DEPARTMENT

OF

COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

B. Tech.

R22-COURSE STRUCTURE&SYLLABUS

III YEAR I SEMESTER

S.No.	Course Code	Course Title	Category	L	T	P	Credits
1	22CY3111	Network Security and Cryptography	PC	3	-	-	3
2	22CY3112	DataBase Management Systems	PC	3	-	-	3
3	22CY3113	Formal Languages and Automata Theory	PC	3	-	-	3
4	**Professional Elective–I**						
	22CY3171	Compiler Design	PE	3	-	-	3
	22CY3172	IoT Security					
	22AM3172	Introduction to Data Science					
	22CY3173	Ethical Hacking					
5	**Professional Elective–II**						
	22CY3174	Cyber Laws	PE	3	-	-	3
	22CY3175	Ad-Hoc & Sensor Networks					
	22BU3178	Cloud Computing					
	22DS3174	Artificial Intelligence					
6	22CY3151	Network Security and Cryptography Lab	PC	-	-	3	1.5
7	22CY3152	Database Management Systems Lab	PC	-	-	3	1.5
8	22HS3151	Advanced English Communication Skills Lab	HS	-	-	2	1
9	22CY3153	Skill Development course (UI design-Flutter)	PC	-	-	2	1
10	22MC0005	Intellectual Property Rights	MC	3	-	-	0
Total				**18**	**0**	**10**	**20**

III YEAR II SEMESTER

S.No.	Course Code	Course Title	Category	L	T	P	Credits
1	22CY3211	Cyber Security	PC	3	0	-	3
2	22CY3212	Cyber Crime Investigation & Digital Forensics	PC	3	0	-	3
3	22CS3211	Machine Learning	PC	3	0	-	3
4	**Professional Elective–III**						
	22CY3271	Mobile Application Security	PE	3	-	-	3
	22CY3272	Design and Analysis of algorithms					
	22CY3273	DevOps					
	22IT3271	Blockchain Technology					
5		**Open Elective–I**	OE	3	-	-	3
6	22CY3251	Cyber Security Lab	PC	-	-	2	1
7	22CY3252	Cyber Crime Investigation & Digital Forensics Lab	PC	-	-	2	1
8	22CY3253	Machine Learning Lab	PC	-	-	2	1
9	22MC0006	Environmental Science*	MC	3	-	-	0
10	22CY3281	Industry Oriented Mini Project	PW	-	-	4	2
Total				**18**	**0**	**10**	**20**

***Note: Environmental Science–Should be registered by lateral entry students only.**

III YEAR – I SEM

22CY3111:NETWORK SECURITY AND CRYPTOGRAPHY

B.Tech. III Year I Sem

Prerequisites

L	T	P	C
3	-	-	3

- A course on "Computer networks"
- Basic knowledge of Mathematics

Course Objectives:

1. Explain the objectives of information security and the importance and application of each of confidentiality, integrity, authentication and availability.
2. Understand various cryptographic algorithms, the basic categories of threats to computers and networks.
3. Describe public-key cryptosystem and the enhancements made to IPv4 by IPSec.
4. Understand Intrusions and intrusion detection and discuss the fundamental ideas of public-key cryptography, generate and distribute a PGP key pair and use the PGP package to send an encrypted email message.
5. Discuss Web security and Firewalls.

Course Outcomes:

Student will be able to

1. Understand basic cryptographic algorithms.
2. Understand message and web authentication and security issues.
3. Understand the Public-Key Infrastructure
4. Ability to identify information system requirements for both of them such as client and server.
5. Ability to understand the current legal issues towards information security.

UNIT - I

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security.

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT - III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512)

Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.
Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure.

UNIT - IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH).

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security.

UNIT - V

E-Mail Security: Pretty Good Privacy, S/MIME
IP Security: IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, Combining security associations, Internet Key Exchange.

Case Studies on Cryptography and security: Secure Multi party Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1.Cryptography and Network Security-Principles and Practice: William Stallings, Pearson Education, 8thEdition.
2.Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 4thEdition.

REFERENCE BOOKS:

1.Cryptography and Network Security: CK Shyamala, NHarini, Dr TRP adman abhan, Wiley India, 1stEdition.
2.Cryptography and Network Security: Forouzan Mukhopadhyay, McGrawHill, 3rdEdition.
3.Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4.Principles of Computer Security: WM. Arthur Conklin, GregWhite, TMH.
5.Introduction to NetworkSecurity: Neal Krawetz, CENGAGE Learning.
6.Network Securityand Cryptography:Bernard Menezes, CENGAGELearning.

22CY3112:DATABASE MANAGEMENT SYSTEMS

B.Tech. III Year ISem.

	L	T	P	C
Prerequisites: A course on "Data Structures".	3	0	0	3

Course Objectives:

1. The objective of the course is to present an introduction to database management systems
2. To provide an emphasis on how to organize, maintain and retrieve-efficiently, and effectively-information from a DBMS.
3. To understand the basic concepts and the applications of database systems.
4. To master the basics of SQL and construct queries using SQL.
5. Topics include data models, data base design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

1. Gain knowledge of fundamentals of DBMS.
2. An ability to design a data base and further reduce redundancy of relationships using various normal forms.
3. Master the basics of SQL for retrieval and management of data.
4. Be acquainted with the basics of transaction processing and concurrency control.
5. Familiarity with database storage structures and access techniques

UNIT - I

Database System Applications: A Historical Perspective, File Systems versus a DBMS**,** the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model

UNIT - II

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views. Relational Algebra**,** Tuple relational Calculus, Domain relational calculus.

UNIT - III

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless joined composition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, serializability, Recoverability, Implementation of Isolation, testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation-Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT - V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods(ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1.DatabaseManagementSystems, Raghurama Krishnan, Johannes Gehrke, *Tata McGraw Hill*3rd Edition
2.Database System Concepts, Silberschatz, Korth, *McGraw hill*, VI edition.

REFERENCE BOOKS:

1.DatabaseSystemsdesign, Implementation, and Management, PeterRob & CarlosCoronel 7th Edition.
2.Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education.*
3.Introduction to Database Systems, C. J. Date, *Pearson Education.*
4.Oraclefor Professionals, The X Team, S.Shah and V. Shah, *SPD.*
5.Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI.*
6.FundamentalsofDatabaseManagementSystems, M.L.Gillenson, *Wiley Student* Edition.

22CY3113: FORMAL LANGUAGES AND AUTOMATA THEORY

B.Tech. III Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives

1. To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
2. To introduce the fundamental concepts of formal languages, grammars and automata theory.
3. Classify machines by their power to recognize languages and employ finite state machines to solve problems in computing.
4. To understand deterministic and non-deterministic machines.
5. To understand the differences between decidability and undecidability.

Course Outcomes

1. Able to understand the concept of abstract machines and their power to recognize the languages.
2. Able to employ finite state machines for modelling and solving computing problems.
3. Able to design context free grammars for formal languages.
4. Able to distinguish between decidability and undecidability.
5. Able to gain proficiency with mathematical tools and formal methods.

UNIT - I

Introduction to Finite Automata : Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory– Alphabets, Strings, Languages, Problems.

Non deterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without€-transitions. Conversion of NFA to DFA, Moore and Melay machines

UNIT - II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages: Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT - III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Left most and Right most Derivations, the Language of a Grammar, Sentential Forms, Parse Tress, applications of Context - Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata: Definition of the Push down Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDAto CFG.

UNIT - IV

Normal Forms for Context-Free Grammars: Eliminating useless symbols, Eliminating €-Productions. Chomsky Normal form Griebech Normal form.

Pumping Lemma for Context-Free Languages : Statement of pumping lemma, Applications

Closure Properties of Context-Free Languages: Closure properties of CFL's, Decision Properties of CFL's.

Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine.

UNIT - V

Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXT BOOKS:

1. Introduction to Automata Theory Languages and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, JeffreyD. Ullman, Pearson Education.
2. Theory of Computer Science–Automata languages and computation, Mishraand Chandrashekaran, 2ndedition, PHI.

REFERENCE BOOKS:

1. Introduction to Languages and The Theory of Computation, John CMartin, TMH.
2. Introduction to Computer Theory, DanielI.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rdedition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

22CY3171: COMPILER DESIGN
(PROFESSIONAL ELECTIVE– I)

B.Tech. III Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites

1. A course on "Formal Languages and Automata Theory".
2. A course on "Computer Organization and architecture".
3. A course on "Computer Programming and Data Structures".

Course Objectives:

1. Introduce the major concepts of language translation and compiler design.
2. To impart the knowledge of practical skills necessary for constructing a compiler.
3. Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.
4. Compare top down with bottom-up parsers, and develop appropriate parser to produce parse tree representation of the input.
5. To provide an overview to students regarding different considerations and phases of compilation.

Course Outcomes:

1. Demonstrate the ability to design a compiler given a set of language features.
2. Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
3. Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
4. Design and implement LL and LR parsers
5. Design algorithms to do code optimization inorder to improve the performance of a programintermsofspaceandtimecomplexityandalsodesignalgorithmstogenerate machine code.

UNIT - I

Introduction : The structure of a compiler, the science of building a compiler, programming language basics.

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT - II

Syntax Analysis: Introduction, Context-Free Grammars, writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT - III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT - IV

Run-Time Environments: Stack Allocation of space, Access to Non local Data on the Stack, Heap Management, Introduction to GarbageCollection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peep hole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

UNIT - V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOK:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S.Lam, Ravi Sethi, JeffryD. Ullman.
2. Lex & Yacc –John R. Levine, Tony Mason, Doug Brown, O'reilly.

REFERENCE BOOKS:

2.Compiler Construction, Louden, Thomson.

22CY3172: IoT SECURITY
(PROFESSIONAL ELECTIVE- I)

	L	T	P	C
B.Tech. III Year I Sem.	**3**	**0**	**0**	**3**

Prerequisites :

- A course on "Computer Network"
- A course on "Cyber security"

Course Objectives:

1. Understand the fundamentals, various attacks and importance of Security aspects in IoT.
2. Understand the techniques, protocols and some idea on security towards Gaming models.
3. Understand the operations of Bit coin block chain, crypto-currency as application of block chain technology.
4. Understand the essential components of IoT.
5. Understand security and privacy challenges of IoT.

Course Outcomes:

1. Incorporate the best practices learnt to identify the attacks and mitigate the same.
2. Adopt the right security techniques and protocols during the design of IoT products.
3. Assimilate and apply the skills learnt on ciphers and block chains when appropriate.
4. Describe the essential components of IoT.
5. Find appropriate security/privacy solutions for IoT.

UNIT - I

Fundamentals of IoT and Security and its need, Prevent Unauthorized Access to Sensor Data, Block ciphers, Introduction to Block chain, Introduction of IoT devices, IoT Security Requirements, M2MSecurity, Message integrity, Modeling faults and adversaries, Difference among IoT devices, computers, and embedded devices.

UNIT - II

IoT and cyber-physical systems RFID Security, Authenticated encryption Byzantine Generals problem sensors and actuators in IoT. IoT security (vulnerabilities, attacks, and counter measures), Cyber Physical Object Security, Hash functions, Consensus algorithms and their scalability problems, Accelerometer, photoresistor, buttons.

UNIT - III

Security engineering for IoT development Hardware Security, Merkle trees and Elliptic curves digital signatures, verifiable random functions, Zero-knowledge systems motor, LED, vibrator. IoT security life cycle, Front-end System Privacy Protection, Management, Secure IoT Databases, Public-key crypto (PKI), blockchain, the challenges, and solutions, analog signal vs. digital signal.

UNIT - IV

Data Privacy Networking Function Security Trees signature algorithms proof of work, Proof of stake, Networking in IoT, Device/User Authentication in IoT, IoT Networking Protocols, Crypto-currencies, alternatives to Bit coin consensus, Bit coin scripting language and their use Real-time communication.

UNIT - V

Introduction to Authentication Techniques Secure IoT Lower Layers, Bitcoin P2P network, Ethereum and Smart Contracts, Band width efficiency, Data Trust worthiness in IoT Secure IoT Higher Layers, Distributed consensus, Smart Contract Languages and verification challenges data analytics in IoT- simple data analyzing methods.

TEXT BOOKS:

1. B. Russell and D. Van Duren, "Practical Internet of Things Security, " Packt Publishing, 2016.
2. FeiHU, "Security and Privacy in Internet of Things(IoTs): Models, Algorithms, and Implementations", CRC Press, 2016.
3. Narayanan et al., "Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, " Princeton University Press, 2016.

REFERENCE BOOKS:

1. A. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies, " O'Reilly, 2014.
2. T.Alpcan and T.Basar, "Network Security: A Decision and Game-theoretic Approach, " Cambridge University Press, 2011.
3. Security and the IoT ecosystem, KPMG International, 2015.
4. Internet of Things: IoT Governance, Privacy and Security Issues" by European Research Cluster.
5. Ollie White house, "Security of Things: An Implementers' Guide to Cyber-Security for Internet of Things Devices and Beyond", NCC Group, 2014
6. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guide to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

22AM3172: INTRODUCTION TO DATA SCIENCE
(PROFESSIONAL ELECTIVE-I)

B. Tech III Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:
- Knowledge on Probability and Statistics.
- Knowledge on Programming languages such as C, Python.

Course Objectives: The objective of this course is to:
1. Learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration.
2. Apply various data science techniques relating to pre-processing, exploring and visualizing data.
3. Understand the basic types of data and basics of R programming.
4. Identify the importance of data reduction and data visualization techniques.
5. Apply statistical and predictive analytical methods to deal with the real time data.

Course Outcomes: After completion of the course, the student should be able to:
1. Understand basic terms what Statistical Inference means.
2. Identify probability distributions commonly used as foundations for statistical modelling. Fit a model to data
3. Describe the data using various statistical measures.
4. Utilize R elements for data handling
5. Perform data reduction and apply visualization techniques.

UNIT - I

Introduction: Definition of Data Science- Big Data and Data Science hype – and getting past the hype- Datafication - Current landscape of perspectives - Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model – Over fitting. Basics of R: Introduction, R- Environment Setup, Programming with R, Basic Data Types.

UNIT - II

Data Types & Statistical Description

Types of Data: Attributes and Measurement, What is an Attribute? The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute, Nominal Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes. Basic Statistical Descriptions of Data: Measuring the Central Tendency: Mean, Median, and Mode, Measuring the Dispersion of Data: Range, Quartiles, Variance, Standard Deviation, and Inter- quartile Range, Graphic Displays of Basic Statistical Descriptions of Data.

UNIT - III

Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector sub setting, Matrices: Creating and Naming Matrices, Matrix Sub setting, Arrays, Class. Factors and Data Frames: Introduction to **Factors:** Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, subsetting of Data Frames, Extending Data Frames, Sorting Data Frames.

Lists: Introduction, creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors

UNIT - IV

Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements. Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List. Functions in R: Introduction, writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R.

UNIT - V

Data Reduction: Overview of Data Reduction Strategies, Wavelet Transforms, Principal Components Analysis, Attribute Subset Selection, Regression and Log-Linear Models: Parametric Data Reduction, Histograms, Clustering, Sampling, Data Cube Aggregation.

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Doing Data Science, Straight Talk from the Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014
2. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd edition. The Morgan Kaufmann Series in Data Management Systems.
3. K G Srinivas, G M Siddesh, "Statistical programming in R", Oxford Publications.

REFERENCE BOOKS:

1. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.
2. Brain S. Everitt, "A Handbook of Statistical Analysis Using R", Second Edition, 4 LLC, 2014.
3. Dalgaard, Peter, "Introductory statistics with R", Springer Science & Business Media, 2008.
4. Paul Teetor, "R Cookbook", O'Reilly, 20

22CY3173: ETHICAL HACKING
(PROFESSIONAL ELECTIVE-I)

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Prerequisites:

- A courses on "Operating Systems"
- A course on "Computer Networks"
- A course on "Network Security and Cryptography"

Course Objectives:

1. The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
2. Provides Insights on Impacts of Hacking
3. Overview on Types of Hackers; Information Security Models; Information Security Program.
4. Business Perspective, Planning a Controlled Attack.
5. Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

Course Outcomes:

1. Understand what is right and what is wrong in the world of hacking.
2. Gain the knowledge of the use and availability of tools to support an ethical hack
3. Gain the knowledge of interpreting the results of a controlled attack
4. Understand the role of politics, inherent and imposed limitations and metrics for planning of a test.
5. Comprehend the dangers associated with penetration testing

UNIT- I

Introduction: Hacking Impacts, The Hacker

Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration.

Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture

Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking.

UNIT - II

The Business Perspective: Business Objectives , Security Policy, Previous Test Results, Business Challenges.

Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations , timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

UNIT - III

Preparing for a Hack: Technical Preparation, Managing the Engagement.

Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance.

UNIT - IV

Enumeration: Enumeration Techniques, Soft Objective, Looking A roundor Attack, Elements of Enumeration, Preparing for the Next Phase.

Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern.

UNIT - V

Deliverable: The Deliverable, The Document, Overall Structure, Aligning Findings, Presentation.

Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion.

TEXT BOOK:

1. JamesS.Tiller, "TheEthical Hack:A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press.
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network, Defense", Cengage Learning.

REFERENCE BOOKS:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.

22CY3174: CYBER LAWS
(PROFESSIONAL ELECTIVE– II)

B.Tech. III Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "Introduction to Cyber Security"
- A course on "Intellectual Property Rights"

Course Objectives:

1. To understand the significance of cyber laws and different acts.
2. Make Learner Conversant with The Social and Intellectual Property Issues Emerging from 'Cyberspace.
3. Explore The Legal and Policy Developments in Various Countries to Regulate Cyberspace.
4. Develop The Understanding of Relationship Between Commerce and Cyberspace.
5. Give Learners in Depth Knowledge of Information Technology Act and Legal Frame Work Of Right To Privacy, Data Security And Data Protection.

Course Outcomes:

1. Understand the need of cyber laws.
2. Understand the important provisions of the act
3. Understanding the significance of digital signatures.
4. Analyze regulatory authorities in cyber law.
5. Overview of cybercrime and procedure to report cybercrime.

UNIT - I

Introduction: History of Internet and World Wide Web, need for cyberlaw, Cyber crime on the rise, Important terms related to cyber law.

Cyber law in India: Need for cyber law in India, History of cyber law in India, Information Technology Act, 2000, Overview of other laws amended by the IT Act, 2000, National Policy on Information Technology 2012.

UNIT - II

Overview of The Information Technology Act, 2000: Applicability of the Act, Important provisions of the Act: Digital signature and electronic signature, Digital Signature under the ITAct, 2000, E-Governance Attribution, Acknowledgement and Dispatch of Electronic Records, Certifying Authorities, Electronic Signature Certificates, Duties of Subscribers, Penalties and Offences, Intermediaries.

UNIT - III

Overview of Rules Issued Under the ITAct, 2000, Electronic Commerce, Electronic Contracts, Cyber Crimes, Cyber Frauds.

UNIT - IV

Regulatory Authorities: Department of Electronics and Information Technology, Controller of Certifying Authorities(CCA), Cyber Appellate Tribuna, Indian Computer Emergency Response Team (ICERT), Cloud Computing, Case Laws.

UNIT - V

Introduction to Cyber crime and Procedure to Report Cyber crime: Procedure to Report Cyber Crime, Some Basic Rules for Safe Operations of the Computer and Internet, The Criminal Law (Amendment) Act, 2013: Legislative Remedies For Online Harassment And Cyberstalking In India.

TEXT BOOKS:

1.Pavan Duggal, Textbook On Cyber Law, second edition, Universal Law.
2.Pavan Duggal, Indian Cyberlaw On Cyber Crimes.

REFERENCE BOOKS:

1. Debby Russell and Sr.G.T.Gangemi, "Computer Security Basics(Paperback)", 2ndEdition, O' ReillyMedia, 2006.
2. Thomas R.Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J.Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGIGlobal, 2009.
4. Thomas R Peltier, Justin Peltier and Johnblackley, "Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996.
5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997.
6. James Graham, "Cyber Security Essentials" Averbach Publication T&F Group.

22CY3175: AD-HOC & SENSOR NETWORKS
(PROFESSIONAL ELECTIVE–II)

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Prerequisites

- A course on "Computer Networks"
- A course on "Mobile Computing"

Course Objectives:

1. To understand the concepts of sensor networks
2. To understand the MAC and transport protocols for ad hoc networks
3. To understand the security of sensor networks
4. To understand the nature of Ad-hoc and sensor networks.
5. To understand the applications of adhoc and sensor networks

Course Outcomes:

1. Ability to understand the state-of-the-art research in the emerging subject of AdHoc and Wireless Sensor Networks
2. Appreciate the importance of Adhoc and sensor networks for applications like environment monitoring, habitat monitoring, health care and data acquisition systems.
3. Ability to solve the issues in real-time application development based on ASN.
4. Ability to conduct further research in the domain of ASN
5. Capable of model building, new protocol design and strategies simulation of the systems that include the above.

UNIT - I

Introduction to AdHoc Networks-Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs-Criteria for classification, Taxonomy of MANET routing algorithms, Topologybased routing algorithms- **Proactive**: DSDV; **Reactive**: DSR, AODV; Hybrid: ZRP; Position-based routing algorithms- **Location Services**-DREAM, Quorum-based; **Forwarding Strategies:** Greedy Packet, Restricted Directional Flooding-DREAM, LAR.

UNIT - II

Data Transmission-Broadcast Storm Problem, **Rebroad casting Schemes-**Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHBP. **Multicasting: Tree-based**-AMRIS, MAODV; **Mesh-based:** ODMRP, CAMP; **Hybrid:** AM Route**,** MCEDAR.

UNIT - III

Geocasting: Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR**.**

TCP over AdHoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Adhoc.

UNIT - IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT - V

Upper Layer Issues of WSN: Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOKS:

1.AdHoc and Sensor Networks–Theory and Applications, Carlos Corderio DharmaP. Aggarwal, World Scientific Publications, March 2006, ISBN– 981–256–681–3.
2.Wireless Sensor Networks: An Information Processing Approach, FengZhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman).

REFERENCES:

1.Wireless sensor networks A network perspective, byJun Zheng, Abbas Jamalipour, A John Wiley & Sons INC Publications.
2. Wireless Ad hoc and Sensor Networks Protocols, Performance, and Control By Jagannathan Sarangapani, Edition1st Edition, First Published2007, eBook Published31 January 2017, Pub. Location Boca Raton.

22BU3178 - CLOUD COMPUTING
(PROFESSIONAL ELECTIVE – II)

B. Tech III Year I Sem

L	T	P	C
3	-	-	3

Pre-requisites:

- A course on "Computer Networks".
- A course on "Operating System".

Course Objectives:

1. To explain the evolving computer model called cloud computing.
2. To Understand the current trend and basics technologies of cloud computing
3. To introduce the various levels of services that can be achieved by cloud to develop applications.
4. To describe the Networking aspects in cloud
5. To describe the security aspects in cloud.

Course Outcomes:

1. Understand different computing paradigms and potential of the paradigms and specifically computing
2. Understand cloud service types, cloud deployment models and technologies supporting and driving the cloud
3. Acquire the knowledge of programming models for cloud and development of software application that runs the cloud and various services available from major cloud providers
4. Understand the security concerns and issues in cloud computing
5. Acquire the knowledge of advances in cloud computing.

UNIT - I

Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management

UNIT - II

Cloud Deployment Models, Cloud Service Models, Technological Drivers for Cloud Computing:
SOA and Cloud, Multicore Technology, Web 2.0 and Web 3.0, Pervasive Computing, Operating System, Application Environment

UNIT - III

Virtualization, Programming Models for Cloud Computing: MapReduce, Cloud Haskell, Software Development in Cloud

UNIT - IV

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers, Transport Layer Issues in DCNs, Cloud Service Providers

UNIT - V

Security in Cloud Computing, and Advanced Concepts in Cloud Computing

TEXT BOOK:

1. Chandrasekaran, K. Essentials of cloud computing. CRC Press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
2. Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

22DS3174: ARTIFICIAL INTELLIGENCE
(Professional Elective-II)

B.Tech. III Year I Sem

L	T	P	C
3	-	-	3

Prerequisites:

- A course on "Data Structures"

Course Objectives:

1. Understand the difference between various intelligent agents and environments including solving problems by searching the solution space.
2. Understand adversarial search and propositional logic to find the solutions of constraint satisfaction problems.
3. Reference using first order logic and describe knowledge representation.
4. Design solutions to a problem in the real world environment
5. Learn to infer in uncertain domains using probabilistic learning models.

Course Outcomes: Differentiate various intelligent agents and environments.

1. Also solve problems by searching the solution space.
2. Use adversarial search and propositional logic to solve constraint satisfaction problems
3. Use first order logic to infer and describe knowledge representation
4. Plan solutions for problems in the real world environment.
5. Infer in uncertain domains using probabilistic learning models

UNIT - I:

Problem Solving by Search-I & II Introduction to AI, Intelligent Agents, Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search.

UNIT – II

Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT - III:

Logic and Knowledge Representation First-Order Logic: Representation, Syntax and Semantics of First- Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. Inference in First- Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Back- ward Chaining, Resolution. Knowledge Representation: Ontological Engineering, Categories and Ob- jects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories.

UNIT - IV:

Planning Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches.
Planning and Acting in the Real World: Time, Schedules, and Resources, Hierarchical Planning, Planning and Acting in Nondeterministic Domains, Multi agent planning.

UNIT - V:

Learning: Forms of Learning, Knowledge in Learning: Logical Formulation of Learning. Probabilistic Reasoning: the Semantics of Bayesian Networks. Approaches to Uncertain Reasoning; Dempster-Shafer theory.

TEXT BOOK:

1. Artificial Intelligence a Modern Approach, Stuart Russell and Peter Norvig, 4th Edition, Pearson Education, 2020.

REFERENCE BOOKS:

1. Artificial Intelligence, E.Rich and K.Knight, , 3rd Edition, TMH, 2009.
2. Artificial Intelligence, Patrick Henny Winston, 3rd Edition, Pearson Education, 2015.
3. Artificial Intelligence, ShivaniGoel, Pearson Education, 2013. .
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education, 2005

22CY3151:NETWORK SECURITY AND CRYPTOGRAPHY LAB

B.Tech. III Year I SEM

L	T	P	C
0	0	3	1.5

Course Objectives:

1. Explain the objectives of information security.
2. To understand basics of Cryptography and Network Security.
3. To be able to secure a message over insecure channel by various means
4. Explain the importance and application of each of confidentiality, integrity, authentication and availability.
5. Understand various cryptographic algorithms.

Course Outcomes:

1. Understand basic cryptographic algorithms, message and web authentication and security issues.
2. Get an overview of cryptographic algorithms
3. Hands on experience on c/java programming languages.
4. Identify information system requirements for both of them such as client and server.
5. Understand the current legal issues towards information security.

List of Experiments:

1. Write a C program that contains a string (charpointer)with a value ‘Helloworld’. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (charpointer)with a value ‘Helloworld’. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
   a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text “Helloworld” using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.

TEXT BOOKS:

1. Cryptography and Network Security-Principles and Practice:William Stallings, Pearson Education, 6th Edition.
2. Cryptography and Network Security: Atul Kahate, McGrawHill, 3rd Edition.

REFERENCE BOOKS:

1. Cryptography and Network Security: CK Shyamala, N Harini, Dr TR Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security:Forouzan Mukhopadhyay, McGraw Hill, 3rd Edition.
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, GregWhite, TMH.
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

22CY3152: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. III Year I Sem.

L	T	P	C
0	0	3	1.5

Co-requisites:

- Co-requisite of course "Database Management Systems"

Course Objectives:

1.Introduce ER data model, database design and normalization
2.To facilitate students in Database design
3.To emphasize the importance of normalization in databases.
4.To familiarize issues of concurrency control and transaction management.
5.Learn SQL basics for data definition and data manipulation

Course Outcomes:

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers
4. Hands on experience on Triggers and Cursors
5. Hands on experience on DDL and DML commands.

List of Experiments:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUPBY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:

1.DatabaseManagementSystems, RaghuramaKrishnan, JohannesGehrke, TataMc Graw Hill, 3rd Edition
2.Database System Concepts, Silberschatz, Korth, McGrawHill, V edition.

REFERENCESBOOKS:

1. Database Systems design, Implementation, and Management, PeterRob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*
3. Introduction to DatabaseSystems, C.J. Date, *Pearson Education*
4. Oraclefor Professionals, The X Team, S. Shahand V. Shah, *SPD.*
5. Database Systems Using Oracle: A Simplified guide to SQLand PL/SQL, Shah, *PHI.*
6. Fundamentals of Database Management Systems, M.L.Gillenson, *Wiley Student Edition.*

22HS3151: ADVANCED ENGLISH COMMUNICATION SKILLS LAB

	L	T	P	C
B.Tech. III Year I Sem	**0**	**0**	**2**	**1**

Course Objectives

This lab focuses on using Multi-media instruction as well as stimulating peer group activities for language development to meet the following targets:

1. To improve students fluency in spoken English.
2. To enable them to listen to English spoken at normal conversational speed.
3. To help students develop their vocabulary.
4. To read and comprehend texts in different contexts.
5. To communicate their ideas relevantly and coherently in writing.

Course Outcomes: Students will be able to

1. Acquire vocabulary and Grammar and use them contextually.
2. Listen and speak effectively, and present themselves effectively.
3. Develop proficiency in academic reading and writing.
4. Communicate confidently in formal and informal contexts.
5. Increase their job opportunities.

Syllabus

The following course activities will be conducted as part of the *Advanced English Communication Skills (AECS) Lab:*

Unit I

Vocabulary and Grammar: Vocabulary Building – Word Formation: Prefixes and Suffixes - Synonyms, and Antonyms, One-word Substitutes, Idioms, Phrases, Collocations, and Compound Words.

Grammar – Articles, Prepositions, Tenses, Subject-Verb Agreement, Voice and Speech- Spotting Errors - Correction of Sentences,

Unit II

Advanced Reading Comprehension: Argumentative Analysis of (with reference to) GRE, TOEFL, IELTS – Jumbled Sentences and Sentence Completion.

Unit III

Writing Skills– Structure and Different Types of Writings – Argumentative Writing – Letter Writing - Resume Writing - Technical Report Writing

Creating and Using LinkedIn Profile - Netiquette - Statement of Purpose (SOP) - Letter of Recommendation

Unit IV

Presentation Skills -_Oral Presentations (Group/Individual) and Written Presentations – PPTs/ Posters (Virtual/Offline) – Projects, Reports and Assignments - Introducing Oneself Virtually (Making a Video on Oneself and Analyzing it critically).

Unit V

Group Dynamics & Interviews: Group Discussion - Dos and Don'ts - Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Debate: Concept and Process - Difference between Group Discussions and Debates- Rubrics of Evaluation - Interviews and Types of Interviews - Pre-interview Planning, Opening Strategies, Answering Strategies - Introducing Self - Oral Interviews (face-to-face) –Virtual Interviews - Mock Interviews - Handling Technical Glitches.

References

- Kumar, Sanjay and Pushp Lata. *English for Effective Communication*, Oxford University Press, 2015.
- Konal, Nira. *English Language Laboratories- A Comprehensive Manual*, PHI Learning Pvt. Ltd. 2011.
- *The Official Guide to the GRE General Test*. Tamil Nadu: McGra Hills Education (India) 3rd Edition, 2017.

22CY3153: SKILL DEVELOPMENT COURSE (UI DESIGN- FLUTTER)

B.Tech. III Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives:

1. Learns to Implement Flutter Widgets and Layouts
2. Understands Responsive UI Design and with Navigation in Flutter
3. Knowledge on Widges and customize widgets for specific UI elements, Themes
4. Understand to include animation apart from fetching data

Course Outcomes:

1. Implements Flutter Widgets and Layouts
2. Responsive UI Design and with Navigation in Flutter
3. Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
4. Design a form with various input fields, along with validation and error handling
5. Fetches data and write code for unit Test for UI components and also animation

List of Experiments: Students need to implement the following experiments

1. a) Install Flutter and Dart SDK.
   b) Write a simple Dart program to understand the language basics.
2. a) Explore various Flutter widgets (Text, Image, Container, etc.).
   b) Implement different layout structures using Row, Column, and Stack widgets.
3. a) Design a responsive UI that adapts to different screen sizes.
   b) Implement media queries and breakpoints for responsiveness.
4. a) Set up navigation between different screens using Navigator.
   b) Implement navigation with named routes.
5. a) Learn about stateful and stateless widgets.
   b) Implement state management using set State and Provider.
6. a) Create custom widgets for specific UI elements.
   b) Apply styling using themes and custom styles.
7. a) Design a form with various input fields.
   b) Implement form validation and error handling.
8. a) Add animations to UI elements using Flutter's animation framework.
   b) Experiment with different types of animations (fade, slide, etc.).
9. a) Fetch data from a REST API.
   b) Display the fetched data in a meaningful way in the UI.
10. a) Write unit tests for UI components.
    b) Use Flutter's debugging tools to identify and fivx issues.

TEXT BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

22MC0005: INTELLECTUAL PROPERTY RIGHTS

III B.Tech I Semester

L	T	P	C
3	0	0	0

Course Objectives:

- To know the concept of intellectual property
- To study about trade marks
- To study about law of copyrights and law of patents.
- To impart the knowledge on trade secrets
- To know new developments in IPR laws at national and international level.

Course Outcomes: At the end of this course, students will demonstrate the ability to

- Distinguish and Explain various forms of IPRs
- Identify criteria to fit one's own intellectual work in particular form of IPRs
- Apply statutory provisions to protect particular form of IPRs.
- Explain about trade secrets
- Appraise new developments in IPR laws at national and international level

UNIT – I:
INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II:
TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes**.**

UNIT – III:
LAW OF COPYRIGHTS: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.
LAW OF PATENTS: Foundation of patent law, patent searching process, ownership rights and transfe

UNIT – IV:
TRADE SECRETS: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.
Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V:
NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: new developments in trade mark law; copyright law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOK:
1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOK:
1. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd

III YEAR-II SEM

22CY3211:CYBER SECURITY

B.Tech. III Year II Sem

L	T	P	C
3	0	0	3

Prerequisites:
A course on "Computer Networks"

Course objectives:

1. To understand various types of cyber-attacks and cyber-crimes
2. To learn threats and risks within context of the cyber security
3. To have an overview of the cyber laws & concepts of cyber forensics
4. To study the defensive techniques against these attacks
5. Tounderstandthesecuritychallengespresentedbymobiledevicesandinformation systems access in the cybercrime world.

Course Outcomes:

1. Analyze and evaluate the cyber security needs of an organization.
2. Understand Cyber Security Regulations and Roles of International Law and Learn, analyse and validate Forensics Data
3. Understand web threats, security and privacy implications of an organization.
4. Design and develop a security architecture for an organization.
5. Understand fundamental concepts of data privacy attacks and policies.

UNIT- I

Cyber Security Fundamentals: Network and Security Concepts- Information Assurance Fundamentals, Basic Cryptography, Symmetric Encryption, Public Key Encryption, The Domain Name System (DNS), Firewalls, Virtualization, Radio-Frequency Identification

Microsoft Windows Security Principles: Windows Tokens, Window Messaging, Windows Program, The Windows firewalls

UNIT- II

Attacker Techniques and Motivations: How Hackers Cover Their Tracks (Antiforensics) How and Why Attackers Use Proxies, Tunneling Techniques, Fraud Techniques, Threat Infrastructure

UNIT- III

Exploitation: Techniques to Gain a Foothold, Misdirection- Shellcode, Integer Overflow Vulnerabilities, Stack-Based Buffer Overflows, Format String Vulnerabilities, SQL Injection, Malicious PDF Files, Race Conditions, Web Exploit Tools, DoS Conditions, Brute Force and Dictionary Attacks, Reconnaissance, and Disruption Methods- Cross-Site Scripting (XSS), Social Engineering, WarXing, DNS Amplification Attacks

UNIT- IV

Malicious Code: Self-Replicating Malicious Code- Worms, Viruses. Evading Detection and Elevating Privileges- Obfuscation, Virtual Machine Obfuscation, Persistent Software Techniques, Rootkits, Spyware, Attacks against Privileged User Accounts and Escalation of Privileges, Token

Kidnapping, Virtual Machine Detection. Stealing Information and Exploitation- Form Grabbing, Man-in-the-Middle Attacks, DLL Injection, Browser Helper Objects

UNIT- V

Defense and Analysis Techniques: Memory Forensics, Honeypots, Malicious Code Naming, Automated Malicious Code Analysis Systems, Intrusion Detection Systems.

TEXT BOOK:

1. James Graham, Richard Howard, Ryan Olson, "Cyber Security Essentials", CRC Press, Taylor & Francis Group, 2011.

2. PGF Case Study for National Virtual Development

REFERENCE BOOK:

1. Mayank Bhusan, Rajkumar Singh Rathore, Aatif Jamshed, "Fundamental of Cyber Security (Principles, Theory and Practices) BPB Publications 2018.
2. PGF (Reference R21)

(An UGC Autonomous Institution, Approved by AICTE, Affiliated by JNTUH, Accredited by NBA & NAAC)

22CY3212: CYBER CRIME INVESTIGATION & DIGITAL FORENSICS

B.Tech. III Year II SEM

L	T	P	C
3	0	0	3

Prerequisites:

- A course on Computer Networks
- A course on Operating systems
- A course on Database management systems

Course Objectives:

1. To have an overview of cyber crime and its types.
2. To study the basic concepts of cybercrime issues.
3. To study investigation tools and techniques.
4. To learn digital forensics tools and technology
5. To understand cybercrime laws and acts, evidence handling procedures.

Course Outcomes:

1. Analyze cybercrime issues and types.
2. Understand the fundamentals of cybercrime and issues.
3. Understand different investigation tools for cybercrime.
4. Understand basics of Forensic Technology and Practices.
5. Analyze different laws, ethics and evidence handling procedures.

UNIT – I

Foundations of Digital Forensics: Digital Evidence, Principles of Digital Forensics, Challenging aspects of Digital Evidence, The Role of computers in crime, Cyber Crime Law.

UNIT – II

Digital Investigations: Digital Investigation process models, Applying Scientific method in Digital Investigations, Handling a digital Crime scene: Fundamental Principles, Surveying and Preserving Digital Investigation.

UNIT - III

Violent Crime and Digital Investigation: The role of Computers in violent crime, Processing Digital crime scene, Investigative Reconstruction, Digital Evidence as Alibi.

UNIT - IV

Cyber stalking, Computer basics for Digital Forensics, Applying Forensics science to computers, Digital Evidence on windows systems, Digital Evidence on Unix systems.

UNIT - V

Network Forensics: Networks basics for Digital Investigators, Applying Forensics science to networks, Digital Evidence on physical and data link layers, Digital Evidence on Network and Transport layers.

TEXT BOOK:

1. Digital Evidence and computer Crime by Eoghan Casey Academic Press Third Edition.

REFERENCE BOOKS:

1. Real Digital Forensics for Handheld Devices, E. P. Dorothy, Auerback Publications, 2013.
2. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics,
3. J. Sammons, Syngress Publishing, 2012.
4. Handbook of Digital Forensics and Investigation, E. Casey, Academic Press, 2010.

22CS3211: MACHINE LEARNING

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A Course on "Data Analytics"
- A Course on "Computer Oriented Statistical methods"

Course Objectives

1. Define Machine Learning and understand the basic theory underlying machine learning.
2. Understand the basic concepts of learning and decision trees.
3. Understand neural networks and Bayesian techniques for problems appear in machine learning
4. Understand the instance based learning and reinforced learning
5. Perform statistical analysis of machine learning techniques

Course Outcomes: After the completion of the course student will be able to

1. Illustrate the learning techniques and investigate concept learning
2. Apply the characteristics of decision tree to solve associated problems
3. Use and Apply Ensemble and Un-Supervised Learning Techniques.
4. Apply effectively neural networks for appropriate applications
5. Evaluate hypothesis and investigate instant based learning and reinforced learning

UNIT-I

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias, Gradient Descent Algorithm and its variants.

UNIT-II

Supervised Learning- Regression: Linear-Simple, Multiple, Logistic Regression. Classification- Naive Bayes Classifier, k-NN classifier, Support Vector Machines -Linear, Non Linear Ensemble Techniques I-Decision Trees-ID3(Iterative Dichotomiser3), CART(Classification and Regression Tree)

UNIT-III

Ensemble Techniques II- C4.5, CHAID (Chi-Square Automatic Interaction Detection), Random Forest Algorithm Unsupervised Learning-Clustering: Measures of distance, k-means, Gaussian

Mixture Model Clustering, Hierarchical Learning- Divisive, Agglomerative Clustering

UNIT-IV

Artificial Neural Networks-1– Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multi layer networks and the back-propagation algorithm.

Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks.

UNIT - V

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms. Reinforcement Learning – Introduction, the learning task, Q–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

TEXT BOOK:

1. Machine Learning – Tom M. Mitchell, - MGH.
2. Introduction to Machine Learning with Python, Author – Andreas C. Müller, Sara h Guido, Edition – First Edition, Publisher – O'Reilly Media, Inc.

REFERENCE BOOK:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis.
2. Mathematics for Machine learning, Author – Marc Peter Deisenroth, Edition – First Edition, Publisher – Cambridge University Press.

22CY3271: Mobile Application Security (Professional Elective– III)

(PROFESSIONAL ELECTIVE –III)

B.Tech. III Year II Sem **L T P C**
3 - - 3

Prerequisites: computer networks, mobile computing

Course Objectives:

1. This course provides a thorough understanding of issues facing mobile devices, platforms and mobile development strategies.
2. The course objective focus will be on wireless Application Protocol (WAP) and Mobile HTML security on PDAs/ smart phone.
3. The course objective focus on Bluetooth's functionality and ubiquity on mobile devices provides some exciting opportunities for mobile application developers.
4. This course objective provides knowledge on SMS security from an attacker's point of view.
5. This course objective discusses the enterprise security features, support, and applications available on four major mobile platforms—BlackBerryOS, Windows Mobile, iPhone OS, and Google Android.

Course Outcomes:

1. Understand the issues and technologies involved in designing a wireless and mobile system that is robust against various attacks.
2. Gain knowledge and understand the security controls of multiple mobile operating systems
3. Understand and analyze the issues and technologies involved in Bluetooth Technology.
4. Analyze and understand the Security of Short Message Service
5. Understand and analyze Enterprise security on the Mobile OS Device.

UNIT - I

Top Mobile Issues and Development Strategies: Top Issues Facing Mobile Devices, Physical Security, Secure Data Storage (on Disk), Strong Authentication with Poor Keyboards, Multiple-User Support with Security, Safe Browsing Environment, Secure Operating Systems, Application Isolation, Information Disclosure, Virus, Worms, Trojans, Spyware, and Malware , Difficult Patching/Update Process, Strict Use and Enforcement of SSL, Phishing, Cross-Site Request Forgery(CSRF), Location Privacy/Security, Insecure Device Drivers, MultiFactor Authentication, Tips for Secure Mobile Application Development.

UNIT - II

WAP and Mobile HTML Security WAP and Mobile HTML Basics, Authentication on WAP/Mobile HTML Sites, Encryption, Application Attacks on Mobile HTML Sites, Cross-Site Scripting, SQL Injection, Cross-Site Request Forgery, HTTP Redirects, Phishing, Session Fixation, Non-SSL Login, WAP and Mobile Browser Weaknesses, Lack of HTTP Only Flag Support, Lack of SECURE Flag Support, Handling Browser Cache, WAP Limitations.

UNIT - III

Bluetooth Security Overview of the Technology, History and Standards, Common Uses, Alternatives, Future, Bluetooth Technical Architecture, Radio Operation and Frequency, Bluetooth Network Topology, Device Identification, Modes of Operation, Bluetooth Stack , Bluetooth Profiles, Bluetooth Security Features, Pairing, Traditional Security Services in Bluetooth, Security "Non-Features", Threats to Bluetooth Devices and Networks, Bluetooth Vulnerabilities, Bluetooth Versions Prior to v1.2, Bluetooth Versions Priorto v2.1.

UNIT - IV

SMS Security Overview of Short Message Service, Overview of Multimedia Messaging Service, Wireless Application Protocol(WAP), Protocol Attacks, Abusing Legitimate Functionality, Attacking Protocol Implementations, Application Attacks, iPhoneSafari, Windows Mobile MMS, Motorola RAZR JPG Overflow, Walkthroughs, Sending PDUs, Converting XML to WBXML.

UNIT - V

Enterprise Security on the Mobile OS Device Security Options, PIN, Remote, 346Secure LocalStorage, Apple iPhone and Keychain, Security Policy Enforcement, Encryption, FullDisk Encryption, E-mail Encryption, File Encryption, Application Sand boxing, Signing, and Permissions, Application Sand boxing, Application Signing, Permissions, Buffer Overflow Protection, Windows Mobile, iPhone, Android, BlackBerry, Security Feature Summary.

TEXT BOOK:

1. Alex Alexandrou, Cybercrime and Information Technology: The Computer Network Infrastructure and Computer Security, Cybersecurity Laws, Internet of Things(IoT), and Mobile Devices, CRC Press, 2021
2. Mobile Application Security, Himanshu Dwivedi, Chris Clark, David Thiel, TATA McGrawHill.

REFERENCE BOOKS:

1. Mobile and Wireless Network Security and Privacy, Kami S. Makki, et al, Springer.
2. Android Security Attacks Defenses, Abhishek Dubey, CRC Press

22CY3272: DESIGN AND ANALYSIS OF ALGORITHMS
(PROFESSIONAL ELECTIVE –III)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites:

- A course on "C Programming"
- A course on "Data Structures"

Course Objectives

1. To analyze performance of algorithms.
2. To understand and choose the appropriate algorithm design technique for a specifiedapplication.
3. To solve problems using algorithm design techniques such as the greedy method, divideand conquer, dynamic programming, backtracking and branch and bound.
4. To analyze the impact of algorithm design techniques on each application solved.
5. To introduce and understand P and NP classes

Course Outcomes

1. Able to analyze the different algorithm design techniques for a given problem.
2. Able to design algorithms for various computing problems.
3. Able to argue the correctness of algorithms using inductive proofs and invariants.
4. Able to analyze the limitations of algorithms.
5. Able to explain about coping with the limitations of algorithms.

UNIT-I

Notation of an Algorithm: Fundamentals of Algorithmic Problem Solving, Fundamentals of the Analysis of Algorithm Efficiency–Order Notations and its properties, Mathematical analysis for Recursive-Towers of Hanoi and Non-recursive algorithms

Divide and conquer- General method-Control abstraction, Solving Recurrence Relation using Substitution method and Master's Theorem, applications - Binary search, Merge sort, Quick sort,Strassen's Matrix Multiplication, Finding Maximum and Minimum element.

UNIT-II

Greedy Method- General method-Control abstraction, applications- Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem.

UNIT - III

Dynamic Programming: General Method, applications-Multi Stage Graphs, Chained matrix multiplication, All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design, Traveling sales person problem.

UNIT-IV

Backtracking: General method-Control abstraction, applications-The 8-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V

Branch and Bound: General Method-Control abstraction, applications-15-Puzzle Problem - LC search,0/1 Knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution, Travelling sales person problem.

NP-Hard and NP-Complete problems: Basic concepts, Non-deterministic algorithms, NP – Hard and NP- Complete classes, Cook's theorem- proof of reduction.

TEXT BOOKS:

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers.
2. M.T. Goodrich, Robert Tamassia, Algorithm design: Foundations, Analysis and Internet examples, Wiley student Edn, John Wiley &sons.
3. Parag Himanshu Dave, Himanshu Bhalchandra Dave, Design and Analysis algorithms Pearson Publication.

REFERENCES:

1. Allen Weiss, Data structures and Algorithm Analysis in C++, 2nd Edn, Pearson Education
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education

22CY3273: DEVOPS
(PROFESSIONAL ELECTIVE –III)

B.Tech. III Year II Sem

L	T	P	C
3	0	0	3

Prerequisites:

- Basic understanding of software development,
- Familiarity with operating system and networking

Course Objectives: The main objectives of this course are to

1. Describe the agile relationship between development and IT operations.
2. Make the learner identify components of DevOps environment
3. Understand the skill sets and high-functioning teams involved in DevOps
4. Understand related methods to reach a continuous delivery capability
5. Implement automated system update and DevOps lifecycle

Course Outcomes: On successful completion of this course, students will be able to:

1. Identify components of DevOps environment
2. Describe Software development models and architectures of DevOps
3. Apply different project management, integration, testing and code deployment tool
4. Investigate different DevOps Software development models
5. Collaborate and adopt DevOps in real-time projects

UNIT - I

Introduction: Introduction, Agile development model, DevOps, and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

UNIT - II

Software development models and DevOps: DevOps Life cycle for Business Agility, DevOps, and Continuous Testing.
DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, These parathion of concerns, Handling database migrations, Microservices, and the data tier, DevOps, architecture, and resilience.

UNIT - III

Introduction to project management: The need for source code control, The history of source code management, Roles and code, source code management system and migrations, Shared authentication, Hosted Gitservers, Different Gitserver implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT - IV

Integrating the system: Build systems, Jenkins build server, managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host,

Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

UNIT - V

Testing Tools and automation: Various types of testing, Automation of testing Pros and cons, Selenium-Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development

Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker

TEXT BOOKS:

1. Joakim Verona. Practical DevOps, Second Edition. Ingram short title; 2nd edition (2018). ISBN10: 1788392574.
2. Deepak Gaikwad, Viral Thakkar .DevOps Tools from Practitioner's Viewpoint. Wiley publications. ISBN: 9788126579952.

REFERENCE BOOK:

1. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley;ISBN-10.

22IT3271: BLOCKCHAIN TECHNOLOGY
(PROFESSIONAL ELECTIVE –III)

III B. Tech II Sem.

	L	T	P	C
Pre-requisites:	3	0	0	3

- Knowledge in Computer Networks.
- Knowledge in Distributed Databases.

Course Objectives:

1. Impart strong technical understanding of Blockchain technologies.
2. Gain knowledge about applications of cryptography in Blockchain.
3. Learn about the concepts of various implementations of Blockchain technology such as Bit coin, Ethereum and Hyper ledger.
4. Understand the modern currencies and their market usage.
5. Introduce application areas, current practices and research activity.

Course Outcomes: After the completion of the course student should be able to

1. Learn fundamentals of Blockchain techniques.
2. Analyze various consensus problems.
3. Adapt Bitcoin technology to improve usage.
4. Make use of Ethereum frameworks to write smart contract.
5. Interpret Blockchain technology in real time applications.

UNIT I

Introduction: What is Blockchain, The history of block chain, Benefits and limitations of Blockchain, Distributed systems, Decentralization using block chain, CAP theorem and block chain, Crowd funding.

UNIT II

Cryptography in Blockchain: Cryptocurrency, How a Cryptocurrency works, cryptographic primitives, Asymmetric cryptography, public and private keys, line interface, Bitcoin improvement proposals (BIPs) , Consensus Algorithms, Digital Identity verification, Blockchain Neutrality, Digital art.

UNIT III

Bitcoin:- The Bitcoin network, Wallets and its types, Bitcoin payments, Bitcoin investment and buying and selling bitcoins, Bitcoin installation, Bitcoin programming and the command line interface, Bitcoin improvement proposals (BIPs).

Blockchain Science: Grid coin, Folding coin, Blockchain Genomics

UNIT IV

Ethereum:- Ethereum Virtual Machine (EVM),Wallets for Ethereum, Solidity, Smart Contracts, Some Attacks on Smart Contracts, The Ethereum network, Applications developed on Ethereum , Scalability and security issues.

UNIT V

Issues in Blockchain: - Technical challenges, Business model challenges, Government Regulations, Zero Knowledge proofs and protocols in Blockchain

Introduction to Hyperledger: - Hyperledger as a protocol, Fabric, Hyper ledger Fabric, Saw tooth Lake, Corda Architecture.

Text Books:

1. Blockchain Blue print for Economy by Melanie Swan.
2. I. Bashir, Mastering Block chain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd revised edition. Birmingham: Packt Publishing, 2018.

References:

1. Vigna, Paul, and Michael J. Casey. The Truth Machine: The Block chain and the Future of Everything. Picador, 2019.

2. Gerard, David. Attack of the 50 foot block chain: Bitcoin, block chain, Ethereum & smart contracts. David Gerard, 2017.

3. Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, "An Overview of Block chain Technology: Architecture, Consensus, and Future Trends," in 2017 IEEE International Congress on Big Data (Big Data Congress), 2017, pp.557–564.

22CY3251:CYBER SECURITY LAB

B.Tech. III Year II Sem.

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Prerequisites: A course on "Network Security and Cryptography".

Course Objective:

1. To understand NMAP for network discovery and services.
2. To lure cyber attackers and detect, deflect and study hacking attempts to gain unauthorized access to information systems. (Pent box)
3. To learn foot-printing together target information using Dmitry.
4. To understand network communication using Wireshark.
5. To understand firewall filtering rules.

Course Outcome:

1. Get the skill to identify cyber threats/attacks.
2. Get the knowledge to solve security issues in day-to-day life.
3. Able to use Autopsy tools
4. Perform Memory capture and analysis
5. Demonstrate Network analysis using Network miner tools

List of Experiments

1. Perform an Experiment for port scanning with nmap
2. Set Up a honeypot and monitor the honey pot on the network
3. InstallJscript/Cryptooltool(oranyotherequivalent)anddemonstrateAsymmetric, Symmetric crypto algorithm, Hash and Digital/PKI signatures.
4. Generate minimum10 passwords of length 12 characters using open SSL command
5. PerformpracticalapproachtoimplementFootprinting-Gatheringtargetinformation using Dmitry-Dmagic, UAtester
6. Working with sniffers for monitoring network communication (Wireshark).
7. Using Snort, perform real time traffic analysis and packet logging.
8. Perform email analysis using the Autopsy tool.
9. Perform Registry analysis and get boot time logging using process monitor tool
10. Perform File type detection using Autopsy tool
11. Perform Memory capture and analysis using FTK imager tool
12. Perform Network analysis using the Network Miner tool
13. Firewallfiltering techniques using IP tables on Linux.

TEXT BOOKS:

1.Real Digital Forensics for Handheld Devices, E.P.Dorothy, Auerback Publications, 2013.
2.The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, J. Sammons, Syngress Publishing, 2012.

REFERENCE BOOKS:

1. Handbook of Digital Forensics and Investigation, E. Casey, Academic Press, 2010.
2. MalwareForensicsFieldGuideforWindowsSystems:DigitalForensicsFieldGuides, C. H. Malin, E. Casey and J. M. Aquilina, Syngress, 2012.
3. The Best Damn Cyber crime and Digital Forensics Book Period, J.Wiles and A.Reyes, Syngress, 2007.

22CY3252:CYBER CRIME INVESTIGATION & DIGITAL FORENSICS LAB

B.Tech. III Year II Sem

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Course Objectives:

1. To provide students with a comprehensive overview of collecting, investigating, preserving, and presenting evidence of cybercrime left in digitals to rage devices, emails, browsers, mobile devices using different Forensics tools.
2. To Understand file system basics and where hidden files may lie on the disk, as well as how to extract the data and preserve it for analysis.
3. Understand some of the tools of e-discovery.
4. To understand the network analysis, Registry analysis and analyse attacks using different forensics tools.
5. To gather data from mobile devices with the goal of analysis using forensic tool.

Course Outcomes:

1. Learn the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing.
2. To Learn the file systems to rage mechanisms and retrieve files in hidden format
3. Learn the use of computer forensics tools used in data analysis.
4. Learn how to find data that may be clear or hidden on a computer disk, find out the open ports for the attackers through network analysis, Registry analysis.
5. Understand how to do data acquisition from mobile phones for investigation purpose

List of Experiments

1. **Perform email analysis** using the tools like Exchange EDB viewer, MBOX viewer and View user mail boxes and public folders, Filter the mailbox data based on various criteria, Search for particular items in user mailboxes and public folders
2. **Perform Browser history analysis** and get the downloaded content, history, saved logins, searches, websites visited etc using Foxton Forensics tool, Dumpzilla.
3. **Perform mobile analysis** in the form of retrieving calllogs, SMS log, all contacts list using the forensics tool like SAFT
4. **Perform Registry analysis** and get boot time logging using process monitor tool
5. **Perform Disk imaging and cloning the** using the X-way Forensics tools
6. **Perform Data Analysis i.e.** History about open file and folder, and view folder actions using Last view activity tool
7. **Perform Network analysis** using the Network Miner tool.
8. **Perform information for incident response** using the crowd Response tool
9. **Perform File type detection using** Autopsy tool
10. **Perform Memory capture and analysis** using the Live RAM capture or any forensic tool.

11. Password cracking
    1.CrackLinux password using the John the ripper tool
    2.Crack the password using The Hydra tool by performing Brue force attack.
    3.Crack Wi-Fi password using Air cracking tool
12. PerformEncrypteddiskdetectionby using Magnet encrypted disk detector tool

TEXT BOOKS:

1. Real Digital Forensics for Handheld Devices, E.P.Dorothy, Auerback Publications, 2013.
2. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, J. Sammons, Syngress Publishing, 2012.

REFERENCE BOOKS:

1. Handbook of Digital Forensics and Investigation, E. Casey, Academic Press, 2010.
2. MalwareForensicsFieldGuideforWindowsSystems:DigitalForensicsFieldGuides, C. H. Malin, E. Casey and J. M. Aquilina, Syngress, 2012.
3. The Best Damn Cyber crime and Digital Forensics Book Period, J.Wiles andA.Reyes, Syngress, 2007.

22CY3253: MACHINE LEARNING LAB

B.Tech. III Year II Sem.

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Prerequisites :

- A course on Computer oriented statistical methods

Course Objective:

1. Define machine learning and understand the basic theory underlying machine learning.
2. Understand basic concepts of learning and decision trees.
3. Understand neural networks and Bayesian techniques for problems appear in machine learning.
4. Understand the instance based learning and reinforced learning.
5. Perform statistical analysis of machine learning techniques.

Course Outcomes:

1. Illustrate the learning techniques and investigate concepts learning
2. Apply the characteristics of decision tree to solve associated problems.
3. Use and apply ensemble and un-supervised learning techniques
4. Apply effectively neural networks for appropriate applications
5. Evaluate hypothesis and investigate instant based learning and reinforced learning

List of Experiments

1. Write a python program to compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
3. Study of Python Libraries for ML application such as Pandas and Matplotlib
4. Write a Python program to implement Simple Linear Regression
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn
6. Implementation of Decision tree using sklearn and its parameter tuning
7. Implementation of KNN using sklearn
8. Implementation of Logistic Regression using sklearn
9. Implementation of K-Means Clustering
10. Performance analysis of Classification Algorithms on a specific dataset (Mini Project)

TEXT BOOK:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOK:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

22MC0002 : ENVIRONMENTAL SCIENCE

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B.Tech. III Year II Sem.

Course Objectives: Develop ability to

1. Identify the importance of ecosystem and its functions.
2. Understand the natural resources and their usage in day to day life.
3. Understand the concept of bio-diversity, its values and conservation.
4. Beaware of the causes of different types of pollution and its control.
5. Understand various environmental impacts, requirement of various policies and legislations towards environmental sustainability.

Course Outcomes

After the completion of the course, the student would be able to–

1. Explain ecosystem and its functions namely, food chain, ecological pyramids etc.
2. Acquire knowledge about different types of natural resources such as land, water, minerals, non-renewableenergyandtheirexcessiveusageleadingtodetrimentaleffects on environment.
3. Comprehend eco system diversity, its values and importance of hotspots to preserve the same.
4. Explain different types of pollution, its control and impact on global environment.
5. Recognize various environmental impacts and the importance of various acts and policies towards environmental sustainability.

UNIT - I

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Bio geochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: LivingandNon-Livingresources, **water resources:** use and over utilization of surface and groundwater, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hotspots of biodiversity. Field visit. Threats

To bio diversity: habit at loss, poaching of wildlife, man-wild life conflicts; conservation of bio diversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards.

Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Waste water Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions/ Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT - V

Environmental Policy, Legislation &EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wildlife Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP). **To wards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon lifestyle.

TEXT BOOKS:

1.Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2.Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by RichardT. Wright.2008PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters andWendel lP.Ela. 2008 PHI Learning Pvt. Ltd.

3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIAedition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, Newage international publishers.
5. Textbook of Environmental Science and Technology- Dr.M.AnjiReddy 2007, BS Publications.

22CY3281: INDUSTRY ORIENTED MINI PROJECT

III B.Tech II Semester

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