Course Structure and Syllabus For

Pre Ph.D.

# COMPUTER SCIENCE AND ENGINEERING

(Engineering &Technology)



###### CHAITANYA (DEEMED TO BE UNIVERSITY)

**Kishanpura, Hanamkonda, Warangal Urban, Telangana-506 001** [**www.chaitanya.edu.in**](http://www.chaitanya.edu.in/)

**Paper - I**

###### RESEARCH METHODOLOGY

**Common to All Science Research Programs (Effective from 2021–2022)**

**Number of Contact hours: 40**

**Credits: 4 Marks: 100**

**Objective**: This paper highlights the various postulates of research problems, research design, writing a thesis and modern statistical methods. This helps to carry out research problem individually in a perfect scientific method.

Unit-I: Meaning of Research - Function of Research

**Meaning of Research** - Function of Research – Characteristics of Research – Steps involved in Research – Research in Pure and Applied Sciences - Inter Disciplinary Research, Factors which hinder Research – Significance of Research - Research and scientific methods – Research Process– Criteria of good Research – Problems encountered by Researchers – Literature review

Identification of Research Problem Selecting the Research problem – Necessity of defining the problem – Goals and Criteria for identifying problems for research, Perception of Research problem – Techniques involved in defining the problem – Source of problems – Personal consideration.

Unit- II: Research Design

**Formulation of Research design** – Need for Research design – Features of a good design- Important concept related to Research design. Different research designs – Basic principles of experimental designs – Computer and internet in designs.

**Data Collection and analysis -** Execution of the research - Observation and Collection of data - Methods of data collection – Sampling Methods- Data Processing and Analysis strategies - Data Analysis with Statistical Packages - Hypothesis-testing - Generalization and Interpretation.

Unit-III: Reporting and thesis writing

Structure and components of scientific reports - Types of report – Technical reports and thesis

– Significance – Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables

Bibliography, referencing and footnotes - Oral presentation – Planning – Preparation –

Practice – Making presentation – Use of visual aids - Importance of effective communication.

Unit -IV: Statistical Techniques and Tools

Introduction of statistics – Functions – Limitations – Measures of central tendency - Arithmetic mean – Median – Mode – Standard deviation – Co-efficient of variation (Discrete serious and continuous serious) – Correlation - Regression – Multiple Regression. Sampling distribution – Standard error – Concept of point and interval estimation – Level of significance – Degree of freedom – Analysis of variance – One way and two way classified data – ‘F’-test

Unit -V: Application of results and ethics

Environmental impacts - Ethical issues - ethical committees - Commercialization – Copy right – royalty - Intellectual property rights and patent law – Trade Related aspects of Intellectual Property Rights – Reproduction of published material – Plagiarism - Citation and acknowledgement - Reproducibility and accountability.

Text Books and References:

1. A Hand Book of Methodology of Research, Raja mall, P. Devadoss and K.Kulandaivel, RMM Vidyalaya press, 1976.
2. Research Methodology Methods & Techniques, C.R. Kothari – New Age international Publishers, Reprint 2008.
3. Thesis and Assignment Writing, J. Anderson, Wiley Eastern Ltd., 1997.
4. Research Methodology, Mukul Gupta, Deepa Gupta – PHI Learning Private Ltd., New Delhi, 2011.
5. Fundamentals of Mathematical statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons,New Delhi,1999.
6. Statistical Methods, G.W. Snedecor and W.G. Cochrans, Lowa state University Press, 1967.

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| **Sl.No** | **Paper-II** |
| 1 | Machine Learning |
| 2 | Mobile Application Development |
| 3 | Data mining |
| 4 | Distributed System |
| 5 | Advanced Computer Networks |
| 6 | Data Science |
| 7 | Internet of Things |
| 8 | Cloud Computing |
| 9 | Cyber Security |
| 10 | Big Data Analytics |
| 11 | Deep Learning |
| 12 | High Performance Computing |
| 13 | Advanced Computer Architecture |
| 14 | Information Security |

###### 1CS05 MACHINE LEARNING

Course Objectives:

To learn the concept of how to learn patterns and concepts from data without being explicitlyprogrammed in various IOT nodes.

To design and analyse various machine learning algorithms and techniques with a modernoutlook focusing on recent advances.

Explore supervised and unsupervised learning paradigms of machine learning. To explore Deep learning technique and various feature extraction strategies.

**Course Outcomes:** After completion of course, students would be able to:

Extract features that can be used for a particular machine learning approach in various IOTapplications.

To compare and contrast pros and cons of various machine learning techniques and to get aninsight of when to apply a particular machine learning approach.

* To mathematically analyse various machine learning approaches and paradigms.

UNIT - I

Supervised Learning (Regression/Classification)

Basic methods: Distance-based methods, Nearest-Neighbours, Decision Trees, Naive Bayes. Linear models: Linear Regression, Logistic Regression, Generalized Linear Models. Support Vector Machines, Nonlinearity and Kernel Methods Beyond Binary Classification: Multi-class/Structured Outputs, Ranking.

UNIT – II

Unsupervised Learning:

Clustering: K-means/Kernel K-means. Dimensionality Reduction: PCA and kernel PCA. Matrix Factorization and Matrix completion. Generative Models (mixture models and latent factor models).

UNIT - III

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests)

UNIT - IV

Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning

Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Introduction to Bayesian Learning and Inference.

References:

* 1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
	2. vor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning,Springer 2009 (freely available online)
	3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007

**Prerequisites**

**1CS06 MOBILE APPLICATION DEVELOPMENT (Program**

**Elective - I)**

1. Acquaintance with JAVA programming
2. A Course on DBMS

Course Objectives:

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To improves their skills of using Android software development tools
3. To demonstrate their ability to develop software with reasonable complexity on mobileplatform
4. To demonstrate their ability to deploy software to mobile devices
5. To demonstrate their ability to debug programs running on mobile devices

Course Outcomes:

1. Student understands the working of Android OS Practically.
2. Student will be able to develop Android user interfaces
3. Student will be able to develop, deploy and maintain the Android Applications.

UNIT - I

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II

Android User Interface: Measurements – Device and pixel density independent measuring UNIT - s Layouts – Linear, Relative, Grid and Table Layouts

User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers

Event Handling – Handling clicks or changes of various UI components

Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing

Between fragments and Activities, Multi-screen Activities

UNIT - III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data fromfiles, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

Text Books:

1. Professional Android 4 Application Dnetwork evelopment, Reto Meier, Wiley India, (Wrox) ,2012
2. Android Application Development for Java Programmers, James C Sheusi, CengageLearning, 2013

Reference:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

###### INFORMATION SECURITY

Prerequisites

1. A Course on “Computer Networks and a course on Mathematics

Course Objectives

1. To understand the fundamentals of Cryptography
2. To understand various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across datanetworks
4. To apply algorithms used for secure transactions in real world applications

Course Outcomes

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms tocounter them.

UNIT - I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security.

Classical Encryption Techniques, DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT - II

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie- Hellman Key Exchange,Elliptic Curve Cryptography.

Message authentication and Hash Functions, Authentication Requirements and Functions, MessageAuthentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT - III

Digital Signatures, Authentication Protocols, Digital signature Standard, Authentication Applications,Kerberos, X.509 Directory Authentication Service.

Email Security: Pretty Good Privacy (PGP) and S/MIME.

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload,Combining Security Associations and Key Management

UNIT - IV

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Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security(TLS), Secure Electronic Transaction (SET).

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall DesignPrinciples, Trusted Systems, Intrusion Detection Systems.

Text Book:

1. Cryptography and Network Security (principles and approaches) by William Stallings PearsonEducation, 4th Edition.

Reference Books:

1. Network Security Essentials (Applications and Standards) by William Stallings PearsonEducation.
2. Principles of Information Security, Whitman, Thomson.

###### DATA MINING

Course Objectives:

To understand data mining concepts.

To learn about various data preprocessing techniques. To learn about data warehousing.

To learn about various data mining functionalities such as association rule mining, clustering,classification and outlier analysis.

UNIT - I

**Introduction:** Fundamentals of data mining, Data Mining Functionalities, Classification of Data Miningsystems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

**Data Preprocessing:** Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT - II

**Data Warehouse and OLAP Technology for Data Mining:** Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining **Data Cube Computation**: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes, Attribute-Oriented Induction for data characterization and its implementation

UNIT - III

**Mining Frequent Patterns, Associations and Correlations:** Basic Concepts, The Apriori algorithm for finding frequent item sets using candidate generation, Generating association rules from frequent item sets, mining frequent item sets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis

**Classification:** Description and comparison of classification and prediction,preparing data for Classification and Prediction

Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification,Classification by Back propagation

UNIT - IV

**Prediction**: Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor

**Cluster Analysis:** Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediods methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, DBSCAN, Grid based clustering

Method: STING, Conceptual Clustering, Constraint-Based Cluster Analysis, Outlier Analysis.

Text Books:

1. Data Mining – Concepts and Techniques - Jiawei Han, Micheline Kamber and Jian Pei, 3rdedition, Morgan Kaufmann Publishers, ELSEVIER.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearsoneducation.

Distributed Systems

**Pre-Requisites** Database Management Systems

**COURSE OBJECTIVE:**

To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.

**Unit I:**

**INTRODUCTION :**

Distributed data processing; what is a DDBS; Advantages and disadvantages of DDBS; Problem areas; Overview of database and computer network concepts

Distributed Database Management System Architecture: Transparencies in a distributed DBMS; Distributed DBMS architecture; Global directory issues8

**Unit II:**

**DISTRIBUTED DATABASE DESIGN**

Alternative design strategies; Distributed design issues; Fragmentation; Data allocation SEMANTICS DATA CONTROL View management; Data security; Semantic Integrity Control QUERY PROCESSING ISSUES Objectives of query processing; Characterization of query processors; Layers of query processing; Query decomposition; Localization of distributed data

**Unit III:**

**DISTRIBUTED QUERY OPTIMIZATION**

Factors governing query optimization; Centralized query optimization; Ordering of fragment queries; Distributed query optimization algorithms

Transaction Management: The transaction concept; Goals of transaction management; Characteristics of transactions; Taxonomy of transaction models

Concurrency Control: Concurrency control in centralized database systems; Concurrency control in DDBSs; Distributed concurrency control algorithms; Deadlock management

**Unit IV:**

**RELIABILITY**

Reliability issues in DDBSs; Types of failures; Reliability techniques; Commit protocols; Recovery Protocols

**PARALLEL DATABASE SYSTEMS**

Parallel architectures; parallel query processing and optimization; load balancing, Mobile Databases, Distributed Object Management, Multi-databases

References:

1. Principles of Distributed Database Systems, M.T. Ozsu and P. Valduriez, Prentice- Hall, 1991.
2. Distributed Database Systems, D. Bell and J. Grimson, Addison-Wesley, 1992.

###### ADVANCED COMPUTER NETWORKS

**Pre-Requisites** Computer Networks

**Course Objectives:** This course is aimed at enabling the students to

* The course is aimed at providing basic understanding of Computer networks starting with OSI Reference Model, Protocols at different layers with special emphasis on IP, TCP & UDP and Routing algorithms.
* Some of the major topics which are included in this course are CSMA/CD, TCP/IP implementation, LANs/WANs, internetworking technologies, Routing and Addressing.
* Provide the mathematical background of routing protocols.
* Aim of this course is to develop some familiarity with current research problems and research methods in advance computer networks.

**Course Outcomes:**

After the completion of the course, student will be able to

* Illustrate reference models with layers, protocols and interfaces.
* Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6.
* Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation.
* Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks
* Describe the emerging trends in networks-MANETS and WSN

UNIT - I

Review of Computer Networks, Devices and the Internet: Internet, Network edge, Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet- Switched Networks, Networking and Internet - Foundation of Networking Protocols: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing.

Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure. The Link Layer and Local Area Networks-Link Layer, Introduction and Services, Error- Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet, Interconnections: Hubs and Switches, PPP: The Point-to-Point Protocol, Link Virtualization

UNIT - II

Data-link protocols: Ethernet, Token Ring and Wireless (802.11). Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs), Multiple access schemes Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intra-domain Routing Protocols, Inter-

Domain Routing Protocols, Congestion Control at Network Layer.

UNIT - III

Transport and Application Layer Protocols: Client-Server and Peer-To-Peer Application Communication, Protocols on the transport layer, reliable communication. Routing packets through a LAN and WAN. Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control. Principles of Network Applications,

UNIT - IV

The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, building a Simple Web Server Creating simulated networks and passing packets through them using different routing techniques. Installing and using network monitoring tools.

Text books:

* 1. Computer Networking: A Top-Down Approach, James F. Kuros and Keith W. Ross, Pearson,6th Edition, 2012.
	2. Computer Networks and Internets, Douglas E. Comer, 6th Edition, Pearson.

###### DATA SCIENCE

Course Objectives:

* + - Provide you with the knowledge and expertise to become a proficient data scientist.
		- Demonstrate an understanding of statistics and machine learning concepts that are vital fordata science;
		- Produce Python code to statistically analyse a dataset;
		- Critically evaluate data visualizations based on their design and use for communicatingstories from data;

**Course Outcomes:** After completion of course, students would be able to:

* + - Explain how data is collected, managed and stored for data science;
		- Understand the key concepts in data science, including their real-world applications and thetoolkit used by data scientists
		- Implement data collection and management scripts using MongoDB

UNIT – I

Introduction to core concepts and technologies: Introduction, Terminology, data science process, datascience toolkit, Types of data, Example applications.

UNIT – II

Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploringand fixing data, Data storage and management, Using multiple data Sources

UNIT-III

Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.

UNIT-IV

Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.

Applications of Data Science, Technologies for visualization, Bokeh (Python).

Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.

References:

1. Cathy O’Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline.O’Reilly.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1,Cambridge University Press.

###### INTERNET OF THINGS

Course Objectives:

* + To introduce the terminology, technology and its applications
	+ To introduce the concept of M2M (machine to machine) with necessary protocols
	+ To introduce the Python Scripting Language which is used in many IoT devices
	+ To introduce the Raspberry PI platform, that is widely used in IoT applications
	+ To introduce the implementation of web-based services on IoT devices

UNIT - I

Introduction to Internet of Things –Definition and Characteristics of IoT,

Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics,Communication protocols, Embedded Systems, IoT Levels and Templates

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry,health and Lifestyle

UNIT - II

IoT and M2M – Software defined networks, network function virtualization, difference between SDNand NFV for IoT

Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT - III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow,functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT - IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets,controlling output, reading input from pins.

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communicationAPIs

Webserver – Web server for IoT, Cloud for IoT, Python web application frameworkDesigning a RESTful web API

Text Books:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, UniversitiesPress, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014,ISBN: 9789350239759

Computer Vision

**Unit I:**

Overview, computer imaging systems, lenses, Image formation and sensing, Image analysis, pre-processing and Binary image analysis

Unit II:

Edge detection, Edge detection performance, Hough transform, corner detection

Unit III:

Segmentation, Morphological filtering, Fourier transform

Unit IV:

Feature extraction, shape, histogram, color, spectral, texture, using CVIP tools, Feature analysis, feature vectors, distance /similarity measures, data pre-processing

Pattern Analysis: Clustering: K-Means, Mixture of Gaussians Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised Classifiers: Bayes, KNN

References:

1. Computer Vision: Algorithms and Applications by Richard Szeliski.
2. Deep Learning, by Goodfellow, Bengio, and Courville.
3. Dictionary of Computer Vision and Image Processing, by Fisher et al

###### CLOUD COMPUTING

**UNIT – I**

**Introduction to Cloud computing:** Approaches to cloud computing, long term vision, Windows Azure as a Pass solution, Windows Azure and cloud computing

**Introduction to the Windows Azure Platform :** The operating system, service creation, Windows Azure storage , The worker role , The virtual Machine role, Windows Azure AppFabric , SQL Azure

**UNIT-II**

**Creating a Webrole Project:** Software Development kits, Windows Azure tools for Visual studio, Webrole project template, the cloud project, Deployment to Windows Azure, Configuration and upgrading, Service Definition file, Role properties

**Windows Azure storage:** Local storage, The Windows Azure storage Account, Windows Azure Management tool, Blob APIs

**UNIT – III**

**Tables, Queues, and Worker roles: The** table service, The Queue service

**Windows Azure Operating System Details:** Affinity group, Content Delivery Network, Certificates, Diagnostics

**UNIT-IV**

**Accessing Azure Services from Everywhere:** Creating the storage Account project, accessing the Storage Account from PHP, Using HTTP and REST

**Application Architecture:** Characteristics of a Multitier solution, The Data Access Layer, The Service Agent

**TEXT BOOKS:**

1. Windows azure step by step – Roberto brunetti – phi learning – Microsoft press.

**REFERENCE BOOKS:**

1. Cloud Computing with the Windows Azure Platform – Roger Jennings-Paperback
2. Programming Windows Azure: Programming the Microsoft Cloud – Sriram Krishnan
3. Windows Azure Platform (Expert’s voice in .NET) [Paperback] – Tejaswi Redkar
4. Pro SQL Azure (Expert’s Voice in .NET) [Paperback] – Scott Klein, HerveRoggero

###### CYBER SECURITY

Course Objectives:

* + To learn about cyber crimes and how they are planned.
	+ To learn the vulnerabilities of mobile and wireless devices.
	+ To learn about the crimes in mobile and wireless devices.

UNIT - I

**Introduction to Cybercrime:** Introduction, Cybercrime and Information security, who are cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

**Cyber offenses: How criminals Plan Them:** Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, AttackVector, Cloud Computing.

UNIT- II

**Cybercrime: Mobile and Wireless Devices:** Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in MobileComputing Era, Laptops.

UNIT - III

**Cybercrimes and Cyber security: the Legal Perspectives**

Introduction, Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: TheIndian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyber law, Technology and Students: Indian Scenario.

UNIT - IV

**Understanding Computer Forensics**

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques, ForensicsAuditing

**Cyber Security: Organizational Implications**

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives,Nina God bole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security**,** Chwan-Hwa(john) Wu, J. David Irwin. CRC Press T & FGroup.

Reference Book:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC

###### BIG DATA ANALYTICS

Course Objectives:

To understand about big data

To learn the analytics of Big Data

To Understand the Map Reduce fundamentals

UNIT - I

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data; Elements of Big Data; Big Data Analytics; Distributed and Parallel Computing for Big Data; Big Data Analytics: What is Big Data Analytics, What Big Data Analytics Isn’t, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools;

UNIT - II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;

Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT - III

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop : Introduction of HDFS, Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations- Programming with HBase; Installation, Combining HBase and HDFS;

UNIT - IV

Big Data Technology Landscape and Hadoop: NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors; HDFC (Hadoop Distributed File System), HDFC Daemons, read, write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN.

Text Books:

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. Big Data, Black BookTM , DreamTech Press, 2015 Edition.
3. Business Analytics 5e , BY Albright |Winston

Reference Books:

1. Rajiv Sabherwal, Irma Becerra- Fernandez,” Business Intelligence –Practice, Technologiesand Management”, John Wiley 2011.
2. Lariss T. Moss, Shaku Atre, “Business Intelligence Roadmap”, Addison-Wesley It Service.
3. Yuli Vasiliev, “Oracle Business Intelligence: The Condensed Guide to Analysis andReporting”, SPD Shroff, 2012.