Design**: Features of Good Relational Designs, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF	
Unit 4: Database Transaction Management 7hrs	CO4
Introduction to Database Transaction, Transaction states, ACID properties, Concept of Schedule, Serial Schedule. **Serializability**: Conflict and View, Cascaded Aborts, Recoverable and Non-recoverable Schedules. **Concurrency Control**: Lock-based, Time-stamp based Deadlock handling. **Recovery methods**: Shadow-Paging and Log-Based Recovery, Checkpoints. **Log-Based Recovery**: Deferred Database Modifications and Immediate Database Modifications	

Text Books

1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition
2. Connally T, Begg C., "Database Systems", Pearson Education, ISBN 81-7808-861-4
   Pramod J. Sadalage and Martin Fowler, “NoSQL Distilled”, Addison Wesley, ISBN-10: 0321826620, ISBN-13: 978-0321826626

Reference Books

1. C J Date, “An Introduction to Database Systems”, Addison-Wesley, ISBN: 0201144719
2. S.K.Singh, “Database Systems: Concepts, Design and Application”, Pearson Education, ISBN 978-81-317-6092-5
3. Kristina Chodorow, Michael Dierolf, “MongoDB: The Definitive Guide”, O‘Reilly Publications, ISBN: 978-1-449-34468-9
4. Adam Fowler, “NoSQL For Dummies”, John Wiley & Sons, ISBN-1118905628
5. Kevin Roebuck, “Storing and Managing Big Data - NoSQL, HADOOP and More”,

Emereopty Limited, ISBN: 1743045743, 9781743045749
6. Joy A. Kreibich, “Using SQLite”, O'REILLY, ISBN: 13:978-93-5110-934-1
7. Ivan Bayross, “SQL, PL/SQL the Programming Language of Oracle”, BPB Publications ISBN: 9788176569644, 9788176569644
8 Seema Acharya, “Demystifying NoSQL”, Wiley Publications, ISBN: 9788126579969

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318210: Machine Learning

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**In-Sem: 25**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : **1.** Basics of Statistics **2.** Linear Algebra **3.** Calculus **4.** Probability		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To understand the basic concepts of machine learning and apply them for the various problems.
2. To learn various machine learning types and use it for the various machine learning tasks.
3. To optimize the machine learning model and generalize it.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Apply basic concepts of machine learning and different types of machine learning algorithms.

CO2: Differentiate various regression techniques and evaluate their performance.

CO3: Compare different types of classification models and their relevant application.

CO4: Illustrate the tree-based and probabilistic machine learning algorithms.

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318210: Machine Learning

Course Content	
Unit 1: Introduction to Machine Learning **7hrs**	**CO**
What is Machine Learning, Definition, Real life applications, Learning Tasks- Descriptive and Predictive Tasks**,** Types of Learning: Supervised Learning Unsupervised Learning, Semi-Supervised Learning, Reinforcement Learning, Features of Machine Learning	CO1
Unit 2: Preparation and Classification **7hrs**	CO2
Training Vs. Testing Dataset, Dataset Validation Techniques – Hold-out, k-fold Cross validation, Leave-One-Out Cross-Validation (LOOCV), **Binary Classification**: Linear Classification model, Performance Evaluation- Confusion Matrix, Accuracy, Precision, Recall**,** ROC Curves, F-Measure **Multi-class Classification:** Model, Performance Evaluation Metrics – Per-class Precision and Per-Class Recall, weighted average precision and recall -with example, Handling more than two classes, Multiclass Classification techniques -One vs One, One vs Rest	
Unit 3: Regression **7hrs**	CO3
Introduction, Univariate Regression – Least-Square Method, Model Representation, Cost Functions: MSE, MAE, R-Square, Performance Evaluation, Optimization of Simple Linear Regression with Gradient Descent - Example. Estimating the values of the regression coefficients	
Unit 4: Tree based and Probabilistic Model **7hrs**	CO4
Decision Tree – Concepts and Terminologies, Impurity Measures -Gini Index, Information gain, Entropy, Tree Pruning -ID3/C4.5, Advantages and Limitations **Probabilistic Models**: Conditional Probability and Bayes Theorem, Naïve Bayes Classifier, Bayesian network for Learning and Inferencing. Basic of Distance Based Model	

Text Books

1. Ethem Alpaydin, Introduction to Machine Learning, PHI 2nd Edition-2013
2. Peter Flach: Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press, Edition 2012
3. Tom M. Mitchell, Machine Learning, 1997, McGraw-Hill, First Edition

Reference Books

1. C. M. Bishop: Pattern Recognition and Machine Learning, Springer 1st Edition-2013.
2. Ian H Witten, Eibe Frank, Mark A Hall: Data Mining, Practical Machine Learning Tools and Techniques, Elsevier, 3rd Edition
3. Kevin P Murphy: Machine Learning – A Probabilistic Perspective, MIT Press, August 2012.
4. Parag Kulkarni: Reinforcement and Systematic Machine Learning for Decision Making, Wiley IEEE Press, Edition July 2012.
5. Shalev-Shwartz S., Ben-David S., Understanding Machine Learning: From Theory to Algorithms, CUP, 2014
6. Jack Zurada: Introduction to Artificial Neural Systems, PWS Publishing Co. Boston, 2002

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318211: Java Programming Lab

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory:	**Th:**	**Theory**	**In-Sem:**
Practical: --2hrs/week	**Practical: --01**		**End-Sem:**
Prerequisite : Students Should Have Knowledge of Basic Programming Language.		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--25**

Course Objectives: The student should be able to

1. To write programs using abstract classes.
2. To write programs for solving real world problems using java collection frame work.
3. To write multithreaded programs.
4. To write GUI programs using swing controls in Jav

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Able to write programs for solving real world problems using java collection frame work.

CO2: Able to write programs using abstract classes

CO3: Able to write multithreaded programs

CO4: Able to write GUI programs using swing controls in Java.

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318211: Java Programming Lab

List Of Experiment		CO
Expt. No 1	Program to define a structure of a basic JAVA program	CO1
Expt. No 2	Program to define class and constructors. Demonstrate constructors	CO2
Expt. No 3	Program to define class, methods and objects. Demonstrate method overloading.	
Expt. No 4	Program to define inheritance and show method overriding.	CO3
Expt. No 5	Program to illustrate default constructor, parameterized constructor and copy constructors	
Expt. No 6	Program to demonstrate Exception Handling.	CO4
Expt. No 7	Program to demonstrate Multithreading	
Expt. No 8	Program to demonstrate Applet structure and event handling.	CO4

Text Books

1. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH

Reference Books

1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
3. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.
4. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
5. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH Java Programming, D. S. Malik, Cengage Learning

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318212 :Data Base Management System Laboratory

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory:	**Th:**	**Theory**	**In-Sem:**
Practical: 2hrs/week	**Practical: 01**		**End-Sem:**
Prerequisite : Discrete Mathematics , Data Structures and Algorithms		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--25**

Course Objectives: The student should be able to

1 To develop basic Database manipulation skills
2 To develop skills to handle MySQL database
3 To learn understand to develop application using SQL or MySQL databases.

Course Outcomes:

On completion of the course, learner will be able to–
CO1:Implement SQL queries for given requirements, using different SQL concepts
CO2:Implement SQL queries using MySQL
CO3:Implement SQL queries for various set operations
CO4: Implement SQL queries for various aggregate functions
CO5: Implement complex SQL queries based on joins.
CO6: Design and develop application using database considering specific requirements

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318212 :Data Base Management System Laboratory

List Of Experiment		CO
Expt. No 1	Study the installation of MySQL database	CO1
Expt. No 2	Write SQL queries for demonstrating the use of DDL & DML	CO2
Expt. No 3	Write at least10 SQL queries for using various set operations	
Expt. No 4	Write at least 5 SQL queries for using various aggregate functions	CO3
Expt. No 5	Write SQL queries for following & Create the database: Borrower (Roll_no, Name, Date_of_Issue, Name_of_Book, Status) Fine (Roll_no, Date, Amt) • Accept Roll_no and Name_of_Book from user. • Check the number of days (from Date_of_Issue). • If days are between 15 to 30 then fine amount will be Rs 5per day. • If no. of days>30, per day fine will be Rs 50 per day and for days less than 30, Rs. 5 per day. • After submitting the book, status will change from I to R. • If condition of fine is true, then details will be stored into fine table. • Also handles the exception by named exception handler or user define exception handler.	
Expt. No 6	Write SQL queries for demonstrating the use of views in SQL	CO4
Expt. No 7	Write SQL queries for demonstrating the use of triggers in SQL	
Expt. No 8	Write and run a sample PL/SQL Code on MySQL.	CO6

Text Books

3. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition
4. Connally T, Begg C., "Database Systems", Pearson Education, ISBN 81-7808-861-4
Pramod J. Sadalage and Martin Fowler, “NoSQL Distilled”, Addison Wesley, ISBN-10: 0321826620, ISBN-13: 978-0321826626

Reference Books

8. C J Date, “An Introduction to Database Systems”, Addison-Wesley, ISBN: 0201144719
9. S.K.Singh, “Database Systems: Concepts, Design and Application”, Pearson Education, ISBN 978-81-317-6092-5

10. Kristina Chodorow, Michael Dierolf, “MongoDB: The Definitive Guide”, O‘Reilly Publications, ISBN: 978-1-449-34468-9
11. Adam Fowler, “NoSQL For Dummies”, John Wiley & Sons, ISBN-1118905628
12. Kevin Roebuck, “Storing and Managing Big Data - NoSQL, HADOOP and More”, Emereopty Limited, ISBN: 1743045743, 9781743045749
13. Joy A. Kreibich, “Using SQLite”, O'REILLY, ISBN: 13:978-93-5110-934-1
14. Ivan Bayross, “SQL, PL/SQL the Programming Language of Oracle”, BPB Publications ISBN: 9788176569644, 9788176569644
9 Seema Acharya, “Demystifying NoSQL”, Wiley Publications, ISBN: 9788126579969

Open Elective II

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-IV **2318213A Software Project Management**

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**In-Sem: 25**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To understand the fundamentals of Software Project Management
2. To investigate software project planning and management tools
3. To learn software project scheduling and tracking
4. To discuss about the agile project management
5. To know people management in software project

Course Outcomes:

On completion of the course, students will be able to–

1. CO1: Comprehend Project Management Concepts
2. CO2: Use various tools of Software Project Management
3. CO3: Schedule various activities in software projects
4. CO4: Track a project and manage changes
5. CO5: Apply Agile Project Management
6. CO6: Analyse staffing process for team building and decision making in Software Projects and Management

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318213A Software Project Management

Course Content	
Unit 1: Introduction **7hrs**	**CO**
Defining of Software Development Process - Process - Tailoring the Process - Improving the process discipline - Need for implementing discipline. **Software Process Models :** Waterfall Model, Prototyping Model, RAD Model, Incremental Model, Spiral Model, Component Assembly Model - Software Life Cycle.	CO1
Unit 2: Software Development **7hrs**	CO2
Software Development Team : Three Vital Aspects of Software Project Management. **Project Planning:** Top-Down and Bottom-Up Planning - Types of Activity. **Project Duration** : Schedule Monitoring Tools - Gantt Chart, PERT Chart, Critical Path.	
Unit 3: Project Review **7hrs**	CO3
Tracking Meetings - Recovery plans - Schedule Work & Escalation Meetings. **Project Engineering:** Product Requirements - Understanding the Customer Problem to solve - Initial Investigation, Strategies for determining information requirements.	
Unit 4: Problem Solving **7hrs**	CO4
Product Specifications - Defining the Final Product - Data Flow Diagram, Data Dictionary, Structured English, Decision Trees, Decision Tables - Feasibility Study. **Software Testing :** Test Plan - Development Testing : Verification and Validation **General Testing Methods :** White Box and Black Box Testing - Unit Testing - System Integration Testing - Validation Testing - System testing.	

Text Books

1 Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

Reference Books

1. Robert K. Wysocki ―Effective Software Project Management‖ – Wiley Publication, 2011.
2. Walker Royce: ―Software Project Management‖- Addison-Wesley, 1998.
3. Gopalaswamy Ramesh, ―Managing Global Software Projects‖ – McGraw Hill Education (India), Fourteenth Reprint 2013.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318213B: Object Oriented Programming using Java

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**In-Sem: 25**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Students Should Have Knowledge of Basic Programming Language.		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. To teach the student the concepts of object oriented Programming.
2. To learn about Object and Classes
3. To learn concept of Inheritance and Polymorphism
4. Develop Application using Exceptional Handling and Multithreading.

Course Outcomes:

On completion of the course, learners should be able to

CO1: Define and Understand The Object Oriented Concepts and Java Programming Concepts

CO2: Apply Object Oriented Concept on Real Time Scenario

CO3: Use Exceptional Handling and multithreading mechanism to create efficient software's.

CO4: Utilize modern tools and collection framework to create java applications to solve real world problem.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318213B: Object Oriented Programming using Java

Course Content	
Unit 1: Introduction to Java **7hrs**	**CO**
Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java	CO1
Unit 2: Objects and Classes **7hrs**	CO2
Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference	
Unit 3: Inheritance and Polymorphism **7hrs**	CO3
Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	
Unit 4: Multithreading in java **7hrs**	CO4
Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.	

Text Books

2. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH

Reference Books

6. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
7. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.
8. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.
9. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
10. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH
11. Java Programming, D. S. Malik, Cengage Learning

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

2300205A : German Language

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2 hrs/week	**Th:02**	**Theory**	**CIA: 25**
Practical: Nil			**End-Sem:50**
		Pract:	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

1. Understand grammar & structure of the German language and use it in daily basic conversations and communication
2. Speak and write German language
3. Critically think in German

Course Outcomes:

On completion of the course, learner will be able to–

CO1: do the proper pronunciation of the sounds of the German language

CO2: understand a basic vocabulary

CO3: comprehend the basic grammatical structures.

CO4: understand German that is spoken at a moderate conversational speed andthat deals with everyday topics and will be able to engage in simple conversations in everydaysituations.

CO5: demonstrate that they can think critically, read& write with a basic knowledge of non-technical German

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) *(2023 Pattern)*

Sem-IV

2300205A : German Language

Module 1: Introduction **7Hrs**	**CO**
Greetings , Introduction To Basic Phonetics; Writing System; Tones; Spelling Rules ,Introducing Oneself And Others , Talk About Family and Family Members, Express likes and dislikes , Hobbies, Asking For Personal Information ,Talking About Date, Month, Year, Talking About Time ,Talking About Age	CO1
Module 2: Grammar **7Hrs**	CO1 , CO2, CO3
Alphabet- Numerals - Nominal Classifiers – Sentences with Adjectival Predicate – Names of Countries and places- Personal Pronoun- Interrogative Sentences - Structural Particle - Verbs and Verb Conjugation – Articles- Singular and Plural- Prepositions – Negative articles – Ja/Nein and W-Fragen (Yes/No and W- Questions) - Negation – Adjective- Possessive Article – Nominative and Accusative cases – Writing notes, SMS and filling up forms- Listen and Understand Telephonic Conversation and Conversations at specific places- Songs and Quiz	
Module3: Oral Communication **7Hrs**	CO4, CO5
Stellungnahme (Taking a particular stance on a given topic)/ Debate/ Discussions/ Interview/ Role play/ group discussion/ Narration, interview skills etc.	
Module4:Writing Communication **7Hrs**	CO1 & CO5
Writing skills: Formal and Informal letters, Email, SMS blogs, Essays, Report, Article, statistical Analysis, book/Film review etc	

Text Books:

1. Kraft, Wolfgang S. Deutsch Aktuell 1, 7th edition (2017). St. Paul: EMC/ParadigmPublishing. ISBN 978-0-8219-8076-7
2. Kraft, Wolfgang S. Deutsch Aktuell 1 Workbook, 7th edition (2017). St. Paul:EMC/Paradigm Publishing. ISBN 978-0-8219-8078-1

Reference books:

1. Funk, Hermann u.a. (hrsg.): Studio D A1. Deutsch AlsFremdsprache. Kurs Und Übungsbuch.Cornelsen and GOYAL SaaB. , 2009.
2. Funk, Hermann, u.a. (hrsg.): Studio D A1. Deutsch AlsFremdsprache. Sprachtraining. Cornelsenand GOYAL SaaB. , 2009.
3. Hirschfeld, Ursula, Reinke, Kerstin, Stock, Eberhard (hrsg.): Phonothekintensiv. München.Langenscheidt, 2007.
4. Studio 21 A1 Glossardeutsch-englisch, CornelsenVerlag, Berlin, 2013.
5. Tangram aktuell 1, Max HueberVerlag, Ismaning 2005 and GOYAL Publishers, Delhi2005.
6. Swick, Ed: Complete German Grammar.Mcgraw-Hill Publ. Comp. New York City, 2012.
7. Evans, Richard J.: Rereading German History, 1800-1996. From Unification to
8. Reunification.Routledge.London& New York, 1997.
9. Fraser, Catherine C. & Hoffmann, Dierk O. (hrsg.): Pop Culture in Germany! Media, Art andLifestyle.ABC-CLIO.England, 2006.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

2300205B : French Language

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2 hrs/week	**Th:02**	**Theory**	**CIA: 25**
Practical: Nil			**End-Sem:50**
		Pract:	--
		Oral:	--
		Termwork	--

Course Objectives: The student should be able to

4. Understand grammar & structure of the French language and use it in daily basic conversations and communication
5. Speak and write French language
6. Critically think in French

Course Outcomes:

On completion of the course, learner will be able to–

CO1: do the proper pronunciation of the sounds of the French language

CO2: understand a basic vocabulary

CO3: comprehend the basic grammatical structures.

CO4: understand French that is spoken at a moderate conversational speed andthat deals with everyday topics and will be able to engage in simple conversations in everydaysituations.

CO5: demonstrate that they can think critically, read& write with a basic knowledge of non-technical French

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

2300205B : French Language

Module 1: Introduction **7Hrs**	**CO**
Greetings , Introduction To Basic Phonetics; Writing System; Tones; Spelling Rules , Introducing Oneself And Others , Talk About Family and Family Members, Express likes and dislikes, Hobbies, Asking For Personal Information ,Talking About Date, Month, Year, Talking About Time, Talking About Age	CO1
Module 2: Grammar **7Hrs**	CO1, CO2, CO3
Alphabet- Numerals - Nominal Classifiers – Sentences with Adjectival Predicate – Names of Countries and places- Personal Pronoun- Interrogative Sentences - Structural Particle - Verbs and Verb Conjugation – Articles- Singular and Plural- Prepositions – Negative articles –- Negation – Adjective- Possessive Article – Nominative and Accusative cases – Writing notes, SMS and filling up forms- Listen and Understand Telephonic Conversation and Conversations at specific places- Songs and Quiz	
Module3:Oral Communication **7Hrs**	CO4, CO5
Stellungnahme (Taking a particular stance on a given topic)/ Debate/ Discussions/ Interview/ Role play/ group discussion/ Narration, interview skills etc.	
Module4:Writing Communication **7Hrs**	CO1, CO5
Writing skills: Formal and Informal letters, Email, SMS blogs, Essays, Report, Article, statistical Analysis, book/Film review etc	

Text Books:

1. Alter Ego, A1 (ISBN: 9782011554208); Publisher: Hachette; Author: Annie Berthet, Catherine Hugot et al.; Published: 2006;
2. Alter Ego, A1 – Cahier d'activités - A1 (ISBN: 9782011558114); Publisher: Hachette; Author:Annie Berthet, Catherine Hugot et al.; Published: 2006

Reference books:

10. Écho (2e edition), A1 (ISBN: 9782090385885); Publisher: CLE International; Authors: Jacky Girardet, Jacques Pecheur; Published: 2013
11. Écho (2e edition), A1 - Cahier personnel d'apprentissage (ISBN: 9782090385892); Publisher: CLE International; Authors: Jacky Girardet, Jacques Pecheur; Published: 2013.

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2300206: Industrial Economics

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**In-Sem: 25**
Practical: --	**Practical: --**		**End-Sem:50**
		Pract:	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

1. Upon completion of the course, students will gain comprehensive knowledge of industrial organization, serving as a cornerstone for exploring various interconnected fields within the industry.
2. Students will develop a profound understanding of how firms interact within the economy, encompassing areas such as business strategy, corporate finance, marketing, international trade, banking, and organizational economics.
3. The course will offer insights into the historical progression of industrial economies, with a primary focus on contemporary advancements in studying firms' behavior.
4. By the end of the curriculum, learners will be equipped with a holistic perspective on industrial organization, paving the way for exploration into numerous other disciplines linked to the industrial sector.
5.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Including its definition, scope, and economic significance in various sectors.

CO2: Learners will recognize the importance of studying Industrial Economics and its role in economic analysis, decision-making, and influencing diverse fields such as marketing, finance, and international trade.

CO3: analyze the interplay between economic development and industrialization, as well as the impact of industrialization on the agricultural sector.

CO4: Learners will identify and assess key factors influencing industrial development, considering socioeconomic and political influences on industrial growth.

CO5: By the end of the course, students will comprehend the dynamics of competition and cooperation among firms, their implications on industrial outcomes, and the strategies like mergers, takeovers, and acquisitions.

CO6: Learners will be equipped to analyze industrial location decisions, determine the determinants of industrial location, and evaluate theories like Weber's and Florence's to understand industrial location patterns.

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2300206: Industrial Economics

Course Content	
Unit 1 - Introduction to Industrial Economics **7hrs**	**CO**
Definition of Industrial Economics and its scope of study, Understanding the industrial sector's economic significance, Importance of Industrial Economics, Need and Significance of Studying Industrial Economics, Role of Industrial Economics in Economic Analysis, Economic Development, Agricultural Development, and Industrialization, Interplay between Economic Development and Industrialization, Impact of Industrialization on Agricultural Sector, Factors Influencing Industrial Development, Analysis of Key Factors Affecting Industrial Growth, Socioeconomic and Political Factors in Industrial Development.	CO1, CO2
Unit 2- Industrial Decisions and Market Structure. **7hrs**	
Competition and Cooperation in Industries, The concept of Competition and Cooperation among Firms, Implications of Different Approaches on Industrial Outcomes, Firm Behavior and Market Outcomes, Understanding Firm Behavior under Different Market Structures, Relationship between Firm Behavior and Market Outcomes, Cartels, Collusion, Mergers, Takeovers, and Acquisitions, Overview of Cartels and Collusion in Industries, Merger, Takeover, and Acquisition Strategies.	CO3, CO4
Unit 3- Price Competition and Pricing Strategies **7hrs**	
Factors Influencing Pricing Decisions, General Considerations for Pricing Decisions in Various Industries, Market Conditions and Pricing Strategies, Pricing under Perfect & Imperfect Competition: Theoretical Perspectives, Pricing Strategies in Perfectly Competitive Markets, Pricing Challenges in Imperfectly Competitive Markets, Pricing Procedures and Methods in Practice, Practical Approaches to Pricing Decisions, Comparative Analysis of Pricing Methods, Pricing in Public Enterprises, Pricing Policies and Practices in Public Sector Enterprise, Economic and Social Implications of Public Enterprise Pricing, Price Wars: Theories and Empirical Evidence, Theoretical Explanations of Price Wars, Empirical Evidence and Impact on Industries	CO5
Unit 4 - Non-Price Competition and Product Differentiation **7hrs**	
Non-Price Competition and Product Differentiation, Understanding Non-Price Competition and Product Differentiation, Importance of Product Differentiation in Competitive Markets, Horizontal Product Differentiation, Analysis of Horizontal Product Differentiation and Consumer Behavior, Case Studies and Examples, Brand Proliferation as an Entry Deterrence Strategy, The Role of Brand Proliferation in Deterring New Entrants, Evaluation of Effectiveness and Challenges, Vertical Product Differentiation, Explanation of Vertical Product Differentiation and its Implications, Comparison with Horizontal Differentiation, Price Discrimination: First-, Second-, and Third-Degree Price Discrimination.	CO6

Text Books

1. “Modern Small Industry in India" -R. K. Vepa

2. “Problems of Accountability of Public Enterprises in India" -M. P. Srivastava
3. “Economic Development Perspectives, Vol. 3, Public Enterprises and Performance" -Binode Mohanty
4. “Public Enterprises in India - Principles and Performance" - V. K. L. Srivastava

Reference Books

1. “Industrial Economics - Issues and Perspectives"- Paul R. Ferguson and Glenys J. Ferguson
2. “The Economics of Industrial Organization" - William G. Shepherd
3. “Modern Small Industry for Developing Countries"- E. Staley and R. Morse
4. “Indian Growth and Stagnation - The Debate in India" - A. V. Desai

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318802: Motherboard Repairing Course

Teaching Scheme:	Credits	Examination Scheme:
		CIA :
PR : 02 Hrs./Week	Practical: 01	ESE :
		TW : 25

Course Objectives:-

1. Understand the fundamental components and architecture of a computer motherboard.
2. Develop the ability to diagnose common motherboard-related problems.
3. Gain hands-on experience in repairing and troubleshooting various motherboard issues.
4. Learn best practices for handling sensitive electronic components to avoid damage.
5. Familiarize with essential tools and equipment used in motherboard repairing.

Course Outcomes:-

On completion of the course, learner will be able to

CO1: Knowledge of Motherboard Components .

CO2: Diagnosis and Troubleshooting Skills.

CO3: Understand and Practical Repairing Skills

CO4: Handling BIOS and Firmware Advanced Repair Techniques

SANDIP FOUNDATION

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech(AIDS) *(2023 Pattern)*

Sem-IV

2318802: Motherboard Repairing Course

The student shall complete the following practical activity as a course work.

Practical List

Module 1	**i. Introduction to Computer Motherboards** ● Understanding the role of a motherboard in a computer system. ● Overview of motherboard components and their functions. ● Different motherboard form factors and their significance. **ii. Basic Electronics and Component Identification** ● Basics of electronics and circuitry relevant to motherboard repairing. ● Identifying essential electronic components on a motherboard. ● Introduction to the use of multimeters and other diagnostic tools. **iii. Common Motherboard Problems and Troubleshooting** ● Identifying common motherboard issues: power failure, boot failure, and more. ● Troubleshooting techniques for diagnosing motherboard problems. Reading motherboard diagnostic indicators and error codes.	CO1 to CO2
Module 2	**i. Motherboard Repairing Techniques** ● Repairing and replacing defective capacitors and resistors. ● Replacing damaged or faulty connectors (RAM slots, CPU sockets, etc.). ● Soldering and desoldering techniques for motherboard components. **ii. BIOS and Firmware Management** ● Understanding the Basic Input Output System (BIOS). ● Updating and flashing the BIOS firmware safely. ● Troubleshooting BIOS-related issues. **iii. Advanced Motherboard Repairs** ● Repairing motherboard traces and damaged PCBs. ● Fixing liquid damage on motherboards. Handling other complex motherboard issues (e.g., VRM, chipset, etc.)	CO3 to CO4

Text Books:

1. "Upgrading and Repairing PCs" Author: Scott Mueller Publisher: Que Publishing
2. "CompTIA A+ Certification All-in-One Exam Guide" Author: Mike Meyers Publisher: McGraw-Hill Education
3. "The Complete Idiot's Guide to PC Repair" Author: Joe Kraynak Publisher: Alpha
4. "How Computers Work" Author: Ron White Publisher: Que Publishing
5. "Electronics for Dummies" Author: Cathleen Shamieh Publisher: For Dummies

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-IV 2318802: System Analyst Certification Course

Teaching Scheme:	**Credits**	**Examination Scheme:**
PR : --		**CIA :** **ESE :** **TW :**

Course Objectives:-

1. To provide adequate understanding of systems concept, system analysis, and systems design, which would help them in having efficient and workable information system for management.
2. To provide an understanding the role of Hardware and Software for realizing organizational Objectives and automation.
3. To provide an understanding of the role of system analysis and design within various systems development stages
4. To understand the activities of the management and systems analyst, and in the overall development of system

Course Outcomes:-

On completion of the course, learner will be able to

CO1: Understanding of systems concept.
CO2: Understanding the role & process of System Analysis & Design.
CO3: Understanding the communication between various system resources.
CO4: Understanding some related & important system analysis activities.

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-IV 2318802: System Analyst Certification Course

The student shall complete the following practical activity as a course work.		
Practical List		
Module 1	**i** The systems analysis setting Role of the analyst Information systems The system development life cycle **ii.** Data modelling Modelling objects and events Actions, attributes, and relationships Complex entities and Multi-typed iii. Designing the logical database 1. Using data normalization to simplify database structure 2. Object-oriented data analysis: Encapsulating behaviour and inheriting properties	CO1 to CO2
Module 2	**i.** Communication 1. Wrapping the deliverables and offering them to the sponsoring users 2. Interactive the requirements to the developers **ii.** Some other important systems analysis activities 1.Collecting information 2.Interviewing potential users 3.Understanding the current systems 4.Justifying a proposed system 5.Communicating with the developers 6.Preparing for system testing 7.Acceptance testing and installation 8.Training and preparing the users 9.Assessing the success of the new system 10.Beginning to plan developments for later versions	CO3 to CO4

Text Books:

1. Avison, D. and Fitzgerald, G. Information systems development: methodologies, techniques and tools, McGraw-Hill
2. Silver and Silver, System Analysis and Design, Addison Wesley
3. James A. Senn-Analysis and Design of Information Systems
4. System Analysis and Design, Elias M Awad

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-IV VAC182: Android Programming

Teaching Scheme: **TH :** **PR : 02 hrs./week**	**Credits** **Th:** **Practical: 01**	**Examination Scheme:** **CIA :** **ESE :** **TW : 25**

Course Objectives:-

This course facilitates classroom and laboratory learning, letting students develop competence and confidence in android programming and understand the entire Android Apps Development Cycle, as well as it would also enable the students to independently create Android Applications

Course Outcomes:-

On completion of the course, learner will be able to

CO1: Demonstrate the Understanding of fundamental of Android Programming. (Understand)

CO2: Build their ability to develop software with reasonable complexity on mobile platform. (Apply)

CO3: Discover the life cycles of Activities, Applications, intents and fragments. (Evaluate).

CO4: Design the Android apps by using Java Concepts. (Create)

SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

2300207:Industrial Work Study

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: 2hrs/week	**Th:02**	**Theory**	**CIA: 25**
Practical: --	**Practical: --**		**End-Sem:50**
Prerequisite : Nil		**Pract:**	**--**
		Oral:	**--**
		Termwork	**--**

Course Objectives:

6. To teach students about how to measure work, optimize methods and fix pay accordingly.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Explain different method study procedures and can implement them for optimizing work approaches.

CO2: Evaluate the work content and can fix standard time for performing work.

CO3: Analyze the data through work sampling.

CO4: Design the plans for fixing incentive and wages based on performance.

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SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE

S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

2300207:Industrial Work Study

Units		
Unit 1	**Method Study** **7 Hrs**	**CO**
Purpose of work study, its objectives, procedure and applications; method study definition and basic procedure, selection of job, various recording techniques like outline process charts, flow process charts, man machine charts, two handed process charts, string diagram, flow diagram, multiple activity chart, simo, cyclographs and chrono-cyclographs; critical examination, development, installation and maintenance of improved method; principles of motion economy and their application in work design; micro motion study, memo motion study and their use in methods study.		**CO1**
Unit 2	**Work Measurement** **7 Hrs**	**CO2**
Introduction & definition, objectives and basic procedure of work measurement; application of work measurement in industries; time study: basic procedure, equipment needed, methods of measuring time, selection of jobs, breaking a job into elements; numbers of cycles to be timed; rating and methods of rating, allowances, calculation of standard time.		
Unit 3	**Work Sampling** **7 Hrs**	**CO3**
Basic procedure, design of work sampling study, conducting work sampling study and establishment of standard-time.		
Unit 4	**Job Evaluation and Incentive Schemes** **7 Hrs**	**CO4**
Starlight line, Tailor, Merrick and Gantt incentive plans, Standard data system; elemental and non-elemental predetermined motion systems, work factors system; Methods, Time Measurement (MTM), MOST		

Text Books

1. Barrnes RM; Motion and Time Study; Wiley Publications.
2. Currie RM; Work study; BIM publications.

Reference Books

1. Mynard; Hand book of Industrial Engineering.
2. Telsang, M.; Industrial Engineering and Production Management, S. Chand Publishers.
3. ILO; work-study; International Labour Organization.

SANDIP FOUNDATION	**SANDIP INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE** **S.Y. B. Tech(AIDS) *(2023 Pattern)*** Sem-IV VAC182: Android Programming

Module 1: Basic of Android Programming	**CO**
Introduction to Android OS, Setting up the Android Application Development Environment, Creating, Testing and Debugging Applications, Android Stack, Android applications structure, Activity life cycle, Understanding implicit and explicit intents.	CO1 to CO2
Module 2: User Interface in Android	
Adaptive and responsive user interfaces, User Input Controls, Menus, Screen Navigation, Recycler View, Drawlabes, Themes and Styles, Fragments Fragment Life Cycle, Introduction to Material Design, Testing the user interface	CO1 to CO4
Module 3 : Sensor, Location and Maps	
Sensor Basic, Motion and Position Sensors, Location services, Google maps API, Google Places API Shared Preferences, App Setting, SQLite primer, Store data using SQLite database, Content. Providers, Content Resolver, Loader	CO1 to CO4
Books & Other Resources	

1. Android: A Programming Guide by J.F. DiMarzio
2. Hello, Android: Introducing Google's Mobile Development Platform by Ed Burnett
3. Programming android by Zigurd Mednieks
4. Android User Interface Design: Turning Ideas and Sketches into Beautifully Designed Apps byIan G. Clifton
5. Android Developer Fundamental Course by Google.
6. Advance Android Developer Course by Google.

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S.Y. B. Tech (Common) ***(2023 Pattern)***

Sem-IV

Minor Project (Exit Course)

Teaching Scheme:	**Credits**	**Examination Scheme**	
Theory: --	Practical:02	**Theory**	**CIA: --**
Practical: --			**End-Sem:--**
		Pract:	**50**
		Oral:	**--**
		Termwork	**--**

Course Objectives: The student should be able to

7. develop ability for the application of fundamental principles and elementary techniques which have been learnt, in developing solutions for real life engineering problems.

Course Outcomes:

On completion of the course, learner will be able to–

CO1: Identify an open ended problem in area of engineering.
CO2: Identify the methods and materials required for the project work.
CO3: Formulate and implement innovative ideas for social and environmental benefits.
CO4: Analyze the results to come out with concrete solutions.
CO5: Write technical report of the project apart from developing a presentation.

PROCEDURE

This subject will be offered to the students who are will to exit second year engineering and opt for UG Diploma after the 4th semester.

Minor Project is an exit course requirement wherein under the guidance of a faculty member, a student is required to do an innovative work with application of knowledge earned while undergoing various courses and laboratories in the course of study.

Minor Project envisages that a student will acquire the ability to use a wide range of the skills learned during their course of study. A student is required to carry out the project work related to Engineering, under the guidance of a faculty member and/or the supervisor of the concerned industry/institute/organization.

The individual student has to undertake the project.

Duration: Minor Project to be completed within one month duration for the respective semester/Exit Course. It is to be assessed and evaluated at the end of 4th semester.