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

INFORMATION TECHNOLOGY

SEMESTER VI

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No. of hours for ESE
				L	T	P		Mid Semester Exam	Continual Assessment	End Sem Examination	Total	
1	PCC	**23IT601T**	Java Programming	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
2	PCC	**23IT601P**	Java Programming Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	-
3	PCC	**23IT602T**	Artificial Intelligence & Machine Learning	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
4	PCC	**23IT602P**	Artificial Intelligence & Machine Learning Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	-
5	PCC	**23IT603T**	Program Elective - II	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
6	PCC	**23IT604T**	Program Elective - III	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
7	AEC	**23AS601T**	Economics & Management	**2**	**-**	**-**	**2**	**7.5**	**7.5**	**35**	**50**	1.5
8	OE	**23IT661O**	Open Elective- III	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
9	ELC	**23IT605P**	Project - I	**-**	**-**	**4**	**2**	**-**	**50**	**50**	**100**	-
10	SEC	**23IT641P**	Career Development - VI	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	-
11	MDM	**23IT631M**	Multidisciplinary Minor - IV	**3**	**-**	**-**	**3**	**15**	**15**	**70**	**100**	3
Total				**20**	**-**	**10**	**25**	**97.5**	**247.5**	**555**	**900**	**-**

Program Elective II	
23IT603T(i)	**Cloud Computing**
23IT603T(ii)	**Mobile Application Development**
23IT603T(iii)	**Wireless Sensor Networks**

Program Elective - III	
23IT604T(i)	Blockchain Technology
23IT604T(ii)	Advanced Computer Network
23IT604T(iii)	Computer Graphics and Animation

Multidisciplinary Minor - IV	
23IT631M	Data Analytics

Open Elective - III	
23IT661O(i)	Agile Software Development
23IT661O(ii)	Basics of Cloud Computing

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INFORMATION TECHNOLOGY

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23IT601T	Java Programming	3	-		3	15	15	70	100

Course Objectives	Course Outcomes
The course is intended 1. This course introduces fundamentals of object- oriented programming in Java, including creating, defining classes, invoking methods, using class libraries, collections frameworks 2. It is aimed at building software development skills using java programming for creating real world applications which can be also used as prerequisite to Mobile app development programming. 3. Use a development environment to design, code, test, and debug simple programs, including multi-file source projects using the concepts of pure object-oriented programming.	**Students will be able to** 1. Apply the data types and control flow for implementation of java programs 2. Discuss various Object-Oriented Concepts like inheritance, data hiding, Exception Handling etc., to implement various programs in Java 3. Demonstrate the concepts of Multithreading & Multiprogramming 4. Implementation of String class, Date class, Time class and Calendar class in various micro projects 5. Memorize the concepts of Collections Framework.

Unit I: Classes & Objects	**[9Hrs]**
Introduction to data types, operators and control statements, Classes: fundamentals of classes, declaring objects, Assigning objects, reference variables, methods, constructor, variable handling. Methods and classes: Overloading methods, understanding static and final.	
Unit II: Inheritance & Exception Handling	**[9Hrs]**
Introduction to Array, Vectors, Wrapper class & Inheritance, Packages and interface: Packages, access protection, importing packages, interfaces. Exception handling: Fundamentals exception types, uncaught exception, try-catch, displaying description of an exception, multiple catch clauses, nested try statements, throw, finally, built in exceptions, creating own exception subclasses	
Unit III: Multithreading	**[9Hrs]**
Multithreading: Fundamentals, Thread Life Cycle, Ways of creating threads, creating multiple threads, is Alive (), join (), Thread Synchronization, Thread priorities, Interthread communication, Methods for suspending, resuming and stopping threads.	
Unit IV: String Class	**[9Hrs]**
String class and its methods. Date, Date Time, Calendar class: Converting Date to String and String to Date using Simple Date Format class ,Object Class: Overriding to String, equals & hashcode method, String Interning, Immutability of Strings.	
Unit V: Introduction to collections	**[9Hrs]**
Introduction to collections: Collection hierarchy List, Queue, Set and Map Collections List Collection: Array, Link list, vector (insert, delete, search, sort, iterate, replace operation), Inner class (Regular, Method local, Anonymous & static inner class)	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Core and Advanced Java Black Book	Dreamtech Press	Old	Dreamtech Press
2	Beginning Programming with Java For Dummies	Barry Burd	5th	Wiley India
3	Java: A Beginner's Guide	Herbert Schildt	New	Mc Graw Hill India

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Java The Complete Reference	Herbert Schildt	Old	McGraw Hill
2	Java 8 Programming Black Book	Dreamtech Press	Old	Dreamtech Press
3	Core Java 8 for Beginners	Sharanam Shah, Vaishali Sha	New	Shroff Publishers

Online Resources

1	https://www.w3schools.com/java/default.asp
2	https://www.programiz.com/java-programming
3	https://www.programiz.com/java-programming

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Chairman - BoS	Dean – Academics	Date of Release	Version	

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23IT601P	Java Programming Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
The course is intended 1. This course introduces fundamentals of object- oriented programming in Java, including creating, defining classes, invoking methods, using class libraries, collections frameworks 2. It is aimed at building software development skills using java programming for creating real world applications which can be also used as prerequisite to Mobile app development programming. 3. Use a development environment to design, code, test, and debug simple programs, including multi-file source projects using the concepts of pure object-oriented programming.	**Students will be able to** 1. Implement the concept of function overloading 2. Demonstrate Object Oriented Concepts like inheritance, data hiding, Exception Handling etc., to implement various programs in Java 3. Develop the java programs using exception handling & threading 4. Demonstrate string methods in java 5. Implement the concepts of Collections Framework.

Expt. No.	Title of the experiment
1	Implement Program based on function overloading
2	Implement Program based on inheritance, using method overriding and also using “this” keyword
3	Implement Program to understand the concepts of Exception Handling
4	Implement Program to create a user define Exception
5	Implement Program to Demonstrate the life cycle of thread
6	Implement Program on Multi-Threading
7	Implement Program to Demonstrate the use of Vector class and Array List
8	Implement Program based on String class methods
9	Implementation of any two collections class framework

Text Books

S.N	Title	Authors	Edition	Publisher
1	Core and Advanced Java Black Book	Dreamtech Press	Old	Dreamtech Press
2	Beginning Programming with Java For Dummies	Barry Burd	5th	Wiley India
3	Java: A Beginner’s Guide	Herbert Schildt	New	Mc Graw Hill India

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Java The Complete Reference	Herbert Schildt	Old	McGraw Hill
2	Java 8 Programming Black Book	Dreamtech Press	Old	Dreamtech Press
3	Core Java 8 for Beginners	Sharanam Shah, Vaishali Sha	New	Shroff Publishers

Online Resources

1	https://codegym.cc/
2	https://exercism.org/
3	https://codingbat.com/java
4	https://www.codechef.com/learn/course/java

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23IT602T	Artificial Intelligence & Machine Learning	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
The course is intended 1. Acquaint with fundamentals of artificial intelligence and machine learning. 2. Learn feature extraction and selection techniques for processing data set. 3. Understand basic algorithms used in classification and regression problems 4. To compare various Knowledge Representation methods and knowledge representation techniques	**Students will be able to** 1. Explain fundamentals of artificial intelligence and machine learning. 2. Apply the suitable algorithms to solve AI problems 3. Design and Implement an example using predicate Logic 4. Apply AI techniques to real-world problems to develop intelligent systems. 5. Apply machine-learning algorithms for classification and regression problems.

Unit I: Introduction to AI	**[9 Hrs]**
	Definition of AI, history & importance of AI, Application of AI, Turing test concept, Task domain of AI, AI Characteristics, AI Problems and its state space search, Introduction to intelligent agents. Production systems, States Space Search: Defining the problems as a state space search, Production systems, Production characteristics and Issues in the design of search problems.
Unit II: Heuristic Search Techniques	**[9 Hrs]**
	Heuristic Search Techniques: Requirements of search algorithms, Heuristic search, Generate-And-Test, Hill climbing, best first search, , Breadth First Search, Depth First Search ,A* search algorithm, mini-max algorithm, Alpha-Beta pruning, Constraint satisfaction.
Unit III: Representation of Knowledge &Expert Systems	**[9 Hrs]**
	Representation of Knowledge: Knowledge representation, Properties, Approaches to knowledge representation, Propositional Logic, Predicate logic, Representation of Simple facts in Logic. Architecture of expert systems, Roles of expert systems, how expert systems works, Knowledge Acquisition.
Unit IV: Introduction to machine learning	**[9 Hrs]**
	Introduction to machine learning, Types of Machine Learning, Data and its importance, Types of data, Data Preprocessing Techniques, Cleaning and handling missing data. , Feature selection and engineering. Feature normalization, PCA.LDA
Unit V: ML Techniques	**[9 Hrs]**
	Introduction to Supervised Learning, Examples of supervised learning: classification models, Evaluation metrics: confusion matrices. Introduction to Unsupervised Learning, examples of unsupervised learning: Clustering, reinforcement learning, The future of AI and machine learning.,

Text Books

S.NO	Title	Authors	Edition	Publisher
1	Artificial Intelligence	Elaine Rich, Kevin Knight.	3rd	McGraw-Hill
2	A First course in Artificial Intelligence	Deepak Khemani	2nd	McGraw-Hill
3	Machine Learning	Tom Mitchell	1st	McGraw-Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Artificial Intelligence	Patrick Henry Winston	3rd	Pearson Edition
2	Introduction to machine learning.	Alpaydin, Ethem	-	MIT press

Online Resources

1	https://onlinecourses.nptel.ac.in/noc25_ge55/preview
2	https://onlinecourses.swayam2.ac.in

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23IT602P	Artificial Intelligence & Machine Learning Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
The course is intended 1. To learn the practical approach for the various AIML problems. 2. To implement the AIML algorithms.	**Students will be able to** 1. Apply fundamentals of Artificial Intelligence for given problem statements. 2. Demonstrate various Heuristics and Non –Heuristics algorithms 3. Implement knowledge representation approaches demonstrate statistical reasoning.

Expt. No.	Title of the experiment
1	Implementation of Uninformed Search (Depth First Search for Water Jug Problem)
2	Implementation of Uninformed Search (Breadth First Search for Tic-Tac-Toe Problem.)
3	Implementation of Informed Search (Best First Search for 8 puzzle problem ,)
4	Write a program to implement Hill Climbing Algorithm.
5	Write a program to implement A* Algorithm.
6	(a) Implementation of Python Basic Libraries such as Math, Numpy and Scipy. (b) Implementation of Python Basic Libraries for ML application such as Pandas and Mathplotlib.
7	(a) Creation and Loading different datasets in Python. (b) Write a python program to compute Mean, Median, Mode, Variance and Standard Deviation using Datasets. (c) Write a python program to compute Reshaping the data, Filtering the Data, Merging the data and Handling the missing values in datasets.
8	Micro project

Text Books

S.N	Title	Authors	Edition	Publisher
1	Artificial Intelligence	Elaine Rich, Kevin Knight.	3rd	McGraw-Hill
2	A First course in Artificial Intelligence	Deepak Khemani	2nd	McGraw-Hill
3	Artificial Intelligence A modern approach	Stuart Russell, and Peter Norvig	2nd	Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Fuzzy Logic with Engineering application	Timothy J. Rose	Third edition	Wiley

Online Resources

1	https://onlinecourses.nptel.ac.in/noc25_ge55/preview
2	https://onlinecourses.swayam2.ac.in

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23IT603T(i)	PE – II Cloud Computing	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
The course is intended 1. Provide fundamental knowledge of cloud concepts, characteristics, and service/deployment models. 2. Explain cloud architecture components, virtualization, containerization, and cloud networking technologies. 3. Familiarize students with major public cloud platforms and their core services. 4. Expose students to modern cloud trends such as serverless, DevOps integration, cloud-native patterns, IoT, and multicloud along with cloud security principles, governance, and cost management models	**Students will be able to** 1. Classify cloud service models (IaaS, PaaS, SaaS, FaaS). 2. Analyze different types of cloud storage and compute architectures. 3. Apply cloud platform concepts to simple real-world scenarios. 4. Analyze cloud risks, vulnerabilities, and compliance requirements. 5. Illustrate the application of cloud in IoT, edge computing, and industry use cases.

Unit I : Fundamentals of Cloud Computing	**[9Hrs]**
Introduction: Evolution from Grid, Cluster, Virtualization to Cloud, Characteristics of Cloud Computing, Cloud Deployment Models: Public, Private, Hybrid, Community, Cloud Service Models: IaaS, PaaS, SaaS, FaaS (Serverless overview), Cloud Ecosystem & Key Stakeholders, Cloud Advantages, Limitations & Use Cases	
Unit II: Cloud Architecture & Technologies	**[9Hrs]**
Cloud Reference Architecture, Virtualization Concepts: Hypervisors (Type 1 & 2), VM lifecycle, Introduction to Containerization: Docker fundamentals, Cloud Storage Concepts: Object, Block, File, Compute Concepts: VM, Autoscaling, Load Balancing, Cloud Networking Basics: VPC, Subnets, Routing, Security groups	
Unit III: Cloud Platforms & Services (AWS / Azure / GCP)	**[9Hrs]**
Overview of leading cloud providers, Compute Services (EC2/VM instances), Storage Services (S3/Blob/GCS), Database Services (RDS/Cloud SQL/NoSQL services), Identity & Access Management (IAM) basics Monitoring & Logging fundamentals	
Unit IV : Cloud Security & Management	**[9Hrs]**
Shared Responsibility Model, Identity and Access Management Principles, Encryption: Data at rest and in transit, Cloud Threats & Vulnerabilities, Cloud Cost Models: Pay-as-you-go, Reserved Instances, Budgeting, Cloud Governance & Compliance Overview (ISO, SOC, GDPR basics)	
Unit V : Modern Cloud Trends & Applications	**[9Hrs]**
Serverless Computing (Introduction and Use Cases), DevOps on Cloud: CI/CD overview, Cloud-Native Concepts: Microservices, Containers (basic view), Edge Computing & IoT Integration, Cloud Use Cases: E-commerce, Education, Banking, Healthcare, Future of Cloud: Multicloud, Hybrid cloud, FinOps overview	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Cloud computing principles and paradigms	Rajkumar Buyya,		Wiley
2	Enterprise Cloud Computing	Gautam Shroff		Cambridge
3	Cloud Security and Privacy	Tim Mather, Subra K, ShahidL.		Oreilly

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Cloud Computing	Dr. Kumar Saurabh		Wiley Publication
2	Cloud and virtual data storage networking	Greg Schulr		CRC Press

Online Resources

1	https://www.geeksforgeeks.org/
2	https://www.oracle.com/in/cloud/

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
23IT603T (ii)	PE-II Mobile Application Development	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
This course is intended 1. Understand the fundamentals of Android architecture, mobile platforms, and application development environments. 2. Apply Activity lifecycle management to build functional mobile applications. 3. Build interactive user interfaces for mobile apps.	**Students will be able to** 1. Explain the fundamentals of Android 2. Create Android applications using Android Studio 3. Analyze the Android project structure and Manifest configuration of an application 4. Evaluate activities, services, intents, permissions, and resources to ensure optimal Android application functionality. 5. Design rich user interfaces using layouts

Unit I: Android Basics **[9Hrs]**

Introduction of android, History of mobile application development, The Open Handset Alliance (OHA) , The Android Platform , Android Versions, Native Android Applications, Android Architecture

Unit II: Android Tool **[9Hrs]**

Introduction to Android Studio, Features of Android Studio, Downloading, installing and launching Android Studio, Downloading and installing JDK, Android Studio IDE Components

Unit III: Android Application Development Basics **[9Hrs]**

Building a sample Android application using Android Studio, Android Project Structure, Android Manifest File and its common settings.

Unit IV: Android Application Design Essentials **[9Hrs]**

Activities: What is activity, Life Cycle of an Activity ,Services ,Intents ,Permissions, Application resources

Unit V: Android User Interface Design **[9Hrs]**

Basic User Interface Screen elements Designing User Interfaces with Layouts, Drawing and Working with Animation.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Android Application Development	Pradeep Kothari,	Black Book	DreamTech
2	Beginning Android 4 Application Development	Wei Meng Lee, Wrox	2nd	Wiley

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Android Wireless Application Development	Lauren Darcey, Shane Conder,	2nd	Pearson

Online Resources

1	https://www.tutorialspoint.com/android/index.htm
2	https://www.geeksforgeeks.org/android/animation-in-android-with-example/

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23IT604T(i)	PE-III Blockchain Technology	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
This course is intended 1. To explore various aspects of Blockchain Technology like application in various domain 2. To design , build and deploy smart contracts and distributed application 3. Integrate ideas from Blockchain technology into their own projects.	**Students will be able to** 1. Express the working of decentralized blockchain technology. 2. Demonstrate how Bitcoin blockchain work 3. Analyze the working of Ethereum blockchain and smart contracts 4. Demonstrate the working of Hyperledger 5. Apply the learning of solidity and de-centralized apps on Ethereum and understand the application of blockchain technology

Unit I: Introduction to Cryptography & Blockchain **[9Hrs]**

Introduction of Cryptography, Public And Private Cryptography, Centralize And Decentralize System, Origin of Blockchain, Block Structure, Types of Blockchain, Benefits And Challenges of Blockchain, Working Process of Blockchain, Types of Blocks, P2P Networks & Its Types, Cryptographic Hash Function, Digital Signature.

Unit II: Bitcoin Blockchain **[9Hrs]**

Bitcoin & Cryptocurrency, Features of Bitcoin, Bitcoin Network, Types of Bitcoin Nodes, Bitcoin Mining Process, Bitcoin Wallets And Its Types, Hard Fork & Soft Fork, Merkle Tree, Double Spend Problem, Bitcoin Cash, Proof of Work (PoW),Proof of Stake (PoS),Proof of elapsed time (PoET),Proof of Burn (PoB).

Unit III: Ethereum **[9Hrs]**

Introduction, History of Ethereum, Features of Ethereum, Ethereum Accounts, Applications of Ethereum, DAO, EVM-Ethereum Virtual Machine, Understanding Gas In Ethereum, Working Process of Ethereum, Smart Contracts, Metamask Setups.

Unit IV: Hyperledger **[9Hrs]**

Introduction To Hyperledger, Hyperledger Fabric, Architecture of Hyperledger Fabric, Benefits of Hyperledger fabric Hyperledger Composer, Architecture of Hyperledger Composer.

Unit V: Basics of Solidity **[9Hrs]**

Introduction To Solidity Programming, Basics of Solidity, Data Types of Solidity Programming, Solidity – Functions, Operators, Solidity Program To Write Smart Contacts, Blockchain Application-Medical Record Management System, Altcoin.

Text Books

S.N	Title	Authors	Edition	Publisher
1	A Comprehensive Introduction	Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder	-	Princeton University Press (July 19, 2016).
2	Bitcoin: A Peer-to-Peer Electronic Cash System	Satoshi Nakamoto	1st	FlavioVit

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Mastering Bitcoin-Unlocking Digital Cryptocurrencies	Andreas M. Antonopoulos	1st	O'Reilly Media
2	ETHEREUM: A Secure Decentralized Transaction Ledger	DR. Gavin Wood	1st	Yellowpaper.2014

Online Resources

1	https://aws.amazon.com/what-is/blockchain/
2	https://www.ibm.com/think/topics/blockchain
3	https://www.geeksforgeeks.org/ethical-hacking/blockchain-technology-introduction/

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SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23IT604T (ii)	PE-III Advanced Computer Network	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
This course is intended 1. To provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks. 2. To focuses on advanced networking concepts for next generation network architecture and design 3. It covers SDN and virtualization for designing next generation networks	**Students will be able to** 1. Understanding of holistic approach to advanced computer networking.. 2. Analyze ome of the most advanced wireless network technologies, 3. Analyze and implement some of the most advanced routing algorithms 4. Comprehend features of SDN and its application to next generation systems 5. Understand advanced concepts and next generation networks

Unit I : Wireless Networks and Mobile IP	**[9Hrs]**
Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Types of Wireless networks.	
Unit II: Mobile A-Hoc Networks	**[9Hrs]**
Mobile Adhoc Networks: Overview of Wireless Ad-HocNetworks, Routing in Ad- Hoc Networks, Routing Protocols for Ad hoc Networks.	
Unit III: Wireless Sensor Networks	**[9Hrs]**
Wireless Sensor Networks: Sensor Networks and Protocol Structures, Communication Energy Model, Clustering Protocols, Routing Protocols	
Unit IV: Software Defined Network	**[9Hrs]**
Software Defined Network -Evolving Network Requirements, The role of vendors in the evolution of SDN, Problems in Traditional Network Devices, Why SDN is Important, Advantages of SDN, Components of Software Defining Networking (SDN),SDN development approach: Force, 4D appraoach, Ethane, SDN Layers, DN Data Plane ,Control plane and Application Plane.	
Unit V: Data communication model	**[9Hrs]**
Data communication model – Internet Multicasting, NAT, VPN , Differentiated and Integrated Services – SONET, ATM – MPLS - Next generation Internet architectures, Green Communication Networks, and Data Center Networking.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Computer Networks	Tanenbaum AS, Wetherall DJ	5th	Pearson Education
2	Computer and Communication Networks	Nader F. Mir	2nd	Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Software-Defined Networks: A Systems Approach, Peterson, Cascone, O'Connor, Vachuska, and Davie,	Cascone, O'Connor, Vachuska, and Davie	1	Systems Approach LLC (Publisher).
2	Cloud Networking: Understanding Cloud-based Data Centre Networks	Gary Lee	2nd	Morgan Kaufmann (Publisher)

Online Resources

1	https://sdn.systemsapproach.org/index.html

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23AS601T	Economics and Management	2	-	-	2	7.5	7.5	35	50

Course Objectives	Course Outcomes
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

SIX SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
23IT661O (ii)	OE- III Basics of Cloud Computing	3	-	-	3	MSE	CA	ESE	Total
						15	15	70	100

Course Objectives	Course Outcomes
This course is intended 1. To introduce the fundamental concepts of Cloud Computing and its service models. 2. To familiarize students with cloud architecture and deployment models. 3. To provide basic understanding of virtualization, storage, and networking in cloud environments. 4. To introduce major cloud service providers and commonly used cloud services. 5. To make students aware of security, privacy, and future trends in cloud computing.	**Students will be able to** 1. Understand the basic concepts, characteristics, and models of cloud computing. 2. Explain cloud architecture, deployment, and service delivery models (IaaS, PaaS, SaaS). 3. Demonstrate understanding of virtualization and resource management in the cloud. 4. Identify and compare major cloud service providers and their offerings. 5. Recognize security challenges and best practices in cloud environments.

Unit I : Introduction to Cloud Computing **[9Hrs]**

Overview of distributed and cloud computing, Characteristics and benefits of cloud computing, Cloud service models – IaaS, PaaS, SaaS, Deployment models – Public, Private, Hybrid, Community Cloud, Evolution from grid to cloud.

Unit II : Cloud Architecture and Virtualization **[9Hrs]**

Cloud architecture – components, layers, and services; Virtualization concepts – types, hypervisors, virtual machines, storage and network virtualization, benefits and challenges.

Unit III : Cloud Storage and Services **[9Hrs]**

Cloud storage fundamentals – object, block, and file storage; Cloud databases; Cloud-based applications and collaboration tools; Cloud platforms: Introduction to AWS, Microsoft Azure, Google Cloud Platform (GCP).

Unit IV : Cloud Management and Security **[9Hrs]**

Cloud resource management, Service Level Agreements (SLAs), Security issues in cloud computing, Data protection and privacy, Identity and access management, Compliance and legal aspects.

Unit V : Emerging Trends and Applications of Cloud **[9Hrs]**

Cloud in IoT and Big Data, Edge and Fog computing, Serverless computing basics, Future trends in cloud technologies, Case studies of cloud-based applications in industry.

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Cloud Computing: Principles and Paradigms	Rajkumar Buyya, James Broberg, Andrzej Goscinski	1st	Wiley
2.	Mastering Cloud Computing	Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi	1st	McGraw Hill
3.	Cloud Computing: Concepts, Technology & Architecture	Thomas Erl	2nd	Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Cloud Computing: A Practical Approach	Anthony T. Velte, Toby J. Velte, Robert Elsenpeter	1st	McGraw Hill
2.	Cloud Computing: A Hands-On Approach	Arshdeep Bahga, Vijay Madisetti	1st	University Press

Web Resources:

1.	https://www.geeksforgeeks.org/
2.	https://www.oracle.com/in/cloud/

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23IT605P	Project – I	-	-	4	2	--	50	50	100

Course Objectives	Course Outcomes
The primary aim of the Project is to enable students to utilize and implement the theoretical concepts they have studied in their undergraduate curriculum to address real-world problems and practical situations.	1. Demonstrate the ability to comprehend, organize, and successfully implement a project collaboratively as a team. 2. Apply the knowledge and skills gained in the selected technology domain to design and develop a project. 3. Analyze, evaluate, and validate the technical components of the chosen project using a structured and systematic methodology. 4. Present and document project activities and outcomes clearly and effectively through appropriate communication methods.

	[2Hrs]

• Students may select a project based on either an industry-oriented problem or a user-defined problem, provided it reflects real-world scenarios.

• It is recommended that students undertake the project in teams consisting of three to four members.

• Once the team is formed, students should finalize the project title and present it before the department. They are also required to prepare a 4–5 page project proposal report and submit it during the presentation.

• Upon completion of the project, students must submit a comprehensive final report in the format prescribed by the department.

• The final report must undergo plagiarism verification using the software recommended by the department, and the similarity index should not exceed 25%.

• Students are required to meet their assigned guide/supervisor every two weeks to review and discuss their project progress.

• The project will be finally assessed based on the demonstration and presentation conducted at the end.

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
23IT641P	Career Development – VI	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
This course is intended 1. 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. 2. This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 3. To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.	**Students will be able to** 1. Students shall solve real life problems comparison of various probabilities, Permutation and combinations to ascertain the best outcomes expected 2. Students shall draw conclusions or Understand geometrical terminology for angles, triangles, quadrilaterals and circles with the help of formulas. 3. The ability to analyze and interpret different forms of data, including tables, graphs, charts, and more. 4. Enable students to critically analyze material (information) to order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions. 5. 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:- Lean 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 Chart	
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		

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

INFORMATION TECHNOLOGY

SIXTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
23IT631M	MDM – IV Data Analytics	3	-	-	3	15	15	70	100

Course Objectives	Course Outcomes
This course is intended 1. To introduce students to the basic principles, concepts, and techniques of data analytics. 2. To develop the ability to preprocess, analyze, and visualize data using analytical tools. 3. To familiarize students with descriptive, diagnostic, predictive, and prescriptive analytics approaches. 4. To provide hands-on understanding of tools such as Python, Excel, and Power BI for data-driven insights. 5. To expose students to real-world applications of data analytics across multidisciplinary engineering domains.	**Students will be able to** 1. Understand fundamental concepts and lifecycle of data analytics. 2. Perform data preprocessing, cleaning, and transformation for analysis. 3. Apply statistical and visualization techniques to derive insights from data. 4. Use analytical tools and libraries (Python, Excel, Power BI) for data analysis. 5. Interpret analytical results and propose data-driven solutions for engineering and business problems.

Unit I : Introduction to Data Analytics	**[9Hrs]**
Definition, Need and Scope of Data Analytics, Data Science vs. Data Analytics, Data Lifecycle and Pipeline, Types of Analytics – Descriptive, Diagnostic, Predictive, Prescriptive; Data-driven decision-making in engineering domains.	
Unit II : Data Collection and Preprocessing	**[9Hrs]**
Data sources – structured, semi-structured, and unstructured data; Data collection methods; Data quality and cleaning; Handling missing values, outliers, and duplicates; Data transformation, normalization, encoding, and feature selection.	
Unit III : Exploratory Data Analysis and Visualization	**[9Hrs]**
Statistical measures – mean, median, mode, variance, correlation; Data summarization and pattern identification; Data Visualization , Excel, and Power BI; Dashboard creation and storytelling with data.	
Unit IV : Predictive Analytics and Machine Learning Basics	**[9Hrs]**
Introduction to predictive modeling; Supervised vs. Unsupervised learning; Regression and Classification basics; Model evaluation metrics (accuracy, precision, recall, F1-score);	
Unit V : Applications and Emerging Trends	**[9Hrs]**
Applications of data analytics in manufacturing, healthcare, finance, IoT, and smart cities; Big Data analytics overview; Ethical issues and data privacy in analytics.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Data Analytics: Principles, Tools, and Practices	Anil Maheshwari	2nd	Pearson
2	Data Science for Business	Foster Provost, Tom Fawcett	1st	O'Reilly Media
3	Data Analytics Made Accessible	Anil Maheshwari	2nd	Amazon Digital Services

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Python for Data Analysis	Wes McKinney	3rd	O'Reilly Media
2.	Introduction to Data Mining	Pang-Ning Tan, Michael Steinbach, Vipin Kumar	2nd	Pearson

Online Resources

1	https://www.geeksforgeeks.org/data-analytics/
2	https://www.kaggle.com/learn