

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Information Technology, VII-Semester

Open Elective IT 703 (A) Cyber Laws and Forensics

Course Objective:

The objective of this course is to emphasize the importance of cyber laws and digital forensics, and to prepare students to conduct a digital investigation in an organized and systematic way.

UNIT-I Introduction to cybercrime, definition, cyber crime and information security, classification of cybercrimes, cybercrime: the legal perspectives, an Indian perspective, cybercrime and the Indian ITA 2000, a global perspective on cybercrime, Cyber offences: How criminals plan them, Tools and methods used in cyber crime, Need of cyber law, The Indian IT act, challenges to Indian law and cybercrime scenario in India, digital signature and Indian IT act, Amendments in the Indian IT act, cybercrime and punishment

UNIT-II Law and framework for information security, law for intellectual property rights(IPR), patent law, copy right law, Indian copyright act, privacy issue and law in Hong Kong, Japan, and Australia, data protection act in Europe, health insurance portability and accountability act of 1996(HIPAA), Gramm-leach-Bliley act of 1999(GLAB),Sarbanes-Oxley(SOX), legal issue in data mining, building security into software/system development life cycle.

UNIT III Digital forensics Science, The need for computer forensics, Understanding computer forensics, computer forensics versus other related disciplines, A brief History of computer Forensics, Cyber forensics and digital evidence, Digital forensics lifecycle, chain of custody concept, Network forensics, Approaching a computer forensics investigation, setting up a computer forensics laboratory, Forensics and social networking sites, computer forensics from compliance perspective, challenges in computer forensics, forensics auditing, antiforensics

UNIT IV Current Computer Forensics Tools, Evaluating Computer Forensics Tool Needs, Types of Computer Forensics Tools, Tasks Performed by Computer Forensics Tools, Tool Comparisons, Other Considerations for Tools, Computer Forensics Software Tools, Command-Line Forensics Tools, UNIX/Linux Forensics Tools, Other GUI Forensics Tools, Computer Forensics Hardware Tools, Forensic Workstations

UNIT V Forensics of hand held devices, Investigating Network Intrusions and Cyber Crime, Network Forensics and Investigating logs, Investigating network Traffic, Investigating Web attacks ,Router Forensics. Cyber forensics tools and case studies.

References:

- 1) The Indian Cyber law with Cyber glossary, Suresh T. Vishwanathan, New Delhi, Bhart Law House, 2000.
- 2) Law of Cyber Crimes and Information Technology Law, S.V. JogaRao, 2007.
- 3) Cory Altheide, Harlan Carvey, Digital Forensics with Open Source Tools, Syngress imprint of Elsevier.
- 4) Bill Nelson, Amelia Phillips, Christopher Steuart, "Guide to Computer Forensics and Investigations", Fourth Edition, Course Technology.
5. Angus M. Marshall, "Digital forensics: Digital evidence in criminal investigation", John – Wiley and Sons, 2008.

6. Nina Godbole and Sunit Belapure– Cyber Security, Wiley India Publication.
7. Nina Godbole, Information system security, Wiley India Publication.
8. Information Warfare: Corporate attack and defense in digital world, William

Course Outcomes:

After the completion of this course, the students will be able to:

1. Become aware of various cyber crimes and cyber laws
2. Underline the need of digital forensic and role of digital evidences
3. Understand different types of digital evidences that can be presented to support investigations
4. List the methods to generate legal evidence and supporting investigation reports
5. Use various digital forensic tools

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Information Technology, VII-Semester

Open Elective IT 703 (B) Internet of Things

Course Objective:

The objective of this course is to provide an understanding of the technologies and the standards relating to the Internet of Things and to develop skills on IoT technical planning.

Unit I IoT definition, Characteristics, IoT conceptual and architectural framework, Physical and logical design of IoT, IoT enablers, Modern day IoT applications, M2M communications, IoT vs M2M, IoT vs WoT, IoT reference architecture, IoT Network configurations, IoT LAN, IoT WAN, IoT Node, IoT Gateway, IoT Proxy, IPv4 vs IPV6

Unit II Sensor, Basic components and challenges of a sensor node, Sensor features, Sensor resolution; Sensor classes: Analog, Digital, Scalar, Vector Sensors; Sensor Types, bias, drift, Hysteresis error, quantization error; Actuator; Actuator types: Hydraulic, Pneumatic, electrical, thermal/magnetic, mechanical actuators, soft actuators

Unit III Basics of IoT Networking, IoT Components, Functional components of IoT, IoT service oriented architecture, IoT challenges, 6LowPAN, IEEE 802.15.4, ZigBee and its types, RFID Features, RFID working principle and applications, NFC (Near Field communication), Bluetooth, Wireless Sensor Networks and its Applications

Unit IV MQTT, MQTT methods and components, MQTT communication, topics and applications, SMQTT, CoAP, CoAP message types, CoAP Request-Response model, XMPP, AMQP features and components, AMQP frame types

Unit V IoT Platforms, Arduino, Raspberry Pi Board, Other IoT Platforms; Data Analytics for IoT, Cloud for IoT, Cloud storage models & communication APIs, IoT case studies

References:

1. Vijay Madiseti, Arshdeep Bahga, “Internet of Things, A Hands on Approach”, University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, “Introduction to Internet of Things: A practical Approach”, ETI Labs
3. Pethuru Raj and Anupama C. Raman, “The Internet of Things: Enabling Technologies, Platforms, and Use Cases”, CRC Press
4. Jeeva Jose, “Internet of Things”, Khanna Publishing House, Delhi
5. Adrian McEwen, “Designing the Internet of Things”, Wiley
6. Raj Kamal, “Internet of Things: Architecture and Design”, McGraw Hill
7. Cuno Pfister, “Getting Started with the Internet of Things”, O Reilly Media

Course Outcomes:

After the completion of this course, the students will be able to:

1. Understand Internet of Things and its hardware and software components

2. Interface I/O devices, sensors & communication modules
3. Analyze data from various sources in real-time and take necessary actions in an intelligent fashion
4. Remotely monitor data and control devices
5. Develop real life IoT based projects

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Information Technology, VII-Semester

Open Elective IT 703 (C) Social Networks

Course Objective:

The objective of this course is to focus on the importance of social network analysis and to enhance skills of students for analyzing social media and networking data.

UNIT I Introduction Introduction to Semantic Web: Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Social Network analysis: Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities - Web-based networks - Applications of Social Network Analysis.

UNIT II Modelling, Aggregating and Knowledge Representation Ontology and their role in the Semantic Web: Ontology-based knowledge Representation - Ontology languages for the Semantic Web: Resource Description Framework - Web Ontology Language - Modelling and aggregating social network data: State-of-the-art in network data representation - Ontological representation of social individuals - Ontological representation of social relationships - Aggregating and reasoning with social network data - Advanced representations.

UNIT III Extraction and Mining Communities in Web Social Networks Extracting evolution of Web Community from a Series of Web Archive - Detecting communities in social networks - Definition of community - Evaluating communities - Methods for community detection and mining - Applications of community mining algorithms - Tools for detecting communities social network infrastructures and communities - Decentralized online social networks - MultiRelational characterization of dynamic social network communities.

UNIT IV Predicting Human Behaviour and Privacy Issues Understanding and predicting human behaviour for social communities - User data management - Inference and Distribution - Enabling new human experiences - Reality mining - Context - Awareness - Privacy in online social networks - Trust in online environment - Trust models based on subjective logic - Trust network analysis - Trust transitivity analysis - Combining trust and reputation - Trust derivation based on trust comparisons - Attack spectrum and countermeasures.

UNIT V Visualization and Applications of Social Networks Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

References:

1. Ajith Abraham, Aboul Ella Hassanien, Václav Snášel, —Computational Social Network Analysis: Trends, Tools and Research Advances, Springer, 2012
2. Borko Furht, —Handbook of Social Network Technologies and Applications, Springer, 1st edition, 2011
3. Charu C. Aggarwal, —Social Network Data Analytics, Springer, 2014
4. Giles, Mark Smith, John Yen, —Advances in Social Network Mining and Analysis, Springer, 2010.

5. Guandong Xu , Yanchun Zhang and Lin Li, —Web Mining and Social Networking – Techniques and applications, Springer, 1st edition, 2012
6. Peter Mika, —Social Networks and the Semantic Web, Springer, 1st edition, 2007.
7. Przemyslaw Kazienko, Nitesh Chawla, Applications of Social Media and Social Network Analysis, Springer, 2015
8. Maksim Tsvetovat and Alexander Kouznetsov , “Social Network Analysis for Startups”, O’Reilly Media, 2011.
9. Charles Kadushin, “Understanding Social Networks”, Oxford University Press, 2012
10. Social Network Analysis: Theory and Applications

Course Outcomes:

After the completion of this course, the students will be able to:

1. Understand the importance of social media and networks
2. Have skills for analyzing social media and networking data
3. Visualize social networks
4. Create real-life case studies using social media data
5. Plan and execute a small-scale network analysis project.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Information Technology, VII-Semester

Open Elective IT 703 (D) Digital Image Processing

Course Objective:

The objective of this course is to describe and explain basic principles of digital image processing.

Unit I Introduction and Digital Image Fundamentals: The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Unit II Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Unit III Image Enhancement in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Image Restoration A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

Unit IV Image Compression: Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.

Image Segmentation Detection of Discontinuities, Edge linking and boundary detection, Threshold, Region Oriented Segmentation, Motion based segmentation.

Unit V Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

References:

1. R.C Gonzalez & Richard E Wood, "Digital Image Processing", Addison Wesley Publishing
2. Anil K Jain, "Fundamentals of Digital image processing". PHI.
3. Sonka, Hlavac, Boyle, "Digital image processing and computer vision", Cengage learning, India Edition.
4. B Chanda, D. Dutta Majumder, "Digital image Processing and Analysis", PHI.

Course Outcomes:

After the completion of this course, the students will be able to:

1. Explain basic concepts of image processing.
2. Have knowledge of techniques employed for the enhancement of images
3. Categorize image compression techniques
4. Interpret image segmentation and representation techniques.
5. Develop any image processing application