GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
COURSE STRUCTURE
(Applicable for the Batch admitted from 2021-2022)

V SEMESTER (THIRD YEAR)

S. No.	Subject Code	Group	Subject	L	T	P	Credits
1	21PC0C415	PCC	Design and Analysis of Algorithms	3	0	0	3
2	21PC0C416	PCC	Network Security & Cryptography	3	0	0	3
3	21PC0C417	PCC	Database Management Systems	3	0	0	3
4		PEC	Professional Elective – I	3	0	0	3
5		OE	Open Elective – I	3	0	0	3
6	21HS0EN04	HSMC	Effective Technical Communication	3	0	0	3
7	21PC0C418	PCC	Network Security & Cryptography Lab	0	0	3	1.5
8	21PC0C419	PCC	Database Management Systems Lab	0	0	3	1.5
9	21MC0CS01	MC	Environmental Science	3	0	0	0
6 Theory + 2 Lab +1 MC			**Total Credits**	**21**	**00**	**06**	**21**

L – Lecture **T** – Tutorial **P** – Practical

VI SEMESTER (THIRD YEAR)

S. No.	Subject Code	Group	Subject	L	T	P	Credits
1	21PC0C420	PCC	Cyber Security	3	0	0	3
2	21PC0C421	PCC	Cyber Laws	3	0	0	3
3	21PC0C422	PCC	Ethical Hacking	3	0	0	3
4		PEC	Professional Elective – II	3	0	0	3
5		PEC	Professional Elective – III	3	0	0	3
6		OE	Open Elective-II	3	0	0	3
7	21PC0C423	PCC	Cyber Security Lab	0	0	3	1.5
8	21PC0C424	PCC	Ethical Hacking Lab	0	0	3	1.5
9	21MC0DS01	MC	Fundamentals of Artificial Intelligence	3	0	0	0
6 Theory + 2 Lab + 1 MC			**Total Credits**	**21**	**00**	**06**	**21**

L – Lecture **T** – Tutorial **P** – Practical

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List of Electives

Professional Elective-1:

S.NO	Subject Code	Subject Name
1	21PEOCY1A	Introduction to Internet of Things
2	21PEOCY1B	Cloud Computing
3	21PEOCY1C	Data Warehousing & Data Mining

Professional Elective-2:

S.NO	Subject Code	Subject Name
1	21PEOCY2A	Cloud Security
2	21PEOCY2B	Machine Learning
3	21PEOCY2C	Object-Oriented Analysis and Design using UML

Professional Elective-3:

S.NO	Subject Code	Subject Name
1	21PEOCY3A	Principles of Software Development
2	21PEOCY3B	Internet of Things and Cyber security
3	21PEOCY3C	Digital Forensics

List of Open Electives:

S.NO	Subject Code	Subject Name
1	21OEOCY01	Python Programming for Emerging Technologies
2	21OEOCY02	Ethical Hacking
3	21OEOCY03	Cyber Laws

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
3	1	0	3

DESIGN AND ANALYSIS OF ALGORITHMS

PRE-REQUISITES:

1. A course on "Programming for problem solving"
2. A course on "Data Structures"

COURSE OBJECTIVES:

The objective of the course is to solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.

SYLLABUS:

UNIT – I

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT – II

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch-and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.

UNIT – III

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree,Topological sorting, Network Flow Algorithm.

UNIT – IV

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

UNIT – V

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – PSPACE

TEXT BOOKS:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MITPress/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz etal.

REFERENCE BOOKS:

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos,Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia,Wiley.
3. Algorithms – A Creative Approach, 3rd Edition, UdiManber, Addison-Wesley, Reading,MA.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO 1: Describe algorithms dealing with various techniques along with the efficiency of algorithms

CO 2: Select the data structures and algorithm design methods that impacts the performance of programs

CO 3: Identify the various searching and graph traversal techniques

CO 4: Distinguish designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.

CO 5: Estimate the performance of algorithms

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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

NETWORK SECURITY & CRYPTOGRAPHY

PRE-REQUISITES:

A Course on "Computer Networks"

COURSE OBJECTIVE:

This course is intended to impart knowledge on network security issues, services, goals and mechanisms and security of communication systems, networks and protocols

SYLLABUS:

UNIT – I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT – II

Conventional Encryption: Principles, Conventional encryption algorithms (DES, AES, RC4, and Blowfish), cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT – III

Number Theory: Modular Arithmetic, Euclid's Algorithm, Fermat's and Euler's Theorem, Chinese Remainder Theorem, Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT – IV

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

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

UNIT – V

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

Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

TEXTBOOK:

1. "Cryptography and Network Security" by William Stallings 3rd Edition, Pearson Education.
2. "Applied Cryptography" by Bruce Schneier.

REFERENCE BOOKS:

1. Cryptography and Network Security by Behrouz A.Forouzan

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define cryptography and network security concepts
CO2: Explain security principles in system design
CO3: Choose and investigate vulnerabilities, security threats, and mechanisms to counter them
CO4: Understand Various E-Mail Security issues
CO5: Understand Various types of viruses and threats on web.

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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

DATABASE MANAGEMENT SYSTEMS

PRE-REQUISITE:

1. A course on "Data Structures"

COURSE OBJECTIVE:

This course is introduced to describe the basic concepts of SQL, build queries using SQL commands and generate applications of database systems

SYLLABUS:

UNIT I:

Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational mode. database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, history of database systems, database design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept 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, form of basic SQL query, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active databases.

UNIT III:

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, 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, Buffer Management, Failure with loss of nonvolatile storage, ARIES Recovery, Remote Backup systems.

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, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCE BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for 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. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

COURSE OUTCOMES:
By the end of the course, students will be able to:
CO 1: Describe the basic fundamentals of DBMS, database design and normal forms
CO 2: Identify the appropriate SQL commands for retrieval and management of data
CO 3: Analyze the schema refinement and normal forms
CO 4: Identify data models for relevant problems
CO 5: Model database storage structures and access techniques

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COURSE STRUCTURE
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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

INTRODUCTION TO INTERNET OF THINGS
(Professional Elective – I)

PRE-REQUISITE:
1. A course on "Computer Networks"

COURSE OBJECTIVE:
This course helps to gain adequate knowledge on the Internet of Things. Students will be able to understand the potential of the Internet of Things for our society, in terms of impact on the lives of billions of people and on the world economy.

SYLLABUS:
UNIT – I

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics.
M2M to IoT – A Market Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies.

UNIT - II

M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.
M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

UNIT - III

IoT Architecture-State of the Art – Introduction, State of the art.
Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model
IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT - IV

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.
Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the

enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

UNIT - V

The Smart Grid-Introduction, Smart metering, Smart house, Smart energy city.

Commercial Building-Automation-Introduction, Case study: phase one-commercial building automation today, Case study: phase two-commercial building automation in the future

Smart Cities-Introduction, Smart cities-the need, Smart cities-a working definition, Smart cities-some examples, Roles, actors, engagement, Transport and logisticsan IoT perspective

TEXT BOOK:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

REFERENCE BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Understand the vision of IoT from a global context.
CO2: Determine the Market perspective of IoT.
CO3: Use of Devices, Gateways and Data Management in IoT.
CO4: Building state of the art architecture in IoT.
CO5: Application of IoT in Industrial and Real World Design Constraints.

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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

CLOUD COMPUTING
(Professional Elective – I)

PRE-REQUISITES:

A Course on "Computer Networks"

COURSE OBJECTIVE:

This course is intended to impart knowledge on to understand the concepts of Cloud Computing, learn Taxonomy of Virtualization Techniques, Cloud Computing Architecture, Aneka Cloud Application Platform, and Industry Cloud Platforms.

SYLLABUS:

UNIT – I

Introduction to Cloud: Cloud Computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, A Closer Look, Cloud Computing Reference Model. Characteristics and Benefits, Challenges Ahead, Historical Developments.

Principles of Parallel and Distributed Computing: Eras of computing, Parallel Vs Distributed computing, Elements of parallel computing, Elements of distributed computing, Technologies for distributed computing

Before the Move into the Cloud: Know Your Software Licenses, The Shift to a Cloud Cost Model, Service Levels for Cloud Applications.

UNIT – II

Virtualization: Introduction, Characteristics of Virtualized Environment, Taxonomy of Virtualization Techniques, Virtualization and Cloud computing, Pros and Cons of Virtualization, Technology Examples- VMware and Microsoft Hyper-V.

Cloud Computing Architecture: Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds, Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges, Cloud Interoperability and Standards, Scalability and Fault Tolerance.

UNIT – III

Ready for the Cloud: Web Application Design, Machine Image Design, Privacy Design, Database Management

Security: Data Security, Network Security, Host Security, Compromise Response.

Disaster Recovery: Disaster Recovery Planning, Disasters in the Cloud, Disaster Management.

UNIT – IV

Aneka Cloud Application Platform: Framework Overview, Anatomy of the Aneka Container, From the Ground Up: Platform Abstraction Layer, Fabric Services, Foundation Services, Application Services, Building Aneka Clouds, Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, Cloud Programming and

Management, Aneka SDK, Management Tools.

UNIT – V

Cloud Applications: Scientific Applications – Health care, Geoscience and Biology. Business and Consumer Applications- CRM and ERP, Social Networking, Media Applications and Multiplayer Online Gaming.

Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services and Additional Services. Google AppEngine-Architecture and Core Concepts, Application Life-Cycle, cost model. Microsoft Azure- Azure Core Concepts, SQL Azure.

TEXTBOOK:

1. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, TMH 2013.
2. George Reese Cloud Application Architectures, First Edition, O"Reilly Media 2009.

REFERENCE BOOKS:

1. Cloud Computing and SOA Convergence in Your Enterprise A Step-by-Step Guide by David S. Linthicum from Pearson 2010.
2. Cloud Computing 2nd Edition by Dr. Kumar Saurabh from Wiley India 2012.
3. Cloud Computing – web based Applications that change the way you work and collaborate Online – Micheal Miller.Pearson Education.

COURSE OUTCOMES:

At the end of this course student will:

CO1. Understand the concept of virtualization and how this has enabled the development of Cloud Computing

CO2. Know the fundamentals of cloud, cloud Architectures and types of services in cloud

CO3. Understand scaling, cloud security and disaster management

CO4. Design different Applications in cloud

CO5. Explore some important cloud computing driven commercial systems

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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

DATA WAREHOUSING AND DATAMINING
(Professional Elective – I)

PRE-REQUISITE:
A Course on "Database Management Systems"

COURSE OBJECTIVE:
The course aims at providing the student with the concepts related to data warehousing, online analytical processing (OLAP) and various techniques used for the functionalities of data mining

SYLLABUS:

UNIT-I
Data Warehousing and Online Analytical Processing: Data Warehouse-Basic Concepts, **Data Warehouse Modeling:** Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction.

UNIT-II
Data Mining: Introduction, Why Data Mining, What is Data Mining, What kinds of Data can bemined, What kind of patterns can be mined, Which Technologies Are Used, Which Kinds of Applications are Targeted, Major issues in data mining.
Getting to Know Your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity.

UNIT-III
Data Preprocessing: Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.
Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Frequent Item set Mining Methods, Pattern Evaluation Methods.

UNIT-IV
Classification: Basic concepts, Decision Tree Induction, Bayes Classification Methods, Rule- Based classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy.
Cluster Analysis: Basic concepts, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering.

UNIT-V

Outlier Detection: Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Proximity-Based Approaches, Clustering-Based Approaches, Classification-Based Approaches.

Data Mining Trends and Research Frontiers: Mining Complex Data Types, Data Mining Applications, Data Mining and Society, Data Mining Trends.

TEXT BOOK:

"Data Mining – Concepts and Techniques", Jiawei Han & Micheline Kamber, Elsevier,Third Edition, 2014.

REFERENCE BOOKS:

"Data Warehousing, Data Mining &OLAP", Alex Berson and Stephen J. Smith,TataMcGraw-Hill, Tenth reprint,2007.

"Building the Data Warehouse", W. H. Inmon, Wiley Dreamtech India Pvt.Ltd., FourthEdition, 2008.

"Data Mining Techniques", Arun K Pujari, Universities Press (India) Private Limited,Eighth Impression, 2005.

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: analyze the data through multi-dimensional data warehouse model

CO 2: define the types of the data to be mined and apply appropriate data mining techniques

CO 3: discuss preprocessing statistical methods for any given raw data

CO 4: evaluate the accuracy of supervised and unsupervised models and algorithms

CO 5: produce interesting patterns from large amounts of data that can be used for further analysis

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III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

PYTHON PROGRAMMING FOR EMERGING TECHNOLOGIES
(Open Elective – I)

PRE-REQUISITE:

1. A course on "Programming for Problem Solving"

COURSE OBJECTIVE:

This course will enable students to learn Syntax and Semantics and create Functions, handle Strings and Files, understand Lists, Dictionaries and Regular expressions, implement Object Oriented Programming concepts in Python.

SYLLABUS:

UNIT-I

Python Basics, PythonObjects- Python Objects, Other Built-in Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types.

Numbers: Introduction to Numbers, Integers, Double Precision Floating Point Real Numbers, Complex Numbers, Operators, Built-in and Factory Functions.

Sequences - Strings, Lists, and Tuples

Mapping and Set Types

Conditionals and Loops

UNIT-II

Files: File Objects, File Built-in Function [open() and file()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution.

Functions and Functional Programming: Calling Functions, Creating Functions, Passing Functions, Formal Arguments, Variable-Lenth arguments, Functional Programming, Variable Scope, *Recursion, Generators.

Modules: Modules and Files, Namespaces, Importing Modules, Features of Module Import, Module Built-in Functions, Packages

UNIT-III

Regular Expressions: Introduction, Special Symbols and Characters, REs and Python

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

Database Programming: Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers (ORMs)

UNIT-IV

NumPy, SciPy: Introduction, N-dimensional Array in NumPy, Numpy Arrays and Operations, SciPy Basics, Broadcasting in NumPy Array Operations, Array Indexing in NumPy, Constants in NumPy, np.linspace, Understanding np.meshgrid(), Using NumPy, SciPy for Getting Some Basic Information about a Matrix.

Pandas: Open Source Data Analysis and Manipulation Tool: Introduction, Basics of pandas, Using Pandas to Open csv Files

UNIT-V

SymPy: Introduction, The "symbols()" Function, Importing Symbols from Module sympy.abc, Equality Testing in SymPy using "==", Numeric Types, Using Operators on Combination of SymPy Objects and Python Objects, Substitution in a SymPy expression, Convert Python Strings to SymPy Expression and Evaluating it(Functions sympify() and evalf()), Singleton Class in SymPy, Functions in SymPy, Lambda Class in SymPy, Matrices, The linsolve() Method, Differentiation, Integration.

Matplotlib, Introduction, An Analogy to Understand Matplotlib, The Figure Class and the Axes Class, Method matplotlib.pyplot.subplot(), Primitives, Creating a Single Plot (no subplots), Format String, Draw sin(x) and cos(x) on Same Plot Using plot(),The Spines and Ticks of a Plot, The plot() Method of pyplot, Draw a Chess-board using Matplotlib, Creating Multiple Subplots, Creating Subplots using subplot() and subplots(), Creating Multiple Figure Objects, Difference between add_axes() and add_subplot(), Creating Scatter Plots, Histograms, Bar-plots and Contour Plots.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Python Programming – Problem Solving, Packages, and Libraries, Anurag Gupta, GP Biswas, McGraw Hill

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press
2. Python for Data Science, Mohd.Abdul Hameed, Wiley

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions

CO 2: Demonstrate proficiency in handling Strings and File Systems

CO 3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions

CO 4: Interpret the concepts of Object-Oriented Programming as used in Python

CO 5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
COURSE STRUCTURE

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

ETHICAL HACKING
OPEN ELECTIVE -I

PRE-REQUISITES:
1. Courses on "Operating Systems, Computer Networks, Network Security and Cryptography".

COURSE OBJECTIVE:
The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security

SYLLABUS:
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 Around or Attack, Elements of Enumeration, Preparing for the Next Phase.
Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network.

UNIT-V

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation
Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy.

TEXT BOOK:

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press.

REFERENCE BOOKS:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning.

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: Describe the basics of ethical hacking
CO 2: Discuss the methods of risk analysis and ethical hacking
CO 3: Plan for a controlled attack
CO 4: Acquaint the role of politics, inherent and imposed limitations, and metrics for the planning of a test.
CO 5: Exploit incident management and security policies

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)
COURSE STRUCTURE

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

CYBER LAWS
OPEN ELECTIVE - I

PRE-REQUISITES:

A Courses on "Computer Networks, Network Security & Cryptography"

COURSE OBJECTIVE:

The Objectives of This Course Is to enable students To Understand, Explore, And Acquire A Critical Understanding of Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes.

SYLLABUS:

UNIT-I

Cyber Law : The Legal Perspectives: Introduction, Cybercrime and the Legal Landscape around the World, Why do we need cyber laws: the Indian context, the Indian IT act.

Traditional Computer Crime: Early Hacker and Theft of Components Traditional problems, Recognizing and Defining Computer Crime, Phreakers: Yesterday's Hackers, Hacking, Computers as Commodities, Theft of intellectual Property.

UNIT-II

Talking to the police, Search Seizure, Arrest: When it happens What it means, Eye witness identification: Pschycology & Procedures.

Booking and Bail: Checking In and Out of Jail, From Suspect to Defendant, Criminal Defense Lawyers, A Walk Through Criminal Court

UNIT-III

The Information Technology Act, 2000: Scope of the Act, Important provisions, Secure Electronic Records and Secure Digital Signatures, Regulation of certifying Authorities, Digital Signature Certificates, penalties and Adjudication, Offences.

UNIT-IV

Web-Based Criminal Activity, Interference with Lawful Use of Computer Malware, DoS (Denial of Service) and DDoS (Distributed Denial of Service) Attacks, Spam, Ransomware and Kidnapping of Information, Theft of Information, Data Manipulation, and Web Encroachment, Dissemination of Contraband or Offensive materials, Online Gambling Online Fraud, Securities Fraud, and stock Manipulation, Ancillary crimes.

UNIT-V

Identity Theft And Identity Fraud: Typologies of Internet Theft/ Fraud, Prevalence and Victimology, Physical Methods of Identity Theft, Virtual and Internet Facilitated methods, Crimes facilitated by Identity theft/fraud, Organized Crime and Technology.

TEXT BOOK:

1. Marjie T. Britz, "Computer Forensics and Cyber Crime An Introduction", Pearson.
2. Paul Bergman, J.D. & Sara J.Berman, J.D, " The Criminal Law Handbook", 12th Edition, Nolo.
3. Bernard L.Menezes, "Cryptography, Network Security, and Cyber Laws", CENGAGE

REFERENCE BOOKS:

1. Vivek Sood, "Cyber Law Simplified", Tata McGraw Hill
2. Cyber Laws Texts and Cases, Ferrera, CENGAGE

COURSE OUTCOMES:

At the end of the course, students will be able to

CO 1: Identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional.

CO 2: Locate and apply case law and common law to current legal dilemmas in the technology field.

CO 3: Use In-Depth-Knowledge of Information Technology Act and Legal Frame Work of Right to Privacy, Data Security and Data Protection.

CO 4: Identify diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriate actions on Online Fraud.

CO 5: Explore The Legal And Policy Developments In Various Countries on Identity Theft.

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)

Subject code: 18HS0EN04

L	T	P	C
3	0	0	3

Course Title: Effective Technical Communication
B.Tech (Common to all Branches)

Course Objectives

The main objective of this course is to impart advance technical communication skills to students in terms of research, writing, editing, and design principles of technical and professional communication. Further, the course prepares students to design effective technical documentation such as Planning, drafting, revising, editing, researching, analyzing, synthesizing and applying information to create technical reports and professional documents through individual and collaborative writing to articulate complex ideas appropriate for target audiences. Moreover, the course inculcates business and professional ethics.

Learning Out comes:

At the end the course students will be able to:

1. Understand the ethical, international, social, and professional constraints of audience, style, and content for writing situations and communicate effectively a.) among managers or co-workers and colleagues of an organization, and b.) between organizations, or between an organization and the public.

2. Understand professional writing by studying management communication contexts and genres, researching contemporary business topics, analyzing quantifiable data discovered by researching, and constructing finished professional workplace documents.

3. Practice the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices and to present technical material orally with confidence and poise.

4. Develop employability skills like time management, values and beliefs, self-esteem, perception and attitude, problem-solving skills and creativity.

Syllabus

	Effective Technical Communication	3L:0T:0P	3credits

Unit I

Information Design and Development- Different kinds of technical documents. Information development life cycle. Organization structures, factors affecting information and document design.

Unit II

Technical Writing, Grammar and Editing- Technical writing process. Writing drafts and revising. technical writing style and language, editing strategies to achieve appropriate technical style. Basics of grammar, Introduction to advanced technical communication.

Unit III

Self Development and Assessment- Self assessment. Awareness, Perception and Attitudes. Values and belief, Personal goal setting, career planning. Self-esteem. Managing Time: Personal memory, Rapid reading. Taking notes; Complex problem solving; Creativity.

Unit IV

Communication and Technical Writing- Public speaking. Oral presentation. . Graphic presentation. Presentation aids. Group discussion. Interviews. Personality Development. Writing reports, project proposals, technical articles, manuals, official notes, business letters, memos, minutes of meetings, event report.

Unit V

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone

Etiquettes, Engineering ethics, Role and responsibility of engineer. Work culture in jobs.

Text/Reference Books:

David E. Beer and David McMurrey, Guide to writing as an Engineer, John Willey, New York, 2004

Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)

Shiv Khera, You Can Win, Macmillan Books, New York, 2003

Raman Sharma, Technical Communications, Oxford Publication, London, 2004.

Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)

Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.

Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

19/06/19

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JNTUH, Nominee

19/6/19

Dr. N.V.S.N. Lakshmi
Subject Expert (JNTUH)

Dr. Jayashree Mohan Raj
Subject Expert (EFLU)

19/6/19

Dr.G.Anjaneyulu
Chairperson (BOS) GNITC

19/6/2019

Dr. M. Sridhar
Member,GNITC

Priti

Ms. Priti
Member, GNITC

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
0	0	3	1.5

NETWORK SECURITY & CRYPTOGRAPHY LAB

CO-REQUISITE:

1. A Course on "Network Security and Cryptography"

COURSE OBJECTIVE:

This lab course is intended to impart practical knowledge on network security concepts and mechanisms, practically analyze and monitor network communication in order to overcome security threats and analyze the network protocols, and configure applications for enhancing security

LIST OF PROGRAMS:

1. Write a program to perform encryption and decryption using the following substitution ciphers.
   - Caesar cipher
   - Play fair cipher
   - Hill Cipher
2. Write a program to implement the DES algorithm.
3. Write a program to implement the Blowfish algorithm.
4. Write a program to implement RSA algorithm.
5. Implement the Diffie-Hellman Key Exchange mechanism.
6. Calculate the message digest of a text using the SHA-1 algorithm.
7. Calculate the message digest of a text using the MD5 algorithm.
8. Working with sniffers for monitoring network communication (Wireshark).
9. Configuring S/MIME for email communication.
10. Using Snort, perform real time traffic analysis and packet logging.

TEXT BOOK:

1. "Cryptography and Network Security" by William Stallings 3rd Edition,Pearson Education.
2. "Applied Cryptography" by Bruce Schneier.

REFERENCE BOOKS:

1. Cryptography and Network Security by Behrouz A.Forouzan.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Identify the various network security algorithms and protocols

CO2: Classify the network protocols and communication network

CO3: Apply the network protocols, and configure applications for enhancing security

CO4: Working with sniffers for monitoring network communication

CO5: Analyze the traffic over the network during transmission of the data.

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
0	0	3	1.5

DATA BASE MANAGEMENT SYSTEMS LAB

CO-REQUISITE:

1. A course on "Data Base Management Systems"

COURSE OBJECTIVE:

This lab course is intended to describe the SQL basics for data definition, data manipulation and introduce ER data model, database design and normalization

SOFTWARE REQUIREMENTS:

Oracle / MySql

SYLLABUS:

LIST OF TASKS

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, GROUP BY, 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. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, 5th Edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for 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.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO 1: design database schema for a given application
CO 2: apply normalization
CO 3: acquire skills in using SQL commands for data definition and data manipulation
CO 4: develop solutions for database applications using procedures
CO 5: employ cursors and triggers

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Subject Code: 18MC0CH01

L	T	P	C
3	0	0	0

Course Title: Environmental Science (Mandatory Course)
B.Tech Common to All Branches

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

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, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, 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, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: 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:** Wastewater Treatment methods: Primary, secondary, and Tertiary. Overview of air pollution control technologies; Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate 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. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life 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).

Towards Sustainable Future: Concept of Sustainable Development Goals, 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 life style.

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 Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-II

L	T	P	C
3	0	0	3

CYBER SECURITY

PRE-REQUISITES:
A Courses on "Computer Networks"

COURSE OBJECTIVE:
This course is introduced to familiarize various types of cyber-attacks and cyber-crimes, give an overview of the cyber laws and study the defensive techniques against these attacks.

SYLLABUS:

UNIT-I

Introduction:

Web and Network Basics: Networks, TCP/IP model, Protocols and ports, HTTP. Remote access protocols, SSH, Deploy Apache.

Cryptography: Why we need cryptography, Various ciphers, Modern algorithms, Encryption in Node. js, Python cryptography, Stegano graphy, Images, Audio encryption, Digital watermarking.

UNIT-II

Hacking overview: Case histories – a context and background of hacks and hacker's motivations, Viruses, Deception, File replication, Trojan, Botnets, DDoS, Motivations behind malware, Spoofing email – the basis of phishing attack, Bots and automated mechanisms.

Packet analysis and penetration testing: Packet sniffing, Wireshark, Analyzing malware – Trickbot.

UNIT-III

Social engineering: Phishing, Social engineering process, Social engineering countermeasures, Software protection, Search Sources, Media – documents, Online tracing with IP addresses and presence

Cyber countermeasures: Introduction, Training, Firewalls, Linux, Cloud, Shields, Malware detection, Websites, Antivirus, Ransomware, Keep backups.

UNIT-IV

Incident response and mitigation: Malware outbreak, Misunderstanding threats, Mistiming of response, Gauging the severity of an incident, The notification process, Timing of breach notifications, Data privacy and protection in the United States, Basic CIS controls, Post-incident analysis and applying gained insights

Digital forensics: Information retrieval, Mobile forensics, Kali Linux, Parrot, Collection, Targeted searches, Constructing timelines and events, Computer storage analysis.

UNIT-V

Counter surveillance in a cyber-intrusive world: Where is detection of an individual in the electronic domain possible?, Strategies for avoidance, Deletion, Obfuscation, Network, Tor, Identity, Defeating profiling and identity capture, Obfuscation agents and automated stealth **Securing the Internet of Things (IoT):** Introduction, The use of crypto-integrated circuits, Comparison of crypto ICs, Wi-Fi connection, Cloud connectivity and dashboard, Security by design in IoT devices, Network devices with possible network weaknesses, Arduino IoT

TEXTBOOK:

1. Ralph Moseley , "Advanced Cyber Security Technologies", CRC Press
2. Nina Godbole and Sunit Belpure, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley.

REFERENCE BOOKS:

1. James Graham, Richard Howard and Ryan Otson, "Cyber Security Essentials", CRC Press.
2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, "Computer and Cyber Security: Principles Algorithm, Applications, and Perspectives", CRC Press.
3. Chwan-Hwa(john) Wu, J. David Irwin, "Introduction to Cyber Security"

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: Understand the concept of network basics and cryptography
CO 2: Identify Spoofing E-Mail and Packet sniffing
CO 3: Locate different malwares.
CO 4: Find threats
CO 5: Analyze different cyber-crimes.

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-II

L	T	P	C
3	0	0	3

CYBER LAWS

PRE-REQUISITES:
A Courses on "Computer Networks, Network Security & Cryptography"

COURSE OBJECTIVE:
The Objectives of This Course Is to enable students To Understand, Explore, And Acquire A Critical Understanding of Cyber Law. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes.

SYLLABUS:

UNIT-I

Cyber Law : The Legal Perspectives: Introduction, Cybercrime and the Legal Landscape around the World, Why do we need cyber laws: the Indian context, the Indian IT act.

Traditional Computer Crime: Early Hacker and Theft of Components Traditional problems, Recognizing and Defining Computer Crime, Phreakers: Yesterday's Hackers, Hacking, Computers as Commodities, Theft of intellectual Property.

UNIT-II

Talking to the police, Search Seizure, Arrest: When it happens What it means, Eye witness identification: Pschycology & Procedures.

Booking and Bail: Checking In and Out of Jail, From Suspect to Defendant, Criminal Defense Lawyers, A Walk Through Criminal Court

UNIT-III

The Information Technology Act, 2000: Scope of the Act, Important provisions, Secure Electronic Records and Secure Digital Signatures, Regulation of certifying Authorities, Digital Signature Certificates, penalties and Adjudication, Offences.

UNIT-IV

Web-Based Criminal Activity, Interference with Lawful Use of Computer Malware, DoS (Denial of Service) and DDoS (Distributed Denial of Service) Attacks, Spam, Ransomware and Kidnapping of Information, Theft of Information, Data Manipulation, and Web Encroachment, Dissemination of Contraband or Offensive materials, Online Gambling Online Fraud, Securities Fraud, and stock Manipulation, Ancillary crimes.

UNIT-V

Identity Theft And Identity Fraud: Typologies of Internet Theft/ Fraud, Prevalence and

Victimology, Physical Methods of Identity Theft, Virtual and Internet Facilitated methods, Crimes facilitated by Identity theft/fraud, Organized Crime and Technology.

TEXT BOOK:

1. Marjie T. Britz, "Computer Forensics and Cyber Crime An Introduction", Pearson.
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REFERENCE BOOKS:

1. Vivek Sood, "Cyber Law Simplified", Tata McGraw Hill
2. Cyber Laws Texts and Cases, Ferrera, CENGAGE

COURSE OUTCOMES:

At the end of the course, students will be able to

CO 1: Identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional.

CO 2: Locate and apply case law and common law to current legal dilemmas in the technology field.

CO 3: Use In-Depth-Knowledge of Information Technology Act and Legal Frame Work of Right to Privacy, Data Security and Data Protection.

CO 4: Identify diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriate actions on Online Fraud.

CO 5: Explore The Legal And Policy Developments In Various Countries on Identity Theft.

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-II

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ETHICAL HACKING

PRE-REQUISITES:
1. Courses on "Operating Systems, Computer Networks, Network Security and Cryptography".

COURSE OBJECTIVE:
The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security

SYLLABUS:

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 Around or Attack, Elements of Enumeration, Preparing for the Next Phase.
Exploitation: Intuitive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network.

UNIT-V

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation

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

TEXT BOOK:

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press.

REFERENCE BOOKS:

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning.

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: Describe the basics of ethical hacking

CO 2: Discuss the methods of risk analysis and ethical hacking

CO 3: Plan for a controlled attack

CO 4: Acquaint the role of politics, inherent and imposed limitations, and metrics for the planning of a test.

CO 5: Exploit incident management and security policies

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COURSE STRUCTURE
(Applicable for the Batch admitted from 2021-2022)

III Year B.Tech, Sem- II

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CLOUD SECURITY
Professional Elective - II

Course objectives:

1. Identify the technical foundations of cloud systems architectures.

UNIT 1:

Security in the Cloud: Overview, Cloud Security Challenges, Software-as-a-Service Security, Security Management, Security Governance, Risk Management, Risk Assessment, Security Portfolio Management, Security Awareness, Policies, Standards, and Guidelines, Secure Software Development Life Cycle (SecSDLC), Security Monitoring and Incident Response, Third-Party Risk Management, Security Architecture Design, Vulnerability Assessment, Password Assurance Testing, Logging for Compliance and Security investigations, Security Images, Data Security, Application Security, Virtual Machine Security, Physical Security.

UNIT 2:

Common Standards in Cloud Computing: The Open Cloud Consortium, The Distributed Management Task Force, Standards for Application Developers, Standards for Messaging, Standards for Security.

Mobile Internet Devices and the Cloud: What Is a Smartphone?, Mobile Operating Systems for Smartphones, Mobile Platform Virtualization, Collaboration Applications for Mobile Platforms, Future Trends.

UNIT 3:

Cloud Computing Software Security Fundamentals: Cloud Information Security Objectives, Confi dentiality, Integrity, and Availability, Cloud Security Services, Relevant Cloud Security Design Principles, Secure Cloud Software Requirements, Secure Development Practices, Approaches to Cloud Software Requirements Engineering, Cloud Security Policy Implementation and Decomposition, Decomposing Critical Security Issues into Secure Cloud, Secure Cloud Software Testing.

UNIT 4:

Cloud Computing Security Challenges: Security Policy Implementation, Policy Types, Computer Security Incident Response Team (CSIRT), Virtualization Security Management, Virtual Threats, VM Security Recommendations, VM-Specifi c Security Techniques.

Cloud Computing Security Architecture: General Issues, Trusted Cloud Computing,, Secure Execution Environments and Communications, Autonomic Security.

UNIT 5:

Cloud Computing Life Cycle Issues: Standards, Jericho Forum, The Distributed Management Task Force (DMTF), The International Organization for Standardization (ISO), The European Telecommunications Standards Institute (ETSI), The Organization for the Advancement of Structured

Information Standards (OASIS), Storage Networking Industry Association (SNIA), Open Grid Forum (OGF), The Open Web Application Security Project (OWASP), Layered Security and IDS, Computer Security and Incident Response Teams.

COURSE OUTCOMES:

By the end of the course, students will be able to

CO1: Understand the concept of Cloud Security.

CO2: Apply principles of best practice in cloud application design and management.

CO3: Analyze the problems and solutions to cloud application problems.

CO4: Identify and define technical challenges for cloud applications and assess their importance.

CO5: Discuss system, network, and storage virtualization and outline their role in enabling the cloud computing system model.

TEXT BOOK:

1. John W Ritting house, James F Ransome, "Cloud computing Implementation, Management & Security" ,CRC Press.

2. Ronald L Crutz,Russell dean vines,"Cloud Security",Wiley.

REFERENCE BOOK:

1. Chris Dotson, "Practical Cloud Security: A Guide for Secure Design and Deployment "1st Edition ,O'REILLY .

2. Raj Samani, Jim Reavis, "CSA Guide to Cloud Computing: Implementing Cloud Privacy and Security", 1st Edition,SYNGRESS.

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(Applicable for the Batch admitted from 2021-2022)

III Year B.Tech. Sem-II

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MACHINE LEARNING
Professional Elective – II

PRE-REQUISITES:
Courses on "Operating Systems, Design and Analysis of Algorithms".

COURSE OBJECTIVE:
This course is intended to learn the basic concepts and techniques of machine learning, understand supervised and unsupervised learning techniques and to study the various probability based learning techniques along with graphical models of machine learning algorithms

SYLLABUS:

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

UNIT-II
Linear Models: Multi-layer Perceptron –Going Forwards –Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice –Examples of using the MLP –Overview –Deriving Back-Propagation –Radial Basis Functions and Splines –Concepts –RBF Network –Curse of Dimensionality – Interpolations and Basis Functions –Support Vector Machines.

UNIT-III
Tree and Probabilistic Models: Learning with Trees –Decision Trees –Constructing Decision Trees – Classification and Regression Trees –Ensemble Learning –Boosting –Bagging –Different ways to Combine Classifiers –Probability and Learning –Data into Probabilities –Basic Statistics –Gaussian Mixture Models –Nearest Neighbor Methods –Unsupervised Learning –K means Algorithms –Vector Quantization –Self Organizing Feature Map.

UNIT-IV
Dimensionality Reduction and Evolutionary Models: Dimensionality Reduction –Linear Discriminant Analysis –Principal Component Analysis –Factor Analysis –Independent Component Analysis –Locally Linear Embedding –Isomap –Least Squares Optimization –Evolutionary Learning –Genetic algorithms –Genetic Offspring: -Genetic Operators –Using Genetic Algorithms –Reinforcement Learning –

Overview –Getting Lost Example –Markov Decision Process.

UNIT-V

Graphical Models: Markov Chain Monte Carlo Methods –Sampling –Proposal Distribution –Markov Chain Monte Carlo –Graphical Models –Bayesian Networks –Markov Random Fields –Hidden Markov Models –Tracking Methods.

TEXT BOOKS:

1. Stephen Marsland, "Machine Learning –An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, "Machine Learning", First Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", First Edition, Cambridge University Press, 2012.
2. Jason Bell, "Machine learning –Hands on for Developers and Technical Professionals", First Edition, Wiley, 2014.
3. Ethem Alpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", Third Edition, MIT Press, 2014.

COURSE OUTCOMES:

After completion of the course, students should be able to

CO 1: distinguish supervised, unsupervised and semi-supervised learning
CO 2: apply appropriate machine learning strategy for any given problem
CO 3: describe probabilistic models for classification and regression
CO 4: apply evolutionary models to improve classification efficiency
CO 5: design systems that uses the appropriate graphical models of machine learning

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III Year B.Tech. Sem-II

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OBJECT ORIENTED ANALYSIS AND DESIGN USING UML
Professional Elective – II

PRE-REQUISITE:

A Course on "Software Engineering/ Object Oriented Programming using JAVA"

COURSE OBJECTIVE:
To apply unified process phases
To apply unified modeling language for software design of any applications
To study case studies for OOAD

SYLLABUS:
UNIT - I
Introduction to UML: Importance of modeling, principles of modeling, object-oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.

UNIT - II
Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT– III
Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

UNIT - IV
Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT - V

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

TEXT BOOK:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education 2nd Edition
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY Dreamtech India Pvt. Ltd.

REFERENCE BOOKS:

1. Meilir Page-Jones: Fundamentals of Object-Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY-Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.

COURSE OUTCOMES:

Will be able to use UML notations

CO1: The core aspects of UML Language
CO2: The conceptual model of Unified Modelling Language
CO3: Can apply the unified process in software development
CO4: Will be able to perform analysis and design using object modeling
CO5: Learn how to apply the UML to a number of common modeling problems using case studies.

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PRINCIPLES OF SOFTWARE DEVELOPMENT
Professional Elective – III

PRE-REQUISITES:
A course on "Object Oriented Programming through JAVA"

COURSE OBJECTIVE:
This course aims to analyze various software process models such as waterfall and evolutionary models, different software architectural styles and software testing approaches

SYLLABUS:

UNIT – I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT – II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT – III

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT – IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT – V

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiely.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML Meiler page-Jones: Pearson Education.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO 1: apply the principles and techniques of software engineering and develop a business plan for a start-up software business

CO 2: prepare technical documentations and make presentations on various aspects of a software development

CO 3: employ software testing and quality assurance techniques at the module level

CO 4: evaluate the assumptions and arguments for improving the quality of the software and reducing the risk factors

CO 5: develop and maintain efficient, reliable and cost-effective software solutions

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III Year B.Tech. Sem-II

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INTERNET OF THINGS AND CYBER SECURITY
Professional Elective – III

PRE-REQUISITES:

A Courses on "Computer Networks, Network Security & Cryptography"

COURSE OBJECTIVE:
This course gives an overview of IoT system in security aspects and it course mainly focuses on current security risks IoT domain faces and countermeasure available for the known issues

SYLLABUS:

UNIT-I
Defining the IoT, Why cross-industry collaboration is vital, IoT uses today, The IoT in the enterprise, The IoT of the future and the need to secure
Vulnerabilities, Attacks, and Countermeasures: Primer on threats, vulnerability, and risks (TVR), Primer on attacks and countermeasures, Today's IoT attacks, Lessons learned and systematic approaches.

UNIT-II
Security Engineering for IoT Development: Building security in to design and development, Secure design, Technology selection – security products and services.
The IoT Security Lifecycle: The secure IoT system implementation lifecycle, Implementation and integration, Operations and maintenance, Dispose.

UNIT-III
Cryptographic Fundamentals for IoT Security Engineering: Cryptography and its role in securing the IoT, Types and uses of cryptographic primitives in the IoT, Hashes, Digital signatures, Cryptographic module principles, Cryptographic key management fundamentals, Examining cryptographic controls for IoT protocols, Future directions of the IoT and cryptography.

UNIT-IV
Identity and Access Management Solutions for the IoT: An introduction to identity and access management for the IoT, The identity lifecycle, Authentication credentials, IoT IAM infrastructure, Authorization and access control.

UNIT-V
Mitigating IoT Privacy Concerns: Privacy challenges introduced by the IoT, Guide to performing an IoT PIA, PbD principles, Privacy engineering recommendations.

TEXT BOOK:

1. Russell, Brian and Drew Van Duren, "Practical Internet of Things Security", Packet Publishing, 2016.

REFERENCE BOOKS:

1. Ollie Whitehouse, "Security of Things: An Implementers' Guide to Cyber-Security for Internet of Things Devices and Beyond", NCC Group, 2014.
2. Fei HU, "Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations", CRC Press,2016.

COURSE OUTCOMES:

At the end of the course, students will be able to

CO 1: comprehend IoT general models and security challenges
CO 2: identify IoT security and vulnerability threats
CO 3: realize different IoT protocols and their security measures
CO 4: describe how to secure an IoT environment
CO 5: discuss different IoT types of attacks

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DIGITAL FORENSICS
Professional Elective – III

PRE-REQUISITES:
1. Courses on "Computer Networks, Network Security and Cryptography".

COURSE OBJECTIVE:
This course is introduced to define and cite appropriate instances for the application of computer forensics

SYLLABUS:

UNIT-I

Computer Forensics Fundamentals: What is Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics services, Benefits of professional Forensics Methodology, Steps to use computer forensics specialists.

Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement.

UNIT-II

Types of Vendor and Computer Forensics Services: Occurrence of Cyber Crime, Cyber Detectives, Fighting Cyber Crime with Risk-Management Techniques.

Data Recovery: Data Recovery Defined, Data Back-up and Recovery, the Role of Back-up in Data Recovery, The Data-Recovery Solution.

Evidence Collection and Data Seizure: Why Collect Evidence, Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving.

UNIT-III

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving Computer Forensic Evidence.

Computer Image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation.

Discovery of Electronic Evidence: Electronic Document Discovery, A Powerful new Litigation Tool.

UNIT-IV

Identification of Data: Time Keeping, Forensic Identification and Analysis of Technical Surveillance Devices.

Reconstructing Past Events: How to become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Networks: Network Forensics Scenario, A Technical Approach, Destruction of E-mail, Damaging

Computer Evidence, Documenting the Intrusion on Destruction of Data.

UNIT-V

Fighting Against Macro Threats: Defensive Strategies for Governments and Industry Groups: Is the U.S. Government Prepared for Information Warfare?, Are Other Governments Prepared for Information Warfare?, What Industry Groups Have Done to Prepare for Information Warfare, Strategic Diplomacy and Information Warfare.

The Information Warfare Arsenal of the Future: Weapons of the Future, The Global Positioning System, Snoop, Sniff, and Snuff Tools, Email Wiretaps Like Carnivore Can Steal Sensitive Correspondence, IW Weapons of the Future, Nanotechnology

Surveillance Tools for Information Warfare of the Future: Monitoring Everything, Cyber Surveillance, The Cyber Footprint and Criminal Tracking, The Implications of Cookies and Integrated Platforms

TEXT BOOK:

1. John R.Vacca, "Computer Forensics Computer Crime Scene Investigation", Networking Series, Firewall Media.

REFERENCE BOOKS:

1. "Practical Mobile Forensics: Forensically investigate and analyze iOS, Android, and Windows 10 devices", 4th Edition, Rohit Tamma.
2. "Practical Guide to Computer Forensics Investigations", Darren Hayes.

COURSE OUTCOMES:

Upon completion of this course, students should be able to

CO 1: explain the basics of computer forensics and its types
CO 2: describe various types of services computer forensics offered by different vendor
CO 3: learn different techniques of duplication and preservation of digital evidence
CO 4: apply different methods of reconstructing past events
CO 5: acquaint with different surveillance tools for information warfare of the future

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III Year B.Tech. Sem-II

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CYBER SECURITY LAB

CO-REQUISITE:

2. A Course on "Cyber Security"

COURSE OBJECTIVES:

The student should be made to:

- To learn different cipher techniques
- To implement the algorithms DES,RSA,MD5,SHA-1
- To use network security tools and vulnerability assessment tools

LISTOFEXPERIMENTS:

1. Write a program to make study of different security protocols like WEP/ WPA2 PSK,802.1x EAP security protocol. And Implement RC4 Algorithm.
2. Write a Program to implement AES.
3. Write a program to perform Encryption / Decryption using Mono alphabetictechniques
4. Write a program to perform Encryption / Decryption using transposition technique.
5. Write a program for simple RSA algorithm to encrypt and decrypt the data.
6. Authenticating the given signatures using SHA-1, MD5 hash algorithm.
7. Study of the features of firewall in providing security and to set Firewall Security inwindows.
8. Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
9. Study of different wireless network components and features of any one of theMobile Security Apps.
10. Automated Attack and Penetration Tools Exploring N-Stalker, Vulnerability Assessment Tool.
11. Defeating Malware-Building Trojans, Rootkit Hunter
12. Perform a wireless audit on an access point or a router and decrypt WEP and WPA.(Net Stumbler).
13. Demonstrate intrusion detection system using any tool(Snort or any other software).
14. Demonstrate how to provide secure data storage, secure data transmission and forcreating digital signatures.

TEXTBOOKS:

1. Ralph Moseley , "Advanced Cyber Security Technologies", CRC Press

2. Nina Godbole and SunitBelpure, "Cyber Security Understanding Cyber Crimes,Computer Forensics and Legal Perspectives", Wiley.

REFERENCE BOOKS:

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

2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, "Computer and Cyber Security: Principles Algorithm, Applications, and Perspectives", CRC Press.

3. Chwan-Hwa(john) Wu, J. David Irwin, "Introduction to Cyber Security"

COURSE OUTCOMES:

At the end of the course, the student should be able to

CO1: Develop code for classical Encryption Techniques to solve the problems. **CO2:**Build cryptosystems by applying symmetric and public-key encryptionalgorithms.

CO3: Construct code for authentication algorithms.

CO4: Develop a signature scheme using Digital signature standards.

CO5: Demonstrate the network security system using open-source tools

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Dr. S. Madhu
Member, BOS

Dr. M. I. Thariq Hussan
Member, BOS

Mr. K. Gopi
Member, BOS

Mr. V. Devasekhar
Member, BOS

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-II

L	T	P	C
0	0	3	1.5

ETHICAL HACKING LAB

CO-REQUISITE:

1. A Course on "Ethical Hacking"

COURSE OBJECTIVE:

The aim of the course is to introduce the methodologies and various tools of ethicalhacking to get awareness in enhancing the security.

LIST OF PROGRAMS:

1. Perform reconnaissance to find all the relevant information on selected website using 10 network information gathering tools.
2. Gather information using Social Networking sites and google Dorks.
3. (i)Perform active reconnaissance using Angry IP Scanner, Soft perfect Network Scanner, Cain&Able(ii) Perform Network Scanning using NMAP in windows and ZENMAP in kali Linux Software Based
4. (i) Install Wireshark and apply filters to gather different information (ii)Find the link accessed by the victim using Wireshark
5. Perform Session hijacking/ find credentials of unsecure real time website using Wireshark
6. Use Nessus tool to find all the vulnerabilities with its level and generate a report for an organization
7. (i) Execute basic commands of Linux(ii) Use CHMOD command to change the privileges and permissions
8. Generate Word list from using wordlist generator Crunch.
9. Exploit windows to gain access of victim's machine using Metasploit framework
10. (i) Install Hiren Boot in bootable pen drive(ii) Perform windows Login Bypass Hiren Boot or active password changer
11. Perform Kali Linux Login Bypass in virtual machine. Perform MAC Login Bypass invirtual machine
12. Create Trojan and Exploit victim's machine by taking its complete access

13. Track keystrokes of victim machine using Ardamax Keylogger
14. Exploit Windows XP using Metasploit
15. Exploit Windows 7 using Metasploit

TEXTBOOK:

1. McClure S., Bray J.S. and Kurtz G., Hacking Exposed 7: Network Security Secretsand Solutions. 1st ed. Tata McGraw Hill, 2012.
2. Michael T. Simpson, "Ethical Hacking and Network Defense", CENGAGELearning Publications, India Edition.

REFERENCE BOOKS:

1. Graham J., Howard R., Olson R., Cyber Security Essentials, 1st ed. CRC Taylorand Francis, 2010.
2. "The Hacker's Underground Handbook", James Pendleton.
3. "Hacking: The Art of Exploitation", 2nd Edition, Jon Erickson.

COURSE OUTCOMES:

Upon successful completion of this course, the student will be able to

CO1: Conduct detailed reconnaissance using document metadata, search engines.

CO2: Utilize scanning tools to conduct comprehensive network sweeps, port scans, OSfingerprinting.

CO3: Recognize security vulnerabilities, such as weak configurations, and unpatchedsystems.

CO4: Apply penetration testing tools to exploit and investigate vulnerable systems.

CO5: Implementing on web application-based attacks

Dr. Ch. Subbalakshmi Chairman-BOS	Dr. A. Damodaram JNTUH Nominee	Dr. G. Narsimha Academic Council Nominee	Dr. Aruna Malapati Academic Council Nominee

Mr. Roop Kumar Raju Member, BOS	Dr. K Venkata Rao Member, BOS	Dr. Rishi Sayal Member, BOS	Dr. J Rajeshwar Member, BOS	Dr. S. Madhu Member, BOS

Dr. M. I. Thariq Hussan Member, BOS	Mr. K. Gopi Member, BOS	Mr. V. Devasekhar Member, BOS

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-II

L	T	P	C
3	0	0	0

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

PRE-REQUISITES: NIL

COURSE OBJECTIVE:

The course is introduced to familiarize the basic concepts of artificial intelligence, its relevance in the modern era and various applications

SYLLABUS:

UNIT- I

Introduction – What is artificial intelligence, foundations of artificial intelligence, history of artificial intelligence

Intelligent Agents – agents and environments, the structure, good behavior: the concept of rationality, the nature of environments, the structure of agents, applications of AI.

UNIT - II

Solving Problem by Searching – Problem solving agents, example problems, searching for solutions.

Uninformed Search Strategies – Breadth first search, uniform-cost search, depth first search, depth limited search, iterative deepening search, bidirectional search, comparing uninformed search strategies.

UNIT - III

Logical Agents – Knowledge-based agents, the wumpus world, logic, propositional logic: the very simple logic.

Knowledge Representation – Introduction, approaches to knowledge representation-relational knowledge, knowledge represented as logic, procedural knowledge, knowledge representation using semantic networks, inheritance in semantic net.

UNIT - IV

Expert System & Applications – Introduction, phases in building expert systems-knowledge engineering, knowledge representation, expert systems architecture-knowledgebase, inference engine, knowledge acquisition, expert systems versus traditional systems-characteristics of expert systems, evolution of expert systems, advantages and disadvantages of expert systems, languages for expert system development., applications of expert systems.

UNIT - V

Machine Learning Paradigm – Introduction, machine learning system-components of learning system, rote learning, learning by taking advice.

Supervised & Unsupervised Learning – supervised concept learning, unsupervised concept learning, reinforcement learning.

TEXT BOOKS:

1. Artificial Intelligence-A Modern Approach, 3rd Edition, Stuart J. Russell, Peter Norvig, Pearson Education.
2. Artificial Intelligence, Saroj Kaushik, Cengage Publication

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar B. Nair, 3rd Edition, McGraw Hill.
2. Principles of Artificial Intelligence, Nils J. Nilson, Morgan Kaufmann Publishers.
3. Artificial Intelligence, 3rd Edition, Patric Henry Winston, Pearson Education.
4. Artificial Intelligence Illuminated, Ben Coppin, Narosa Publication

COURSE OUTCOMES:

By the end of the course, students will be able to

CO 1: identify the importance of artificial intelligence
CO 2: apply various search strategies to provide efficient solutions for problem space
CO 3: comprehend various approaches for knowledge representation
CO 4: employ expert systems for knowledge engineering applications
CO 5: develop models using machine learning techniques

Dr. Ch. Subbalakshmi
Chairman-BOS

Dr. A. Damodaram
JNTUH Nominee

Dr. G. Narsimha
Academic Council Nominee

Dr. Aruna Malapati
Academic Council Nominee

Mr. Roop Kumar Raju
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Mr. V. Devasekhar
Member, BOS

Subject Code:18MC0CH01

L	T	P	C
3	0	0	0

Course Title: Environmental Science (Mandatory Course)
B.Tech Common to All Branches

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

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, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, 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, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: 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:** Wastewater Treatment methods: Primary, secondary, and Tertiary. Overview of air pollution control technologies;

Concepts of bioremediation. **Global Environmental Issues 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. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life 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).

Towards Sustainable Future: Concept of Sustainable Development Goals, 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 life style.

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 Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

Dr. N. Bhaskar
Chairman of BOS, Chemistry - GNITC

Dr. B. Rama Devi
Member, (JNTUH Nominee)

Dr. Ch. Venkatramana Reddy
Member, (Academic Council Nominee)

Dr. Ch. Jyotsna
Members, (Academic Council Nominee)

Mrs. N. Ch. Kalyani
Member, (GNITC Nominee)

Mrs. M. Sudha Rani
Member, (GNITC Nominee)

Mr. B. Srinivas
Member, (GNITC Nominee)

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)

Subject code: 18HS0EN04

L	T	P	C
3	0	0	3

Course Title: Effective Technical Communication
B.Tech (Common to all Branches)

Course Objectives

The main objective of this course is to impart advance technical communication skills to students in terms of research, writing, editing, and design principles of technical and professional communication. Further, the course prepares students to design effective technical documentation such as Planning, drafting, revising, editing, researching, analyzing, synthesizing and applying information to create technical reports and professional documents through individual and collaborative writing to articulate complex ideas appropriate for target audiences. Moreover, the course inculcates business and professional ethics.

Learning Out comes:

At the end the course students will be able to:

1. Understand the ethical, international, social, and professional constraints of audience, style, and content for writing situations and communicate effectively a.) among managers or co-workers and colleagues of an organization, and b.) between organizations, or between an organization and the public.

2. Understand professional writing by studying management communication contexts and genres, researching contemporary business topics, analyzing quantifiable data discovered by researching, and constructing finished professional workplace documents.

3. Practice the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices and to present technical material orally with confidence and poise.

4. Develop employability skills like time management, values and beliefs, self-esteem, perception and attitude, problem-solving skills and creativity.

Syllabus:

	Effective Technical Communication	**3L:0T:0P**	**3credits**

Unit I

Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design.

Unit II

Technical Writing, Grammar and Editing- Technical writing process, Writing drafts and revising, technical writing style and language, editing strategies to achieve appropriate technical style. Basics of grammar, Introduction to advanced technical communication.

Unit III

Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity.

Unit IV

Communication and Technical Writing- Public speaking, Oral presentation, , Graphic presentation, Presentation aids, Group discussion, Interviews, Personality Development. Writing reports, project proposals, technical articles, manuals, official notes, business letters, memos, minutes of meetings, event report.

Unit V

Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone

Etiquettes, Engineering ethics, Role and responsibility of engineer, Work culture in jobs.

Text/Reference Books:

David F. Beer and David McMurrey, Guide to writing as an Engineer, John Willey. New York, 2004

Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)

Shiv Khera, You Can Win, Macmillan Books, New York, 2003.

Raman Sharma, Technical Communications, Oxford Publication, London, 2004.

Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)

Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.

Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

19/06/19 19/6/19

Dr. V. Parvathi	Dr. N.V.S.N. Lakshmi	Dr. Jayashree Mohan Raj
JNTUH, Nominee	Subject Expert (JNTUH)	Subject Expert (EFLU)

Dr.G.Anjaneyulu	19/6/2019	Priti
19/6/19	Dr. M. Sridhar	Ms. Priti
Chairperson (BOS) GNITC	Member,GNITC	Member, GNITC