Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications
Name of Program: MCA(Banking Technology)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCBT301	Compulsory	Biometric Systems in Banking	3	1	0	4	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objectives (CEOs):

- To introduce biometric traits and its aim, image processing basics, basic image operations.
- Understand the various methods of password management and protocols to maintain system security.

Course Outcomes (COs):

After the successful completion of this course students will be able to: -
- Elaborate the security aspects in biometrics.
- Explore biometric application areas.
- Understand the various methods of password management and protocols to maintain system security.
- Describe different concepts related to the biometrics and image processing.

Unit-I

BIOMETRIC FUNDAMENTALS AND STANDARDS:
Definition, Biometrics versus traditional techniques, Characteristics, Key biometric processes: Verification, Identification, Biometric matching, Performance measures in biometric systems, Assessing the privacy risks of biometrics, Designing privacy sympathetic biometric systems, Different biometric standards, Application properties.

Unit-II

PHYSIOLOGICAL BIOMETRICS:
Facial scan, Ear scan, Retina scan, Iris scan, Finger scan, Automated finger-print identification system, Palm print, Hand vascular geometry analysis, DNA, Dental.

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
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MCBT301	Compulsory	Biometric Systems in Banking	3	1	0	4	60	20	20	0	0

Unit-III

BEHAVIOURAL BIOMETRICS:
Signature scan, Keystroke scan, Voice scan, Gait recognition, Gesture recognition, Video face, Mapping the body technology.

Unit-IV

USER INTERFACES:
Biometric interfaces: Human machine interface BHMI structure, Human side interface: Iris image interface, Hand geometry and fingerprint sensor, Machine side interface: Parallel port, Serial port, Network topologies, Case study: Palm scanner interface.

Unit-V

BIOMETRIC APPLICATIONS:
Categorizing biometric applications, Application areas: Criminal and citizen identification, Surveillance PC/network access, Ecommerce and retail/ATM, Costs to deploy, Issues in deployment, Biometrics in medicine, cancellable biometrics.

Text Books:

1. Paul Reid, "Biometrics for Network Security", First Edition, Prentice Hall, 2004.
2. NaliniRatha, Ruud Bolle, "Automatic Fingerprint Recognition System", Springer, 2004.
3. Laxmi C. Jain, U. Halici, I. Hayashi, S. B. Lee, S. Tsutsui, "Intelligent Biometric Techniques in Fingerprint and Face Recognition", First Edition, Routledge, 1999.
4. S. Y. Kung, M.W. Mak, S. H. Lin, "Biometric Authentication: A Machine Learning Approach", First Edition, Prentice Hall, 2010.
5.

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Vishwavidyalaya, Indore   Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCBT301	Compulsory	Biometric Systems in Banking	3	1	0	4	60	20	20	0	0

Reference Books:

1. John Chirillo, Scott Blaul, "Implementing Biometric Security", John Wiley & Sons, 2003.
2. Samir Nanavati, Michael Thieme, Raj Nanavati, "Biometrics: Identity Verification in a Networked World", First Edition, Wiley, 2002.
3. John R. Vacca, "Biometric Technologies and Verification Systems", First Edition, Elsevier Science, 2007.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Computer Applications
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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA302	COMPULSORY	Software Engineering	3	0	2	4	60	20	20	30	20

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
Q/A – Quiz/Assignment/Attendance, MST - Mid Sem Test.
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Course Education Objectives (CEOs):
- To provide knowledge about system development.
- To impart knowledge about software process models.
- To provide detailed knowledge about software design.
- To acquaint students with software quality and testing.
- To provide study of MIS.

Course Outcomes (COs): Students will be having:
- An ability to understand system design and its constraints.
- An ability to apply knowledge of software engineering.
- An ability to design a system, a component or process to meet desired needs.
- An ability to identify, formulate and solve engineering Problems
- An ability to measure and to understand quality issues.
- An ability to understand MIS and DSS.

UNIT -I
Introduction to Software Engineering: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications. System's concept, characteristics of system, elements of system, The System Development Life Cycle, The Role of System Analyst.

UNIT -II
Software Processes: Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, RAD model, Iterative Enhancement model, Spiral model, Component based development, Comparative study of various development models.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
MCA302	COMPULSORY	Software Engineering	3	0	2	4	60	20	20	30	20

UNIT-III
Software Project Planning: Project planning objectives, Decomposition Techniques, Empirical estimation models, The Make/Buy Decision., Risk analysis. Software Design: Design Principles, Cohesion & Coupling.

UNIT-IV
Software Quality Assurance: Quality Concepts, The Quality Movement. Software Reviews: Formal Technical Reviews. Statistical Software Quality Assurance, Software Reliability. **Software Testing Techniques:** Testing fundamentals, White box testing, Black box testing. Testing Strategies: A strategic approach of software testing strategic issues, unit testing, integration testing, validation testing, system testing.

UNIT-V
MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, Applications of MIS in manufacturing sector and service sector. Decision Support System concepts, types of DSS.

Text Books:
1. R. S. Pressman, "Software Engineering – A practitioner's approach", 6th ed., McGraw Hill Int.
2. Pankaj Jalote "Software Engg" Narosa Publications.
3. Ian Sommerville : Software Engineering 6/e (Addison-Wesley)
4. Richard Fairley : Software Engineering Concepts (TMH)
5. Elis Awad, "System Analysis & Design", Galgotia publications
6. W.S. Jawadekar: Management Information Systems, TMH Publication, India

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MCA302	COMPULSORY	Software Engineering	3	0	2	4	60	20	20	30	20

Practical List:
1. To study the Software Development Life Cycle.
2. To understand and apply good Software Analysis and Design practices
3. To study Data Flow Diagrams (DFDs) and levels in DFDs.
4. To create Data Dictionary for some applications
5. To use various information gathering tools (Questionnaire, Interview, On Site Survey)
6. To choose suitable software development process models for developing different applications.
7. Perform Feasibility Study and to create Feasibility Report for applications.
8. To make decision whether to buy/lease/ develop the software.
9. To understand and create Use Case Diagram.
10. To study Functional Point Analysis.
11. To devise Test Cases for software testing, black-box, white-box testing and different types of testing.
12. To study the Risk Management during the software development.
13. To assure Quality of Software, Statistical Software Quality Assurance, Reliability of Software.
14. To understand and apply concepts of Project Management.
15. Case study (MIS and DSS).

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA311	Elective-I	Cloud Computing	3	0	0	3	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance. MST – Mid Semester Test.
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Course Education Objectives (CEOs):
The goal of this course is to provide students with an understanding of basic concepts of cloud computing along with cloud computing architecture, cloud management and cloud security.
Course Outcomes (COs): After course completion Students will be able to understand:
1. Concept of cloud computing with broader perspective of cloud architecture and reference models.

2. Theory of cloud Management and its security.

3. Virtualization Technology Management.

4. Applications of cloud computing with the help of some important commercial systems like Google App Engine, Microsoft Azure and Amazon.

Unit-I

Cloud Computing: Introduction, Historical development, principles and vision, Cloud services requirements, Types of Clouds, Advantages and disadvantages of cloud computing, effect of cloud computing on human lives, Characteristics of Cloud Computing, Cloud and dynamic infrastructure, key elements in adopting cloud, Cloud adoption rudiments.

Unit-II
Architecture for Cloud Computing: Cloud Computing Environments, Characteristics of cloud computing as per NIST, Concepts of Deployment Models and Service Models, Cloud Interoperability &Standards, Scalability and Fault Tolerance.

Cloud Solutions: Cloud Ecosystem and its benefits, Cloud Business Process Management, Cloud Service Management.

Cloud Offerings: Cloud Analytics, Testing Under Control.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA311	Elective-I	Cloud Computing	3	0	0	3	60	20	20	0	0

Unit-III
Cloud Management: Resiliency, Provisioning, Asset management, Concepts of Map reduce, Cloud Governance, High Availability and Disaster Recovery. Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition.

Unit-IV

Virtualization Technology: Introduction, working process of virtualization and benefits of virtualization. **Type of virtualization: Hardware Virtualization, Software Virtualization, Memory Virtualization, Storage Virtualization, Data and Network Virtualization, Desktop and Application virtualization. Technology used for virtualization,** Hypervisor Virtualization Software, Virtual LAN (VLAN) and Virtual SAN (VSAN) with their benefits.

Unit-V
Cloud Security: Introduction of cloud Information security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, and Security Challenges. Introduction of cloud applications: ECG Analysis in the cloud. CRM and ERP, Social networking.

Case study of cloud computing platforms: Google App Engine, Microsoft Azure, Hadoop. Amazon.

Textbooks:
1. Judith S. Hurwitz, Daniel Kirsch" Cloud Computing For Dummies, 2nd Edition,John Wiley and Sons inc., New Jersey, 2000.
2. Hashmi, Tahir, Landreau, Jean-Francois" Cloud Strategy: A Decision-based Approach to cloud migration" GregorHohpe:An architect Elevator Guide,2019-2020.
3. Kavis, Michael J. "Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS) John Wiley and Sons inc., Hoboken, New Jersey, 2000.
4. Mr. Ray J Rafaels "Cloud Computing: From Beginning to End" Second edition, paperback,2018.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA321	Elective-I	Internet of Things	3	0	0	3	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

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Course Education Objectives (CEOs):
1. Vision and Introduction toIoT.
2. Understand IoT Market perspective.
3. Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Course Outcomes (COs):
At the end of the course the student will be able to:
1. Understand the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Use of Devices, Gateways and Data Management in IoT.
4. Building state of the art architecture in IoT.
5. Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints

Unit-I
Introduction to the internet of things – origins, early concepts and products, Examples of current products and value propositions, Architectures and design patterns, Analysis of a full connected- object experience. State of the Art, challenges and future directions. Role of Cloud in IoT, Security aspects in IoT.

Unit-II
Elements of IoT: Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing, Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication Protocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA321	Elective-I	Internet of Things	3	0	0	3	60	20	20	0	0

Unit-III

IoT Application Development: Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration.

Unit-IV

Device data storage: Unstructured data storage on cloud/local server, Authentication, authorization of devices.

Unit-V

IoT Case Studies: IoT case studies and mini projects based on Industrial automation, Home Automation.

Text Books:

1. Vijay Madisetti, ArshdeepBahga, Ïnternet of Things, "A Hands on Approach",University Press.
2. Dr. SRN Reddy, RachitThukral and Manasi Mishra, "Introduction to Internet of Things: Apractical Approach", ETILabs.
3. JeevaJose, "Internet of Things", Edition 2018, Khanna Publishing House,Delhi.
4. Adrian McEwen, "Designing the Internet of Things", Edition 2013, Wiley.
5. Raj Kamal, "Internet of Things: Architecture and Design", Edition 2017, McGrawHill.

Reference Books:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press,2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications,2013

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
							THEORY			PRACTICAL	
MCA331	Elective-I	Distributed Systems	3	0	0	3	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objectives (CEOs):
- Understand foundations of Distributed Systems
- Understand the network virtualization, remote method invocation and objects and RPC.
- Introduce the idea of peer to peer services and file system
- Methods of understanding clock synchronization protocols &replication
- Understand the issues involved in studying process and resource management

Course Outcomes (COs):
- Discuss trends in Distributed Systems
- Demonstrate an understanding of the challenges faced by future distributed systems
- Learn and apply the concept of network virtualization and remote method invocation
- Apply network virtualization in Real time systems like
- Analyze the mechanism of peer to peer systems, DFS and DNS.
- Understand key mechanisms and models for distributed systems including logical clocks,
- Causality, distributed mutual exclusion, distributed deadlocks.
- Design process and resource management systems.

UNIT-I
Concepts of Distributed Systems: Introduction, Goals of Distributed Systems, Examples of distributed Systems Distributed

Theoretical Foundation for Distributed System : Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks.

UNIT-II
Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and Non Token based algorithms.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA331	Elective-I	Distributed Systems	3	0	0	3	60	20	20	0	0

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

UNIT-III
Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem.

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications.

UNIT-IV
Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery

UNIT-V
Replication: System model and group communication, Fault-tolerant services, Transactions with replicated data. Distributed Algorithms: Destination based routing, APP (assignment problem in parallel), Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm.

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
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MCA331	Elective-I	Distributed Systems	3	0	0	3	60	20	20	0	0

Text Books:

1. Sinha P. K., "Distributed operating systems; Concepts and design", PHI Learning.

2. Mahajan S. & Shah, Distributed Computing, Oxford Press

3. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill.

4. Tanenbaum and Steen, "Distributed systems: Principles and paradigms", 2nd edition, PHI Learning.

5. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed.

6. Gerald Tel, "Distributed Algorithms", Cambridge University Press.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA312	Elective-II	Data Mining and Warehousing	3	0	0	3	60	20	20	0	0

Legends:L -Lecture; T -Tutorial/Teacher Guided Student Activity; P –Practical; C -Credit; Q/A – Quiz/Assignment/Attendance, MST -Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):
- To familiarize the students with the need and scope of the subject.
- To build the mental makeup of the students for the field of data mining
- To develop a better understanding of the recent techniques like Support Vector Machine, Rough Set Theory etc as the tools of data mining.
- Using simple and well drawn illustrations develop students skills to discover knowledge to support the decision making process.
- To make the students well versed with the latest trends in data warehousing and data mining.

Course Outcomes (Cos): The student will be able to
- Understand the basic principles, concepts and applications of data warehousing and data mining
- introduce the task of data mining as an important phase of knowledge recovery process
- Ability to do Conceptual, Logical and Physical design of Data Warehouses, OLAP applications and OLAP deployment
- Have a good knowledge of the fundamental concepts that provide the foundation of data mining
- Design and implement a data warehouse or data mart to present information needed by management in a form that is usable for management client
- Design and implement the data pre-processing solutions for different applications
- Identify and use suitable data mining techniques for Knowledge Discovery
- Develop dashboard solutions for presentation of knowledge
- Explore the subject to start as a researcher

UNIT –I
Motivation, importance, Data types for Data Mining: Relation Databases, Data Warehouses, Transactional databases, Advanced Database System and its applications, Data mining functionalities: Concept/Class description, Association Analysis, Classification & Prediction, Cluster Analysis, Outlier Analysis, Evolution Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA312	Elective-II	Data Mining and Warehousing	3	0	0	3	60	20	20	0	0

UNIT –II
Data Warehouse and OLAP Technology for Data Mining: Differences between Operational Database Systems and Data Warehouse, a multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Servers, Implementation of Data Warehouse, Data Cube Technology.

UNIT-III
Data Pre-processing: Problems with real world data, data pre-processing as a process, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Languages and System Architectures, Concept Description: Characterization and Comparison, Analytical Characterization.

UNIT –IV
Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single-Dimensional Boolean Association Rules from Transactional Databases: different algorithms, the Apriori, Partition, Dynamic Itemset Counting, pincer search, FP tree Growth, Generating Association rules from Frequent items, Improving the efficiency of Apriory, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint-Based Association Mining.

UNIT –V
Classification, Prediction and Cluster Analysis: Issues regarding classification and prediction, Different Classification and Clustering Methods, Cluster Analysis, Applications and Trends in Data Mining: Data Mining Applications, currently available tools.

Text Books:
1. J. Han and M. Kamber, 'Data Mining: Concepts and Techniques', Morgan Kaufmann Pub.
2. Berson, 'Data Warehousing, Data Mining and OLAP', TMH.
3. W.H. Inmon, 'Building the Data Warehouse', Wiley India.
4. Anahory, 'Data Warehousing in Real World', Pearson Education.
5. Adriaans, 'Data Mining', Pearson Education.
6. A.K. Pujari, 'Data Mining Techniques', University Press, Hyderabad.

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| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
| | | | | | | | THEORY | | | PRACTICAL | |
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA322	Elective-II	Cryptography and Information Security	3	0	0	3	60	20	20	0	0

Legends: L – Lecture; T – Tutorial/Teacher Guided Student Activity; P – Practical; Q/A – Quiz/Assignment/Attendance; MST – Mid Semester Test.

*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class activities, given that no component shall exceed more than 10 marks

Course Education Objectives (CEOs):
1. To learn about different Cryptography Encryption and Decryption Technique.
2. To understand the concepts of various asymmetric and symmetric algorithms.
3. To understand the different aspects of Information Security and other security areas.

Course Outcomes (COs): Upon completion of the subject, students will be able to:
- Explain concepts of cryptography and ciphers.
- Describe advance encryption techniques and algorithms.
- Understand the key exchange protocols.
- Define information systems and its related security aspects.
- Explore different types of security including network, computer, internet security.

Unit-I
Cryptography: Concepts & Techniques: Introduction, Plaintext & Cipher text, Creaser Cipher, Substitution Techniques, Substitution Boxes (SBoxes), Permutation Cipher, Transposition Techniques, Encryption & Decryption, Symmetric and Asymmetric key Cryptography, Key Range & Key Size.

Unit-II
Symmetric Key Algorithm: Introduction of Block Ciphers, Overview of Symmetric Key Cryptography, DES (Data Encryption Standard) algorithm, Double DES Triple DES, AES, IDEA (International Data Encryption Algorithm) algorithm.

Unit-III
Asymmetric Key Algorithm: Overview of Asymmetric key Cryptography, RSA algorithm, Symmetric & Asymmetric key Cryptography together, Diffie-Hellman Key Exchange, Digital Signature, Basic concepts of Message Digest and Hash Function. Man in Middle Attack, DoS and DDoS Attacks.

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
MCA322	Elective-II	Cryptography and Information Security	3	0	0	3	60	20	20	0	0

Unit-IV
Information Security: Introduction of Information System, Functions and Types of Information System, Information System Threats and Attacks Defined, Security Services, Information System Security and control, Cyber Crime and Information Security

Unit-V
Other Security: Threats in Network, Network Security, Attacks on Computer, Computer Security, Network Access Control and Cloud Security, Transport- Level Security, Wireless Network Security, Electronic Mail Security, IP Security.

Text Books:
1. William Stallings, "Cryptography and Network Security: Principles and Practice", Sixth Edition, Pearson Education, 2013.
2. C. Kaufman, R. Perlman and M. Speciner, "Network Security: Private Communication in a Public World", Second Edition, Pearson, 2016.
3. Atul Kahate, "Cryptography & Network Security", Third Edition, McGraw Hill Education, 2017.
4. Gaurav Gupta, Sarika Gupta "Information Security and Cyber Laws", First Edition, Khanna Publishing, 2019

References:
1. Wenbo Mao, "Modern Cryptography: Theory and Practice", First Edition, Prentice Hall, 2003.
2. William Stallings, "Network Security Essentials: Applications and Standards", Sixth Edition, Pearson Education, 2018.
3. Douglas R. Stinson, M. Paterson, "Cryptography: Theory and Practice", Fourth Edition, CRC Press, 2018.
4. Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, "Building Internet Firewalls", Second Edition, O'Reilly, 2000.
5. http://nptel.ac.in/

Chairperson	Chairperson	Controller of Examination	Joint Registrar
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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	THEORY END SEM University Exam	THEORY Two Term Exam	THEORY Teachers Assessment*	PRACTICAL END SEM University Exam	PRACTICAL Teachers Assessment*
MCA332	Elective-II	Big Data Analytics	3	0	0	3	60	20	20	0	0

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P Practical; C - Credit;
Q/A Quiz/Assignment/Attendance, MST - Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/Project/Participation in class
(Given that no component shall be exceed 10 Marks)

Course Educational Objectives (CEOs):
- To familiarize the students with the need and scope of the subject.
- Provide an exposure giving a strong foundation to the data analytics practices.
- create a basis for the use of advanced investigative and computational methods to convertinformation to useful knowledge.
- To develop an understanding of how business analytics is actually performed
- covers foundational techniques and tools required for data science and big data analytics.

Course Outcomes (Cos): After the completion of the course the student will be able to
- Explain the information lifecycle from events in the real world to business actions,
- Recognize the types of events and characteristics that are often used in business analytics,
- Use the data captured by source systems and stored using both traditional and emergenttechnologies,
- Gain a high-level familiarity with relational databases and learn how to use a simple butpowerful language called SQL to extract analytical data sets of interest,
- Appreciate the spectrum of roles involved in the data lifecycle, and gain exposure to thevarious ways that organizations structure analytical functions,
- Summarize some of the key ideas around data quality, data governance, and data privacy
- function on multi-disciplinary teams
- understand the professional and ethical responsibility
- present you with and structured around the broad contours of the different types ofdata analytics, namely, descriptive, inferential, predictive, and prescriptive analytics.
- to produce the good decision makers who can use empirical approaches, wide range ofdata analytic techniques to problem solving.

PRE- REQUISITES:
This course requires the familiarity with linear algebra, calculus, matrix operations, probability theory, statistics, programming, Database Management System.

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							THEORY			PRACTICAL	
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MCA332	Elective-II	Big Data Analytics	3	0	0	3	60	20	20	0	0

Syllabus

Unit I:
Measures of Central Tendency: Mean, Median, Range, Mode, Variance, Standard deviation. Correlation and Regression: Linear Correlation, Correlation and Causality, Linear Regression, Linear Regression with Nonlinear Substitution.

Statistical Concepts: Population, Sample, sampled data, Sample space, sampling methods.

Unit-II
Big Data: Introduction and basics, Evolution of Data Management, Definition, Importance, Big Data Types, Structured and unstructured Data, Sources of big structured data and unstructured data, Architecture of Big Data Management System, Stages of Big Data Management.

Big Data Technology Foundations: Technology Components, virtualization, distributed computing, Cloud and Big Data, Integration of data types into a big data environment.

Unit-III
Big Data and operational Databases: relational, non-relational, key-value pair, document, column oriented, graph, spatial databases, MapReduce, Hadoop, Hadoop Foundation and Ecosystem, Appliances and Big Data Warehouse.

Unit IV
Big Data Analytics: Introduction, Basic and Advanced Analytics, Drivers, Pillars of Analytics: descriptive, predictive, and prescriptive. Core Components of analytical data architecture, Performance issues, Parallel vs. distributed processing, Shared nothing data architecture and Massive parallel processing, Elastic scalability, Data loading patterns.

Data Analytics lifecycle: Discovery, Data Preparation, Model Planning, Model Building, Communicating results and findings, Big data Implementation, Big Data Applications.

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Unit-V

Machine Learning, supervised and unsupervised learning, Classification, Classification Criteria, Naive Bayesian Classifier, use of regression and classification, Support Vector Machine, Challenges for Big Data Analytics, Clustering, Association Rule Mining.

Data Science Tools: Cluster Architecture vs. Traditional Architecture, Introduction to R, Data Manipulation and Statistical Analysis with R, Basics, Simple manipulations, Numbers andvectors, Input/ Output, Arrays and Matrices, Loops and conditional execution, functions, Data Structures, Data transformations, Strings and dates.

Text Books:
1. " Big Data for Dummies" by Judith Hurwitz, Alan Nugent, Fern Hapler, Marcia Kaufman,Wiley, ISBN: 978-1- 118-50422-2, 2013
2. "Data Analytics, Models and Algorithms for Data Analysis" by Runkler, Thomas A., Springer Vieweg , ISBN 978-3-8348-2589-6, 2013
3. "Big Data Analytics with R and Hadoop" by Vignesh Prajapati, Packt Publication, ISBN-978-1-78216-328-2, 201
4. The Elements of Statistical Learning " by Hastie, Trevor, et al. Vol. 2. No. 1. New York:springer, 2009.
5. "Applied Statistics and Probability for Engineers" by Montgomery, Douglas C., and George C. Runger, John Wiley & Sons, 2010
6. "Data Science and Big Data Analytics Student Guide" distributed by EMC Education Services, I Edition, 2015.

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MCA305	Compulsory	Python Programming	3	0	4	5	60	20	20	30	20

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Course Education Objectives (CEOs):
The goal of this course is to provide students with an understanding of basic concepts of Python Programming Language along with its features and application areas, cloud management and cloud security.
Course Outcomes (COs): After completion of this syllabus students will be able to
- Apply the principles python programming.
- Write clear and effective python code.
- Create applications using python programming.
- Implementing database using SQL.
- Access database using python programming.

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Unit-I
Introduction To Python: Basic Concept, characteristics, Features, various flavours of python, limitations of python, versions of python, Python-2 and Python-3 differences, python installation on windows, Identifiers, keywords, data types, type casting, use of comments in python, variables and constants, various operators used in python.

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MCA305	Compulsory	Python Programming	3	0	4	5	60	20	20	30	20

Unit-II
Input-output, Conditional, Iterative and Transfer Statements: Basic simple programs using input and output statements. Decision Making statements: if statement, if-else statement and nested if statement. Iterative statements: For Loop, While loop, nested loops. Transfer statement: break, continue and pass statement.

Unit-III
Python Strings, List, Tuples and Functions: Definition, accessingcharacters or values of a String, Updating Strings, String Special Operators, String Formatting Operator, Triple Quotes, Python Lists, python Tuples, list Vs tuples, python functions, python dictionary.

Unit-IV

Python File Handling: types of files, opening and closing a file with various modes, deleting a file.

Python exceptions and Assertions: exception handling, Exception Handling Vs Assertions:

Python OOPs Concepts: Introduction of Class and Object, creating class and its instance, constructor (Parameterized Constructor and Non-Parameterized Constructor), destructors, polymorphism, inheritance (Multilevel and multiple), data abstraction.

Unit-V
Using Databases in Python: Python MySQL Database Connectivity. Create database, create table, insert data into table, inserting multiple records into table, extracting data from the table, updating table record and delete table data.

Introduction to Real-world Applications of Python: Artificial Intelligence and Machine Learning, Scientific and Numeric Applications, Desktop GUI, Enterprise-level/Business Applications, Image Processing and Graphic Design Applications, Web Development, software development, Language development, game development etc.

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MCA305	Compulsory	Python Programming	3	0	4	5	60	20	20	30	20

Text Books:
1. Pratiyush Guleria," Basics of Python Programming, BPB Publications, March 2020.
2. Jason Cannon" Python programming for beginners, Kindle book, 2020
3. Paul Deitel and Harvey Deitel, "Python for Programmers with Big Data and Artificial Intelligence Case Studies" Deitel Developer Series, April 2019.
4. Ryan Turner, "Python Programming: 3 Books in 1: Ultimate Beginner's, Intermediate & Advanced Guide to Learn Python Step-by-Step", Kindle Edition, 2018.
5. Martin Brown, "Python: The Complete Reference", Mc-Graw-Hill, 2018.

List of Practical:
1. Write python program to print Hello World.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write python program to Hello World using string variable.
4. Write python program to show use of conditional statement.
5. Write a python program to find largest of three numbers.
6. Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
 [Formula : c = (f-32)/1.8]
7.Write python program to store data in list and then try to print them.
8.Write python program to print list of numbers using for loop.
9. Write a python program to find factorial of a number using loop.
10.Write python program to store strings in list and then print them.
11.Write a program to create, append, and remove lists in python.
12. Write a program to demonstrate working with tuples in python.
13.Write a program to demonstrate working with dictionaries in python.
14.Write python program to let user enter some data in string and then verify data and print welcome to user.
15. Write python program in which a function is defined and calling that function prints Hello World.
16. Write python program in which a function(with single string parameter) is defined and calling that function prints the string parameters given to function.