CVM UNIVERSITY

M.Sc. (Information Technology)
Semester – I

Syllabus with Effective from: 2020-2021

First Semester

Subject Code	Subject Title
101410101	Discrete Mathematics
101410102	Advanced Programming Concepts & Data Structures
101410103	Relational Database Management Systems
101410104	Practicals based on 101410102 and 101410103
101410105	Programming with C
101410106	Comprehensive Viva-Voce
101410107 Or 101410108	Elective Subject

Elective Subjects:

101410107   Operating Systems

101410108   Machine Learning Techniques

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M.Sc. (Information Technology)
Semester – I
Syllabus with Effective from: 2020-2021

Paper Code: 101410101
Paper Title: Discrete Mathematics

(Total Marks: 100)

Unit 1:
Set theory and Function Introduction to Set Theory, Methods of Representation of a Set, Operations on Set, Algebra of Sets, DeMorgan's Laws, Introduction to Function, Types of Function: One-to-One, Many-to-One, Onto, Into, Composition of a Function, Inverse of a Function. Introduction to Relations, Binary Relation, Classification of Relations: Reflexive, Symmetric, Antisymmetric, Transitive; Equivalence and Complement of a Relation.

Unit 2:
Introduction, Definition of a Matrix, Different Types of Matrices, Operation on Matrices (Addition, Subtraction and Multiplication), Inverse of a Matrix, Rank of a Matrix, Eigen Vectors of a Matrix, Linear System of Equations, Solution of Linear Equations using Matrix Inversion Method.

Unit 3:
Lattices and Boolean Algebra:
Partial ordering; Partially ordered sets; Hasse diagram; Least, Greatest, Maximal, Minimal Members; Upper bound, lower bounds, least upper bound or supremum, greatest lower bound or infimum; Well-ordered sets Relation and ordering, partially ordered sets, Lattices as poset, properties of lattices, Lattices as algebraic systems, sublattices, direct product and homomorphism, complete lattices, bounds of lattices, distributive lattice, complemented lattices.
Boolean Algebra:
Introduction, definition and important properties, Sub Boolean algebra, direct product and homomorphism, join-irreducible, meet-irreducible, atoms, anti atoms of Boolean Algebra, Stone's representation theorem.
(Without Proof),
Note: No proof is required for Theorems or Results on lattices and Boolean Algebra. Theorems should be justified and explained by suitable examples.

Unit-4:
Graphs and Planar Graphs
Introduction; Basic terminology; Multigraphs and Weighted Graphs; Paths and Circuits; Shortest paths in Weighted Graphs; Eulerain Paths and Circuits, The Traveling Salesperson Problem; Factors of a Graph; Planar Graphs;

Reference Books:
1. C Lliu: Elements of Descrete Mathematics – TMH
2. Swapan Kumar chakraborty and Bikash Kanti Sarkar: Discrete Mathematics – OXFORD Higher Education.

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M.Sc. (Information Technology)
Semester – I
Syllabus with Effective from: 2020-2021

Paper Code: 101410102
Paper Title: Advanced Programming Concepts & Data Structures

(Total Marks: 100)

Unit 1: Introduction to Object Oriented Concepts - Introduction to Object Oriented Programming (OOP) , Advantages of OOP , Difference between Object Oriented Programming and Procedure Oriented Programming , An anatomy of C++ Program ,Classes and Objects , Data members, member functions ,Constructors, Destructors, new and delete operators , Basic input/output , Different types of inheritance , Abstraction , Encapsulation

Unit 2: Object Oriented Programming - Access controls ,Polymorphism, virtual functions , Function overloading , Operator overloading ,Exception handling , Introduction to namespace , Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, Templates

Unit 3:   Introduction to Data Structures- Data Structure Definition and Classification
Linear Data Structures: Arrays, Storage Structure for Arrays, Stack: List Implementation, Applications of Stacks. Queue: List Implementation, Circular Queue, Priority Queue, double ended queue. Linked List and its types
Nonlinear Data Structures- Tree - Basic Tree Concepts, Operations on Binary Trees, Storage Representation & Manipulation of Binary Trees, Conversion of General Tree to Binary Trees, Sequential & Other Representation of Trees

Unit 4: Sorting and Searching Techniques: Sorting – Notation and Concepts, Selection Sort, Bubble Sort, Merge Sort, Heap Sort, Quick Sort, Searching - Sequential Searching, Binary Searching, Search Trees – Height Balanced, Weight Balanced Tree, Hash Table Search Methods, Introduction, Hashing Functions.

Reference Books:
1. Tremblay J. & Sorenson P.G: An Introduction to Data Structures with Applications 2nd Edition – TMH
2. Stroustrup, Bjarne : The C++ Programming Language, Special Edition, Parson Education Asia, 2001
3. Object Oriented Programming with C++, E Balagurusamy, TMH

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M.Sc. (Information Technology)
Semester – I
Syllabus with Effective from: 2020-2021

Paper Code: 101410103
Paper Title: Relational Database Management Systems

(Total Marks: 100)

Unit 1:
Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – Examples of Normalization, ERD.

Unit 2:
Introduction to SQL syntax -Data definition language commands -Data manipulation language commands -Data control language commands -
Oracle Overview: Personal Databases – Client/Server Databases – Oracle Environment – Commands, Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Unit 3:
Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations. Database objects like views, indexes, sequence, synonyms.

Unit 4:
PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT of clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.
PL/SQL Composite Data Types: Records – Tables – arrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.

Reference Books:

1. SQL, PL/SQL The Programming Language of ORACLE- IVAN BAYROSS.
2. DATABASE SYSTEMS USING ORACLE – Nilesh Shah, 2nd edition, PHI.
3. Korth, Silbertz, Sudarshan, "Database Concepts". McGraw Hill.
4. DATABASE MANAGEMETN SYSTEMS – Gerald V. Post, 3rd edition, TMH.

Paper Code: 101410104
Paper Title: Practicals based on 101410102 and 101410103

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

Paper Code: 101410105
Paper Title: Programming with C

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

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M.Sc. (Information Technology)
Semester – I
Syllabus with Effective from: 2020-2021

Paper Code: 101410107
Paper Title: Operating Systems

(Total Marks: 100)

Unit 1: Introduction – Operating system objectives and Functions ,Understanding the role of operating systems , Interrupt handling ,Operating system interfaces(GUI, Command Line Interface), device drivers, system calls , Types of Operating Systems , Structure of operating system , Operating system services

Unit 2: Process Management - Process Concept - Scheduling of Processes, Schedulers - long term, middle term, short term , Inter Process communications , Shared memory, Message passing , Introduction to process synchronization , Critical Section Problem , Semaphores, Monitors , Deadlock – detection, prevention and avoidance

Unit 3: Memory Management - Basic concepts of memory management, Swapping , Contiguous Memory Allocation , Paging , Segmentation , Virtual Memory- demand paging, Page Replacement Algorithms

Unit 4: Disk & File System Management - File Systems, File attributes, operations, types, access methods, Directory structure, Disk structure, Disk attachment, Disk Scheduling, RAID structures

Reference Books:
1. Silbetschatz, Galvin, Gagne: Operating System Concepts, 8th edition, John Wiley and Sons, Inc., 2008
2. Tanenbaum A. S. : Modern Operating Systems, 3rd edition, Prentice-Hall, 2008

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M.Sc. (Information Technology)
Semester – I
Syllabus with Effective from: 2020-2021

Paper Code: 101410108
Paper Title: Machine Learning Techniques

(Total Marks: 100)

Unit 1:
INTRODUCTION Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminant – Perceptron – Linear Separability – Linear Regression.

Unit 2:
LINEAR MODELS Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multilayer Perceptron in Practice – Examples of using the MLP – Overview – Deriving BackPropagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines. No. of Lectures: 10

Unit 3:
TREE AND PROBABILISTIC MODELS Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantification – Self Organizing Feature Map

Unit 4:
Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process - Graphical Models - Naive Bayes" Classifier Hidden Markov Model - Linear Regression

Reference Books:
1. Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014
2. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014
3. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.
4. Stephen Marsland, ―Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014. ☐ Tom M Mitchell, ―Machine Learning‖, First Edition, McGraw Hill Education, 2013

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M.Sc. (Information Technology)
Semester – II

Syllabus with Effective from: 2020-2021

Second Semester

Subject Code	Subject Title
101410201	Software Engineering
101410202	Object oriented programming in JAVA
101410203	Advanced .Net Technologies
101410204	Practicals based on 101410202 and 101410203
101410205	Python Programming
101410206	Comprehensive Viva-Voce
101410207 or 101410208	Elective Subjects

Elective Subjects:

101410207   Cloud Computing

101410208   IoT and Applications

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M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410201
Paper Title: Software Engineering

(Total Marks: 100)

Unit 1: Introduction to Software Engineering - Software Process and process models, Characteristics of Software Process, Software development process models - Waterfall model, Prototyping, Iterative

Unit 2: S/W Requirement Specification and Project Management - Need of Software Requirement, Types of Requirements ,Requirement Engineering Process ,Software Requirement Specifications , Characteristics of SRS Documentation ,Organization of SRS ,Project and Project Management ,Role of Project Manager ,Project Management Process, Effort and Schedule Estimation – COCOMO Model, Risk Management

Unit 3: Software Design - Overview of Functional Design , Design Principles , Module level Concepts, OO Analysis and Design , UML Overview- Class Diagram, Activity Diagram, Sequence and Collaboration Diagram, State Chart Diagram, Use Case Diagram ,Generalization, Specialization, Relationship

Unit 4: Software Testing & Maintenance - Coding Process – Incremental Coding Process, TDD , Common Coding Error , Error, Fault and Failure ,Verification and Validation ,Testing Methods – Unit testing, Integration testing, System testing, Acceptance testing, White box testing, Black box testing, Regression testing ,Overview of Testing Tools , Types of S/W maintenance , Software Re-engineering

Reference Books:
1. An Integrated approach to Software Engineering – By Pankaj Jalote (3rd Edition), Narosa Publication
2. Software Engineering – By Sageeta Sabharwal, New Age Int. Publication
3. Software Engineering – A Practioners Approach – By Roger. Pressman (5th Edition), MGH Int. Publication

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M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410202
Paper Title: Object oriented programming in JAVA

(Total Marks: 100)

Unit 1: Introduction to Java and its Basic Concepts - The Java programming language: history, evolution, features, Introduction to the Java programming environment, JDK, JRE, An anatomy of a Java program, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Single and Multidimensional Array, String class, StringBuffer class, Operations on string, Command line argument, Use of Wrapper Class

Unit 2: Classes, Objects ,Methods, Inheritance & Polymorphism- Class, Object, Object reference, Constructor, Constructor Overloading, Method Overloading, Recursion, Passing and Returning object form Method, new operator, this and static keyword, finalize() method, Access control, modifiers, Nested class, Inner class, Anonymous inner class, Abstract class, Inheritance in java, Super and sub class, Final and super Keyword, Overriding, Polymorphism, Interface in java, Package in java, UTIL package

Unit 3: Exception Handling, I/O Programming - Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class, Introduction to Stream, Byte Stream, Character stream, Readers and Writers, File Class, File InputStream, File Output Stream, InputStreamReader, OutputStreamWriter, FileReader, FileWriter, Buffered Reader

Unit 4: Graphical Programming - An introduction to graphics in Java - Introduction to the Abstract Window Toolkit (AWT) - Overview of Java Applets - The Swing library - Writing graphical programs using Swing - Using various Swing components ,Managing layout using Swing - Event handling using Swing

Reference Books:
1. Schildt H. : The Complete Reference Java 2, 5th Edition , McGraw-Hill/Osborne,2002.
2. C. Thomas: Introduction to Object Oriented Programming with Java – TMH
3. Naughton: The Java Hand Book - TMH

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M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410203
Paper Title: Advanced .NET Technologies

(Total Marks: 100)

Unit 1
An introduction to C# syntax, comments, Namespace, introduction to datatypes: predefined data types, reference type and value type, casting-implicit and explicit, Boxing and unboxing Explaining control structures: (Using the if statement, using the if-else statement. Using the switch case statement, using the for statement, using the while statement, using the do while statement, using the break statement, using the continue statement, using the return statement, using the goto statement) Using Exception Handling : (Using the try Block, using the catch block, using the finally block, using the throw statement) Enums and Collections, Arrays (Single-Dimensional Array, multidimensional arrays jagged Arrays) Preprocessor Directives, Classes, Structures, Properties as a smart fields. Fundamentals of OOPs OOPs concepts, Inheritance, Polymorphism, Interfaces, Events and Delegates: (single cast, multicast)

Unit 2
Overview of Asp.net, ASP.NET Architecture and framework, ASP.Net Web applications,
Web Controls:
Label, TextBox, Button, LinkButton, ImageButton, HyperLink, Dropdownlist ListBox, CheckBox, CheckBoxList, RadioButton, RadioButtonList, Calendar, AdRotator, Panel, Hidden Fields, File Upload.
Validation Controls:
Required Field Validator Control, Regular Expression Validator Control, Compare Field Validator Control, Range Validator Control, Validation Summary Control, Custom Validator Control, Summary Creating a Layout Using Master Pages and Themes Accessing a Master Page from Code, Nesting Master Pages.
Website Navigation : SiteMapPath, Menu, TreeView

Unit 3:
Working with Data ADO.NET fundamentals ADO.NET Architecture, ADO.NET Objects, DataSet & DataTable Features, Data Access Controls : Data Binding Server Controls, SqlDataSource, ObjectDataSource, AccessDataSource, GridView, DetailsView, Data List and Repeater Multitier Architecture in ASP.NET 3-tier overview: User Interface Layer, Business Logic Layer, Data Access Layer.

Unit 4:
ASP.NET AJAX & JQuery AJAX Architecture   AJAX.NET Controls : Accordion, Calendar, CascadingDropDown,   CollapsiblePanelFilteredTextBox,   NumericUpDown,   ModalPopup, PopupControl,   jQuery: Introduction to jQuery, jQuery effects, jQuery html, jQueryajax. LINQ Overview Introduction of LINQ : LINQ Queries.

Reference Books:
1. Beginning ASP. NET 4.5 in C#, MacDonald, Matthew. Apress, 2012.
2. ASP .NET Bible, Mridula, Parihar, and A. Essam. New York, NY: Hungry Minds (2002).
3. ASP. Net 4 Unleashed, Walther, Stephen, Pearson Education India, 2012
4. ASP. NET: the complete reference, MacDonald, Matthew. Osborne/McGraw-Hill, 2002

M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410204
Paper Title: Practicals based on 101410202 and 101410203

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

Paper Code: 101410205
Paper Title: Python Programming

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410207
Paper Title: Cloud Computing

(Total Marks: 100)

Unit 1:
Overview of Computing Paradigm:
Recent trends in Computing: Grid Computing, Cluster Computing, Distributed Computing, Utility Computing, Cloud Computing; Evolution of cloud computing: Business driver for adopting cloud computing

Introduction to Cloud Computing:
Cloud Computing Model, Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers, Properties, Characteristics & Disadvantages: Pros and Cons of Cloud Computing, Benefits of Cloud Computing, Cloud computing vs. Cluster computing vs. Grid computing, Role of Open Standards

Unit 2:
Cloud Computing Architecture:
Cloud computing stack: Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web service: Service Models (XaaS): Infrastructure as a Service(IaaS),Platform as a Service(PaaS), Software as a Service(SaaS), Deployment Models: Public cloud , Private cloud, Hybrid cloud, Community cloud

Infrastructure as a Service(IaaS):
Introduction to IaaS: IaaS definition, Introduction to virtualization, Different approaches to virtualization, Hypervisors, Machine Image, Virtual Machine(VM): Resource Virtualization: Server ,Storage, Network, Virtual Machine(resource) provisioning and manageability, storage as a service, Data storage in cloud computing(storage as a service) Examples: Amazon EC2, Renting, EC2 Compute Unit, Platform and Storage.

Unit 3:
Platform as a Service(PaaS):
Introduction to PaaS: What is PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management: Computation, Storage
Examples: Google App Engine, Microsoft Azure,SalesForce.com, Force.com platform

Software as a Service(SaaS):
Introduction to SaaS ,Web services,Web 2.0,Web OS, Case Study on SaaS

Unit 4:
Cloud Security, Infrastructure Security, Network level security, Host level security, Application level security, Data security and Storage: Data privacy and security Issues.

Case Study on Open Source & Commercial Clouds:
Eucalyptus, Microsoft Azure, Amazon EC2

Reference Books:

1. Kenneth Hess, Amy NewMan – Practical Virtualization Solutions – Prentice Hall, 20102.
2. Shahed Latif, Tim Mather, Subra Kumaraswamy – Cloud Security and Privacy : An Enterprise perspective on risks and compliance – O'Reilly Media Inc., 20093.
3. Gautam Shroff – Enterprise Cloud Computing: Technology, Architecture, Applications –Cambridge University Press, 20104.
4. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 20105.Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg,Andrzej M. Goscinski, Wile, 20116.
5. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 20127.
6. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 20108.
7. George Reese – Cloud Application Architectures: Building Applications and Infrastructures in the cloud – O'Reilly Media Inc., 20099.
8. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter – Cloud Computing A practical Approach – McGraw Hill, 2010

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M.Sc. (Information Technology)
Semester – II
Syllabus with Effective from: 2020-2021

Paper Code: 101410208
Paper Title: IoT and Applications

(Total Marks: 100)

Unit 1:

IoT & Web Technology The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.

Unit 2:

M2M to IoT: A Basic Perspective– Introduction, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT. IoT Technology and Architecture Introduction (Design and Infrastructure), Basic Communication Flow, Hardware Requirements, Functional View, Information View, Deployment, Operational View, Other relevant architectural views.

Unit 3:

Sensors and Actuators: Definition, Properties, Types of Sensors and its Application. Communication Flow: Basic IoT Protocols a) Node to Gateway: ZigBee, ZWave, RF, BT, BLE   b) Gateway to Node: HTTP/HTTPS, MQTT, CoAP, GPRS and Wi-Fi. Definition and its Application: RESTFUL Web Services, Cloud Computing and Data & Visual Analytics

Unit 4:

IoT Applications and Case Studies for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

Reference Books:
1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013
3. CunoPfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-14493-9357-1

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M.Sc. (Information Technology)
Semester – III

Syllabus with Effective from: 2020-2021

Third Semester

Subject Code	Subject Title
101410301	Advanced Computer Networks
101410302	Advanced Java
101410303	Mobile Computing
101410304	Practicals based on **101410302** and **101410303**
101410305	Web Programming
101410306	Comprehensive Viva-Voce
101410307 **or** **101410308**	Elective Subjects

Elective Subjects:

101410307   Information Security

101410308   Cyber Security

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M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410301
Paper Title: Advanced Computer Networks

                                                                    (Total Marks: 100)

Unit 1:
Basics of Computer Networks
ATM: The WAN Protocol Introducing ATM Technology, Introducing Faces of ATM, Explaining the basic concepts of ATM Networking, Exploring the B-ISDN reference model, explaining the Physical Layer Explaining the ATM Layer, Explaining the ATM Adaptation Layer, Exploring ATM Physical interface

Unit 2:
Packet Switching Protocols: Introduction, Virtual Circuit Packet Switching, Introduction to X.25, Switched multimegabit data service
Protocols and Interfaces in Upper Layers of TCP/IP: Introducing TCP/IP suite, Explaining Network Layer Protocols, Explaining Transport Layer Protocol, Explaining Application Layer Protocol
Routing in the Internet: Introduction to Intra-domain and inter-domain routings, Unicast Routing Protocols, Multicast Routing Protocols

Unit 3:
Other Routing Techniques: Introduction to traffic Engineering, IP over ATM, Multiprotocol Label Switching, Storage Area Network
Network Management and Services: Introduction to Network Management, Standard Network Management Protocol

Unit 4:
Traffic Engineering Basics
Introduction to traffic Engineering, Requirement Definition for Traffic Engineering, Traffic sizing, Traffic Characteristics Protocols, Time and Delay Consideration, Connectivity Availability, Reliability, and Maintainability Throughput Calculation
Multimedia over Internet
Introduction to Multimedia Services ,Explaining Transmission of Multimedia over the Internet, Explaining IP Multicasting , Explaining VOIP

Reference Books:

1. Advance Computer Network, By DayanandAmbawade, Dr. Deven shah, Prof. Mahendra Mehra, Wiley India
2. CCNA Intro – Study Guide – Todd Lammle, Sybex
3. High-Speed Networks and Internets, Performance and Quality of Service, Second Edition, William Stallings, Pearson
4. TCP/IP Protocol Suite by Behrouz A. Forouzan
5. Computer Networks, Andrew Tanenbaum, 5th Edition, Pearson Education

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M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410302
Paper Title: Advanced Java

(Total Marks: 100)

Unit 1:
Multithreading: Life cycle of a Thread, Creating thread and running it, Creating Multiple Threads, Waiting for Threads, Thread group, Thread priorities, Synchronization
Introduction to J2EE Technology: Introduction to J2EE Platform, J2EE Architecture, Introduction to J2EE APIs
Java Database Connectivity (JDBC): JDBC Overview & Architecture, Introduction to JDBC JDBC Architecture, Database connectivity using JDBC

Unit 2:
Servlets: Introduction to Java Servlet, Servlet Interface and the Servlet Life Cycle, Handling HTTP get and post Requests , Session Tracking , Cookies
JavaServer Pages (JSP): Introduction, JavaServer Pages Overview, JSP Architecture & life cycle , JSP Directives, JSP Scripting Elements, JSP action elements, JSP implicit Objects,

Unit 3:
The Spring Framework: Introduction to the spring framework and architecture,
Beans (Definition, scope, lifestyle), Aspect- Oriented Spring, Spring MVC, Security, JDBC Framework
Web Service: Introduction about Restful Web Service

Unit 4:
Enterprise Java Beans (EJB): Introduction To Enterprise Java beans: Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Entity Beans, Session Beans, Message Driven Beans

Reference Books:
1. Java the complete reference, 8th edition by Herbert Schildt
2. Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
3. "Restful Java Web Services", Jose Sandoval, Packt Publication
4. "Spring MVC Beginner's Guide", Amuthhan Ganeshan, Packt Publication
5. "Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition by Herbert Schildt

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M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410303
Paper Title: Mobile Computing

(Total Marks: 100)

Unit 1:
Introduction to Android - Introduction to Android - Standard development environment for Android applications - Installing Android - Creating Hello World and running application on Emulator - Android Architectural Overview and Android Development Framework - Introduction to Android Studio - Structure of Android application - Components of Android

Unit 2:
Introduction to Activities and User Interface Design - Introduction to activity - Activity lifecycle phases - Introducing Toast - Introduction to Views and layouts and Common UI components - Input and Selection components - Adapters - Menus and Dialogs - Working with Intents - Types of Resources

Unit 3:
Introduction to Content Provider and Sqlite Database - File systems - Persistent storage in Android - Android databases - Storing and retrieving data - Content provider Classes

Unit 4:
Multimedia and System Services - Notifications - Using images, audio, video - Accessing the camera using intent - Using text messages(SMS) - Performing tasks in background - Accessing files and data from a server - Introduction to geolocation and location aware applications

Reference Books:
1. Wei-Meng Lee: Beginning Android 4 Application Development, Wiley Publishing, Inc, Wrox Programmer to Programmer, 2013.
2. J. F. DiMarzio: Beginning Android Programming with Android Studio, Wiley Publishing, Inc, 2017.
3. Meier Reto : Professional Android 2 Application Development, Wiley Publishing, Inc., 2010.
4. Android cookbook - Ian F. Darwin Oreilly.
5. Advanced Android Application Development – Joseph Annuzzi, Lauren darcey, Shane Conder – 4th Edition, Addision – Wesley.

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M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410304
Paper Title: Practicals based on 101410302 and 101410303

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

Paper Code: 101410305
Paper Title: Web Programming

(Total Marks: 100)

[Based on Industrial demand department would decide the list of experiments]

CVM UNIVERSITY

M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410307
Paper Title: Information Security

(Total Marks: 100)

Unit 1:
Understanding TCP/IP , Network configuration and access files ,TCP/IP daemons, utilities and commands ,Audit trails, Unix logs, accounting and utilities, Windows audit trails , Architecture for securing VPN , IP Spoofing and sniffing , sniffing methods, sniffing results, sniffing prevention, ARP, ICMP and TCP Spoofing

Unit 2:
Firewalls, Introduction to firewall, Components and characteristics, Types of firewall, Building firewalls, Brief idea of using network security reporting tools

Unit 3:
Encryption - Techniques - Cryptography - Digital ID's, Certificates and Signatures - Symmetric (secret key) Cryptography - Asymmetric Cryptography - Cryptanalysis - SSL - PGP (Pretty Good Privacy) Overview - Using PGP, generating, distributing, signing public keys - Keys and Key management - Message Operations

Unit 4:
Operating System Security - Windows server Overview - Logon and authentication - Intranet related features of Windows server - Web Server IIS - Proxy Server - Configuring Services and ports in Windows server - Unix Security

Reference Books:
 1. Internet Security – Professional Reference, Techmedia
2. Maximum Security Author – Anonymous Techmedia

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M.Sc. (Information Technology)
Semester – III
Syllabus with Effective from: 2020-2021

Paper Code: 101410308
Paper Title: Cyber Security

(Total Marks: 100)

Unit 1:
Introduction to Computer and Cyber Security Types of Threats: Malware, Viruses, Trojan Horses, Spyware Compromising System Security Denial of Service Attacks Web Attacks Session Hijacking DNS Poisoning Basic Security Terminology Hacker Slang Professional Terms Online Security Resources CERT Microsoft Security Advisor F-Security SANS Institute

Unit 2:
Networks and the Internet How the Internet works IP Addresses CIDR Uniform Resource Locators Basic Network Utilities IPConfig Ping Tracert Cyber Stalking, Fraud, and Abuse Industrial Espionage in Cyberspace Cryptography Basics Computer Security Software Virus Scanners Firewalls Antispyware Intrusion-Detection Software Website Security Email Mobile Devices Employees Facility Security Operational Security Payment Cards Incident Response and Reporting

Unit 3:
Cyber Security Best Practices Governance and Risk Management Governance Framework Management Involvement Best Practice Recommendations for Small and Medium companies Personnel Screening and the Insider Threat Physical and Environmental Security Cyber Security Awareness and Training Assessing Threats and Vulnerabilities Network Security Wireless Network Security Remote Access Information System Protection Bring Your Own Device Backup and Recovery User Account Management and Access Control Asset Management Incident Response Information Sharing and Breach Reporting Privacy Breach Notification Information Sharing Vendor Risk Management Cloud Computing Security Policies

Unit 4:
Cyber Law of India Introduction, Categorization of Cybercrimes Technical aspects of cybercrimes: Unauthorized access & Hacking, Trojan Attack, Virus and Worm attack, E-mail & IRC related crimes, Denial of Service attacks, Pornography, Forgery, IPR Violations, Cyber Terrorism, Banking/Credit card Related crimes, E-commerce/ Investment Frauds, Sale of illegal articles, Online gambling, Defamation, Pedophiles, Identity Theft, Data diddling, Theft of Internet Hours, Theft of computer system (Hardware), Physically damaging a computer system, Breach of Privacy and Confidentiality.

Reference Books:
1. Computer Security Fundamentals, by Chuck Easttom, Pearson Education
2. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
3. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley

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M.Sc. (Information Technology)
Semester – IV
Syllabus with Effective from: 2020-2021

Paper Code: 101410401
Paper Title: Project Work

(Total Marks: 600)

[Full time project work of one semester duration]

Learning Objectives:

- To solve industrial (or society or research) problems
- To plan, schedule, and monitor the software project
- Development, coding, and testing of a large project cohesively
- Documentation of project

Evaluation Parameters:

- Evaluation of the projects would be done considering the Internal and External guide of the project.
- The main parameter of assessment would be the ability of the students to code.
- Though the project and domain specific knowledge would be assessed for, the evaluation would predominantly depend on the students' ability to explain, modify or revise of code.
- Coding standards should have been implemented.
- Though the project would be evaluated for the entire team, the examiner should emphasize on the contribution of each team member in the project development

Paper Code: 101410402
Paper Title: Comprehensive Viva-Voce

(Total Marks: 50)

[Comprehensive Viva Based on the Project Work]