



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

COMPUTER ENGINEERING

SEMESTER VI

Sr. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No. of Hrs. for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total	
1.	PCC	23CE601T	Machine Learning	2	-	-	2	7.5	7.5	35	50	1.5
2.	PCC	23CE601P	Machine Learning Lab	-	-	2	1	-	25	25	50	-
3.	PCC	23CE602T	Design and Analysis of Algorithms	3	-	-	3	15	15	70	100	3
4.	PCC	23CE602P	Design and Analysis of Algorithms Lab	-	-	2	1	-	25	25	50	-
5.	PEC	23CE603T	Program Elective - II	3	-	-	3	15	15	70	100	3
6.	PCC	23CE604P	Computer Lab - III	-	-	4	2	-	25	25	50	-
7.	AEC	23AS601T	Economics & Management	2	-	-	2	7.5	7.5	35	50	1.5
8.	ELC	23CE605P	Project - I	-	-	4	2	-	50	50	100	-
9.	SEC	23CE641P	Career Development - VI	-	-	2	1	-	50	-	50	-
10.	OE	23CE661O	Open Elective - III	3	-	-	3	15	15	70	100	3
11.	MDM	23CE631M	Multidisciplinary Minor- IV	3	-	-	3	15	15	70	100	3
Total				16	0	14	23	75	250	475	800	-

Open Elective - III

23CE661O(i)	Advanced Python Programming
23CE661O(ii)	Cloud Computing & Virtualization
23CE661O(iii)	Data Visualization

Professional Elective – II (T)

23CE603T(i)	Data Warehousing and Mining
23CE603T(ii)	Mobile Application Programming
23CE603T(iii)	Digital Image And Video Processing

MDM-IV

Data Analysis For Decision Making

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COMPUTER ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE601T	Machine Learning	2	-	-	2	7.5	7.5	35	50

Course Objectives	Course Outcomes
This course is intended <ol style="list-style-type: none">To apply foundational concepts of machine learning and perform basic data handling and exploratory data analysis.To analyze supervised learning algorithms, including regression and classification modelTo explore and apply unsupervised learning techniques for clustering, dimensionality reduction, and feature engineering.	Student will be able to <ol style="list-style-type: none">Apply foundational concepts of machine learning and perform basic data handling and exploratory data analysis.Analyze supervised learning algorithms, including regression and classification models, using appropriate performance metrics.Differentiate unsupervised learning techniques.

Unit I	[10Hrs]
Introduction to Machine Learning: concepts, scope, and real-world impact, Types of ML: Supervised, Unsupervised, Reinforcement Learning, Machine learning cycle, Data – training, testing, and validation, Introduction to ML/python Libraries: NumPy, Pandas, Matplotlib, Introduction to data handling and exploratory data analysis (EDA).	

Unit II	[10Hrs]
Supervised Learning: Regression Techniques: Simple & Multiple Linear Regression, Polynomial Regression, Performance metrics: MSE, RMSE, MAE, R ² ; Classification Techniques: Logistic Regression, k-Nearest Neighbors (kNN), Decision Trees & Random Forest, Naïve Bayes Classifier; Support Vector Machines (SVM), Ensemble learning: Bagging, Boosting (AdaBoost, XGBoost); Model evaluation and validation : Confusion Matrix	

Unit III	[10Hrs]
Unsupervised Learning: Clustering: K-Means, Hierarchical Clustering; Dimensionality Reduction: PCA; Feature Engineering: Feature selection techniques, Handling missing values & scaling methods. Introduction to reinforcement learning.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Introduction to Machine learning	Ethem Alpaydin		
2	Understanding Machine Learning: From Theory to Algorithms	Shai Shalev-Shwartz and Shai Ben-David	Kindle Edition	Cambridge University Press

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Machine Learning for Absolute Beginners	Oliver Theobald	Third Edition (Kindle Edition)	Scatterplot Press
2	Deep Learning From Scratch: Building with Python from First Principles	Seth Weidman	Greyscale Indian Edition	Shroff

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COMPUTER ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CE601P	Machine Learning Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<p>This course is intended</p> <ol style="list-style-type: none">To apply and implement fundamental and advanced machine learning algorithms for classification, clustering, and prediction using real-world datasetsTo analyze and evaluate the performance of ML models, compare algorithmic results.	<p>Students will be able to</p> <ol style="list-style-type: none">Implement fundamental machine learning algorithmsAnalyse clustering results by applying EM, K-Means.Design and build advanced learning models including Artificial Neural NetworksEvaluate and compare the performance of multiple machine learning models by interpreting accuracy

Expt. No.	Title of the experiment
1	Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
2	Write a program to demonstrate the working of the decision tree algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
3	Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.
4	Write a program to implement Support Vector Machine algorithm to classify the iris data set. Print both correct and wrong predictions
5	Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.
6	Apply Hierarchical Clustering algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.
7	Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set
8	Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets
9	Write a program to implement AdaBoost algorithm to classify the iris data set. Print both correct and wrong predictions.
10	Perform model aggregation on MNIST digit dataset.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Machine Learning	Tom M. Mitchell		Mcgraw Hill Education
2	Machine Learning With Python, Tensorflow And Scikit-Learn:	Jerry E. Riddick		Kindle

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE602T	Design and Analysis of Algorithms	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
<p>This course is intended to provide</p> <ol style="list-style-type: none">1. Analysis of asymptotic performance of algorithms.2. Analysis of asymptotic runtime complexity of algorithms including formulating recurrence relations.3. Understanding and way of designing algorithms using greedy strategy, divide and conquer approach, dynamic programming.	<p>Student will be able to:</p> <ol style="list-style-type: none">1. Apply various methods to solve recurrence relations2. Analyze worst-case running times of sorting algorithms using asymptotic notation.3. Implement greedy, divide & conquer algorithms and solve recurrences describing the performance of each.4. Formulate dynamic-programming paradigm and implement dynamic programming algorithms5. Design and apply graph algorithms to engineering problems and classify problems as P, NP Hard or NP Complete.

Unit I	[9Hrs]
Mathematical foundation, Important summation, logarithmic formulas for algorithmic analysis, asymptotic notations & growth of functions, solutions of recurrence relations using technique of substitution method, tree method and master method, solution for homogeneous and non-homogeneous recurrence.	
Unit II	[8Hrs]
Analysis of sorting algorithms such as selection sort, insertion sort, bubble sort, heap sort, lower bound proof, disjoint set with operations on them and their time complexity, sorting networks.	
Unit III	[10Hrs]
Divide and conquer basic strategy, binary search, quick sort, merge sort. Greedy method - basic strategy, fractional knapsack problem, application to job sequencing with deadlines problem, Strassen's Matrix Multiplication, minimum cost spanning trees -Prim's algorithm and kruskal's algorithm, single source shortest path - Dijkstra's and Bellman Ford algorithm, closest-pair and convex - hull problems, Huffman Coding.	
Unit IV	[9Hrs]
Dynamic Programming basic strategy, multistage graphs, all pairs shortest path Floyd Warshall algorithm, single source shortest paths, 0/1 knapsack problem, matrix chain multiplication, longest common sub sequence problem, travelling salesman problem.	
Unit V	[9Hrs]
Basic Traversal and Search Techniques, breadth first search and depth first search, Backtracking basic strategy, 8-Queen's problem, graph coloring, Hamiltonian Circuit Problem, Subset Sum Problem, Randomized and Approximate algorithms, Basic concepts of NP-hard and NP-complete problems, non-deterministic algorithms, Cook's Theorem, Polynomial reduction.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Introduction to Algorithms	Cormen T.H	Third Edition	Prentice Hall of India
2	Foundations of Algorithms	Shailesh R. Sathe	First Edition	Penram International

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Computer Algorithms	Horowitz, Sahani, Rajsekharan		Galgotia Publications Pvt. Ltd
2	Fundamentals of Algorithms	Brassard, Bratley		Prentice Hall
3	Data Structures and Algorithms	Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman	Reprint 2006	Pearson Education

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CE602P	Design and Analysis of Algorithms Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<p>This course is intended to provide</p> <ol style="list-style-type: none">1. Analysis of asymptotic performance of algorithms.2. Analysis of asymptotic runtime complexity of algorithms including formulating recurrence relations.3. Understanding and way of designing algorithms using greedy strategy, divide and conquer approach, dynamic programming.	<p>Student will be able to:</p> <ol style="list-style-type: none">1. Apply various methods to solve recurrence relation and analyze worst-case running times of algorithms using asymptotic notation2. Implement greedy, divide & conquer algorithms and solve recurrences describing the performance of each.3. Formulate dynamic-programming paradigm and implement dynamic programming algorithms4. Describe the major graph algorithms and employ graphs to model engineering problems

Expt. No.	Title of the experiment
1	Implementation and Time Analysis of sorting algorithms. Bubble Sort, Selection Sort, Insertion Sort, Merge Sort and Quick Sort.
2	Implementation and Time Analysis of search algorithms.
3	Implementation of Max-Heap sort algorithm.
4	Implementation and Time Analysis of factorial program using iterative and recursive method
5	Implementation of different greedy algorithms.
6	Implement Minimum Spanning tree algorithms.
7	Implementation of dynamic programming algorithms.
8	Implementation of shortest path algorithm.
9	Implementation of Graph and Searching (BFS and DFS).

Text Books

S.N	Title	Authors	Edition	Publisher
1	Introduction to Algorithms	Cormen T.H		Prentice Hall of India

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Computer Algorithms	Horowitz, Sahani, Rajsekharan		Galgotia Publications Pvt. Ltd
2	Fundamentals of Algorithms	Brassard, Bratley		Prentice Hall
3	Data Structures and Algorithms	Alfred V. Aho, John E. Hopcroft , Jeffrey D. Ullman	Reprint 2006	Pearson Education

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE603T(i)	PE-II Data Warehousing and Mining	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
<p>This course is intended to:</p> <ol style="list-style-type: none"> 1. Provide the concepts of data warehouse and data mining, 2. Use tools and techniques for Knowledge Discovery in Databases preprocessing and classification 3. Gain knowledge of how data is grouped using clustering techniques. 	<p>Student will be able to:</p> <ol style="list-style-type: none"> 1. Differentiate between data warehousing and operational databases, and explain the fundamental concepts of data warehousing. 2. Analyze the relationship between data warehousing and data mining, and evaluate key mining technologies, patterns, and challenges. 3. Apply data preprocessing techniques such as cleaning, integration, reduction, and transformation to improve data quality. 4. Implement suitable classification and clustering algorithms to discover meaningful patterns from data. 5. Compare different classifiers and clustering methods to determine their effectiveness for specific applications.

Unit I	[10 Hrs]
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Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

Unit II	[8Hrs]
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Data Preprocessing: Data Processing An overview: Data Quality, Major Task in data Preprocessing. Data Cleaning- Missing Values, Noisy Data, Data cleaning as a Process. Data Integration, Data Reduction, Data Transformation Strategies Overview

Unit III	[9 Hrs]
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Data Mining: Fundamentals of data mining, Relationship of data warehousing and data mining, what is data mining, kind of data mined, kind of patterns mined, Technologies used for mining, kind of application targeted by mining, Major issues in data mining, Data mining applications

Unit IV	[9 Hrs]
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Classification: Basic Concepts, General approaches to solving a classification problem, Decision Tree Induction- Attributes Selection Measure, Tree Pruning. Bayes Classification Methods: Bayes Theorem, Naive Bayesian Classification, Rule Based Classification: using If- then rules for classification, Rule Extraction from decision Tree. Classification by Back propagation -A multi-layer Feed forward Neural Network, Lazy Learners - K- Nearest Neighbor Classifiers

Unit V	[9 Hrs]
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Cluster Analysis: - what is cluster analysis, Requirements of Cluster Analysis, Overview of Categorization Basic Clustering Methods, Partitioning Methods, Hierarchical Clustering - Agglomerative Methods and divisive methods, key issues in hierarchical clustering. Outlier Detection: Types of outliers, Outliers Detection methods

Text Books

S.N	Title	Authors	Edition	Publisher
1	Data Mining Concepts and Techniques	Jiawei Han, Micheline Kamber and Jian Pei	3 rd Edition	Elsevier

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Introduction to Data Mining	Pang-Ning Tan, Michael S, Vipin Kumar	-	Pearson
2	Introduction to Data Mining with Case Studies	G. K. Gupta	Easter Economy Edition	PHI

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE603T(ii)	PE – II Mobile Application Programming	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
<p>This course is intended</p> <ol style="list-style-type: none">To provide fundamentals and practical approach to the mobile application development.To make students understand, how to develop and deploy mobile application to the app market.To make student aware characteristics of mobile application, mobile application framework	<p>Student will able to</p> <ol style="list-style-type: none">Explain fundamentals of mobile application developmentDescribe user interface components of mobile applicationIllustrate user interfaces for interacting with apps and triggering actionsIdentify options to save application data persistent mediumDemonstrate storing and retrieving of data in mobile application and describe steps involved in publishing mobile application to share with world.

Unit I	[9Hrs]
Introduction: Brief History of mobile technologies, Different mobile technologies, Introduction to Android, Get to know the required tools, Creating your first Android application, Anatomy of android Application. Understanding Activities, linking Activities using intents, fragments, calling Built-in Applications using Intents, Displaying Notifications.	
Unit II	[9Hrs]
User Interface and Designing with views: Understanding the components of a screen, adapting to display orientation, managing changes to screen orientation, Utilizing the Action Bar, Creating the user Interface programmatically, Listening for UI Notifications. Using Basic Views, Using Picker views, Using List views to display lists, Understanding specialized fragments.	
Unit III	[9Hrs]
Designing User interface : Designing User interface Designing by declaration, creating the opening screen, using alternate resources, implementing an about box, applying a theme, adding a menu, adding settings, debugging with log messages, debugging with debugger.	
Unit IV	[9Hrs]
Displaying with views: Using Image Views to display pictures, using menus with views, some additional views. Saving and loading user preferences, persisting Data Files, Data persistence: Reading/writing local data, Accessing the Internal File system, Accessing SD card.	
Unit V	[9Hrs]
Putting SQL to work: introducing SQLite, In and Out of SQLite, Hello Database, Data Binding, using content provider, implementing content provider. Preparing and Publishing: Preparing app for publishing, Deploying APK files, uploading in Market.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Android - A programmer's Guide	Jerome (J.F) DiMarzio		TataMcgraw Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Beginning Android 4	Grant Allen		Apress
2	Hello, Android: Introducing Google's Mobile Development Platform	Ed Burnette		Pragmatic. Bookshelf

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B. Tech. Scheme of Examination & Syllabus 2023-24**COMPUTER ENGINEERING****SIXTH SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CE603P	Computer Lab – III	-	-	4	2	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. To realize the fundamental concepts of object oriented programming language 2. To develop program using features of object oriented programming language to solve real world problems.	Students will be able to 1. Apply object-oriented programming principles to design and implement programs using core OOP concepts. 2. Develop applications using exception handling and file-handling techniques. 3. Demonstrate problem-solving skills through the implementation of modular and reusable programs.

Expt. No.	Title of the experiment
1	Program to implement concept of class and object
2	Program to implement constructor & destructor
3	Program to implement inheritance
4	Program to implement polymorphism
5	Program to implement abstract class and interface
6	Program to implement package
7	Program to implement exception handling
8	Program to implement file handling using stream
9	Programming Assignment - Design and develop a module

Text Books

S.N	Title	Authors	Edition	Publisher
1	Programming with Java	E.Balaguruswamy	6 th Edition	Tata McGraw Hill
2	The Complete Reference Java	Herbert Schildt	9 th Edition	Tata McGraw Hill
3	Core Java Volume I – Fundamentals	Cay S. Horstmann & Gary Cornell	12 th Edition	Pearson Education
4	Head First Java	Kathy Sierra & Bert Bates	12 th Edition	O'Reilly

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Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23AS601T	Economics & Management	2	-	-	2	15	35	50

Course Objectives	Course Outcomes
1. The course examines how the economics, business and industrial management practices are related and how business decision is taken.	1. Apply economic principles for business decisions by understanding production cost relationships 2. Assess impact of macroeconomics and government policies on business and economy. 3. Recognize key management, marketing, financial and HRM functions and their role in effective business decision-making

Unit I	[10Hrs]
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Types of Elasticity of demand, Concept of Production, Factors of Production, types of cost, cost curves,	
Unit II	[10Hrs]
Market Structures-Perfect competition, Monopoly, and Monopolistic competition, Functions of central bank, Inflation, Deflation, Recession, National income, GDP, GNP, Liberalization, Privatization and Globalization	
Unit III	[10Hrs]
Definition of management, functions of management, Functions of human resources Management, Marketing Management, Functions of Marketing Management. Methods of pricing, advertising and sales promotion. Financial Management, functions of financial management, Sources of finance.	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

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COMPUTER SCIENCE & ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CE605P	Project - I	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
<p>This course is intended</p> <ul style="list-style-type: none">• Enable students to identify, formulate, and analyze an engineering problem in a selected domain.• Develop the ability to design a structured solution using appropriate tools, algorithms, or hardware/software frameworks.• Provide hands-on experience in implementation, testing, and validation of a working model or system.• Strengthen research orientation through literature survey, methodology design, and technical documentation.	<p>Students will be able to:</p> <ol style="list-style-type: none">1. Define a problem statement based on literature review and real-world relevance.2. Select appropriate techniques, tools, or models for system design and implementation.3. Develop and test a functional prototype, model, or simulation.4. Analyze results using quantitative performance metrics.5. Prepare structured technical documentation and present outcomes professionally.

2 Hrs
<p>Students shall undertake a domain-specific engineering project emphasizing design and validation. The project must include:</p> <ul style="list-style-type: none">• Problem identification with justification• Literature review of minimum 5 research works• Methodology design and system architecture• Implementation using appropriate tools/platforms• Performance evaluation using measurable parameters• Technical report and presentation• Publication

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COMPUTER ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23CE641P	Career Development - VI	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
<p>The sole objective of imparting aptitude training is to make students able to critically evaluate various real-life situations by resorting to an analysis of key issues and factors.</p> <p>This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.</p> <p>To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.</p>	<ol style="list-style-type: none"> Students shall solve real life problems comparison of various probabilities, Permutation and combinations to ascertain the best outcomes expected Students shall draw conclusions or Understand geometrical terminology for angles, triangles, quadrilaterals and circles with the help of formulas. The ability to analyze and interpret different forms of data, including tables, graphs, charts, and more. Enable students to critically analyze material (information) to order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions. The ability to analyses visual information and solve problems based on visual reasoning.

Unit I	[6Hrs]
Aptitude:- Permutation and Combinations:- Letter Arrangement, Number Arrangement, miscellaneous questions Probability:- Color balls, Dice Problems, coins Problems, Playing Cards Problem, Miscellaneous Imax:- Learn Start-up, True Entrepreneurship,	
Unit II	[6Hrs]
Aptitude: - Mensuration: - 2-Dimension Problems, 3-Dimension Problems, Area, Volume, Surface Area, Total Surface Area. Geometry: - Lines, Circle, Triangles Etc. Imax:- Personal Accountability, Innovation Lessons from our Ancestors	
Unit III	[6Hrs]
Aptitude:- Data Interpretation:- Tabular DI Bar Graph Line graph Pie Char	
Unit IV	[6Hrs]
Aptitude:- Logical Thinking (Syllogism) and Venn Diagram problem:- Some, No, All, Some Not, Very Few, Few, Possibility Problem Imax:- Interview Practice 1, Interview Practice 2, Interview Practice 3	
Unit V	[6Hrs]
Aptitude:- Non Verbal Reasoning:- Mirror Images, Water Images, Paper Cutting, Paper Folding, Fig Embedded Imax:- Interview Practice 4, Interview Practice 5, Interview Practice 6	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publication
3	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Aggarwal		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude for CAT by Arun Sharma	Arun Sharma		

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COMPUTER ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE661O (ii)	OE – III Advanced Python Programming	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
<p>This course is intended</p> <ol style="list-style-type: none"> To provide fundamentals of python programming language To develop python programs using functions, objects, data structures –lists, tuples, dictionaries. To develop mini project using Python. 	<p>Student will be able to</p> <ol style="list-style-type: none"> Apply Python data structure to solve computational problems. Analyze Python modules and packages to determine appropriate modular structures for program development. Evaluate object-oriented programming concepts to design class-based solutions. Implement suitable exception-handling techniques to handle different types of exceptions. Create exploratory data analysis solutions using Pandas, NumPy, and visualization techniques.

Unit I	[9Hrs]
Introduction to control statement, List, tuple, Dictionary, Set. Function – recursive, iterative, Lambda. Programming on all data structures.	
Unit II	[8Hrs]
Python Modules- Module, types of Modules: predefined and user-defined. Function based, class based, connecting module. Import module. Package- Types, Package Vs Folder, Importing. PIP – installing and uninstalling.	
Unit III	[9Hrs]
Object Oriented Programming – OOP Vs POP, Class and object, Defining class, initialization of object. Accessing variable and methods. Access modifiers. Encapsulation and Abstraction. Polymorphism: - types of overloading and overriding.	
Unit IV	[9Hrs]
Exception Handling & Types of Errors – Exception, exception handling, Syntax error v/s Runtime error, Exception codes, finally block, Raise keyword. File & Directory handling - Opening file, files mode, file reading. Appending. CSV module -creating CSV, reading from CSV file, writing into CSV file. XML Parsing, JSON parsing.	
Unit V	[10Hrs]
Exploratory Data Analysis: - Dimension, Series, Data frame, Panel-create, select data from panel, reindexing. Statistical Functions-covariance, correlation. Merging/Joining, Concatenation of object and time series. Visualization- Bar Plot, Histograms, Box Plots, Scatter Plot, Pie Chart. NumPy – Datatypes, Array, Indexing & Slicing, Iteration, mathematical, sort, search function.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Think Python: How to Think Like a Computer Scientist	Allen B. Downey	2 nd Edition	
2	An Introduction to Python	Guido van Rossum and Fred L. Drake Jr		
3.	Python for Data Science	Kake VanderPlas	Grayscale	Oreilly
4.	The Complete reference of Python	Martin C. BRown	Indian	Mc-Graw Hill Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Exploring PythonII	Timothy A. Budd		Mc-Graw Hill Education
2	Fundamentals of Python: First ProgramsII	Kenneth A. Lamber		CENGAGE Learning

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ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

COMPUTER ENGINEERING

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23CE631M	MDM – IV Data Analytics for Decision Making	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
<p>This course is intended to</p> <ul style="list-style-type: none">Describe fundamental principles and workflow of data analytics.Apply techniques for data collection, cleaning, and organization.Interpret data using statistical and visualization methods.Develop basic predictive models for analytical tasks.Examine tools, ethics, and interdisciplinary applications of analytics.	<p>Students will be able to</p> <ol style="list-style-type: none">Outline the key ideas and operational process of data analytics.Apply preprocessing and transformation techniques on datasets.Analyze datasets using statistical and visualization toolsDevelop simple predictive models for practical applicationsExamine analytical tools, ethics, and real-world applications.

Unit I: Introduction to Data Analytics	[09 Hrs]
Overview of Data Analytics – Need, Scope, and Applications across disciplines, Data-driven decision making, Types of Data: Structured, Semi-structured, and Unstructured, Stages of Data Analytics: Collection, Cleaning, Analysis, Visualization, Interpretation, Case studies: Data analytics in multiple domains.	
Unit II: Data Acquisition and Preprocessing	[09 Hrs]
Data sources: Sensors, Web data, Databases, Public datasets, Data collection and storage fundamentals, Data quality and integrity issues, Handling missing, inconsistent, and noisy data, Data transformation and normalization, Practical perspective: Working with CSV/Excel datasets using Python or Excel	
Unit III: Exploratory Data Analysis and Visualization	[09 Hrs]
Descriptive statistics: Mean, Median, Mode, Variance, Standard deviation, Data summarization techniques, Data visualization concepts: Bar charts, Histograms, Scatter plots, Pie charts, Box plots, Correlation and covariance, Introduction to sampling, Visualization tools: Excel Charts, Matplotlib/Seaborn	
Unit IV: Fundamentals of Predictive Analytics	[09 Hrs]
supervised and unsupervised learning, Regression and Classification, Simple Linear Regression and Logistic Regression, Clustering basics, K-Means clustering, Model evaluation metrics (accuracy, precision, recall, confusion matrix – intuitive explanation), Interpreting model outputs, Use cases in various engineering applications.	
Unit V: Applications, Tools, and Emerging Trends	[09 Hrs]
Overview of commonly used data analytics tools: Excel, Python (Pandas, NumPy), Power BI, R, capabilities and comparison,, Introduction to Big Data, Cloud, and IoT-based analytics, Data governance principles, ethical analytics, and data security considerations, Future scope: Integration of AI and Machine Learning in Data Analytics	

Text Books/ Reference Books

S.N	Title	Authors	Edition	Publisher
1	Data Analytics: Principles, Tools, and Practices	Anil Maheshwari	2nd	McGraw Hill Education
2	Python for Data Analysis	Wes McKinney	3rd	O'Reilly Media
3	Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber, Jian Pei	4th	Morgan Kaufmann Publishers

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