

**COURSE STRUCTURE
AND
DETAILED SYLLABUS**

CYBER SECURITY

M.TECH. TWO YEAR DEGREE COURSE

(Applicable for the batches admitted from 2020-21)



VAAGDEVI COLLEGE OF ENGINEERING

(Autonomous)

**Bollikunta, Warangal – 506 005
Telangana State, India**

VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
M.Tech (CYBER SECURITY)
COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-21 onwards)

I-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	C
1	M20CY01	Mathematical Foundation for Cyber Security	3	0	0	3
2	M20CS08	Network Security and Cryptography	3	0	0	3
		Program Elective-I				
3	M20CS03	Cloud computing	3	0	0	3
	M20CS04	Python Programming				
	M20CS05	Internet of Things				
		Program Elective-II				
4	M20CY02	Secure Software Design and Development	3	0	0	3
	M20CY03	Operating System Security				
	M20CS07	Artificial Intelligence				
5	M20CY04	Network Security and Cryptography Lab	0	0	4	2
		Program Elective-I Lab				
6	M20CS10	Cloud computing Lab	0	0	4	2
	M20CS11	Python Programming Lab				
	M20CS12	Internet of Things Lab				
7	M20MC01	Research Methodology and IPR	2	0	0	0
8	M20AC01	Audit Course-I	2	0	0	0
		English for Research Paper Writing				
			16	0	8	18

II-SEMESTER

S.No	Course Code	Course Title	L	T	P	C
1	M20CS27	Cyber Security	3	0	0	3
2	M20CY05	Web Application and Penetrating Testing	3	0	0	3
		Program Elective-III				
3	M20CS16	Machine Learning	3	0	0	3
	M20CS17	Digital Forensics				
	M20CS18	Blockchain Technology				
		Program Elective-IV				
4	M20CY06	Ethics and Law of Cyber Security	3	0	0	3
	M20CY07	Firewall and VPN Security				
	M20CY08	Big Data Analytics				
5	M20CY09	Ethical Hacking and Cyber Security Lab	0	0	4	2
6		Program Elective-III Lab				
	M20CS24	Digital Forensics Lab	0	0	4	2
	M20CS23	Machine Learning Lab				
	M20CY10	Block Chain Techology Lab				
7	M20CY11	Mini Project with seminar	0	0	4	2
8	M20AC02	Audit Course-II	2	0	0	0
		Stress Management				
		Total Credits	14	0	10	18

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III-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	C
1		Program Elective-V				
	M20CY12	Information Warfare	3	0	0	3
	M20CY13	Intrusion Detection				
	M20CY14	Social, Web and Mobile Analytics				
2		Open Elective				
	M20MA01	Advanced Optimization	3	0	0	3
	M20CE27	Waste Management				
	M20VL07	Embedded System Design				
3	M20CY15	Project / Dissertation Phase-I	0	0	20	10
		Total Credits	6	0	20	16

IV-SEMESTER

S.No	Course Code	Title of the Course	L	T	P	C
1	M20CY16	Project / Dissertation Phase-II	0	0	32	16
		Total Credits	0	0	32	16
		Grand Total				68

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****(M20CY01) MATHEMATICAL FOUNDATION OF CYBER SECURITY
(CORE COURSE – I)****M.Tech: I-Semester****L/T/P/C
3/ 0/ 0/ 3****Prerequisites:**

Mathematical Foundation for Computer Science , Probability and Statistics.

Course Objectives:

- To Provide fundamental concepts of linear algebra.
- To study advanced number theory concepts.
- To study probability models in Bayesian framework.

UNIT-I :

Graph Theory: Euler graphs, Hamiltonian paths and circuits, planar graphs, trees, rooted and binary trees, distance and centres in a tree, fundamental circuits and cut sets, graph colorings and applications, chromatic number, chromatic partitioning, chromatic polynomial, matching, vector spaces of a graph.

UNIT-II :

Analytic Number Theory: Euclid's lemma, Euclidean algorithm, basic properties of congruences, residue classes and complete residue systems, Euler-Fermat theorem, Lagrange's theorem and its applications, Chinese remainder theorem, primitive roots. Algebra: groups, cyclic groups, rings, fields, finite fields and their applications to cryptography.

UNIT-III :

Linear Algebra: vector spaces and subspaces, linear independence, basis and dimensions, linear transformations and applications.

UNIT-IV :

Probability and Statistics: introduction to probability concepts, random variables, probability distributions (continuous and discrete), Bayesian approach to distributions, mean and variance of a distribution, joint probability distributions, theory of estimation,

UNIT-V :

Bayesian methods of estimation. Random Processes: general concepts, power spectrum, discrete-time processes, random walks and other applications, Markov chains, transition probabilities.

Course Outcomes:

- Define the concepts related to the basics of group theory.
- Develop understanding of number theory algorithms.
- Discover different operations on algebraic structure.
- Derive the probability density function of transformation of random variables.
- Develop understanding of Bayesian framework.

Text Books/ Reference books:

1. R.P.Grimaldi, "Discrete and Combinatorial Mathematics", Fifth edition, Pearson Education, 2007.
2. K. H. Rosen, "Discrete Mathematics and its applications", Seventh Edition, Tata McGraw-Hill Publishing company limited, New Delhi, 2007.
3. H. Anton, "Elementary Linear Algebra", John Wiley & Sons, 2010.
4. N. Deo, "Graph theory with applications to Engineering and Computer Science", Prentice Hall of India, New Delhi, 1974.
5. T. M. Apostol, "Introduction to Analytic Number Theory", Springer, 1976.

6. Douglas C. Montgomery and George C. Runger, “Applied Statistics and Probability for Engineers”, Third Edition, John Wiley & Sons Inc., 2003.
7. A. Papoulis and U. Pillai, Probability, “Random Variables and Stochastic Processes”, Fourth Edition, McGraw Hill, 2002.
8. Ronald E. Walpole, Raymond H Myres, Sharon.L.Myres and Kying Ye, “Probability and Statistics for Engineers and Scientists”, Seventh Edition, Pearson Education, 2002.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS08) NETWORK SECURITY AND CRYPTOGRAPHY
(CORE COURSE – II)**

M.Tech: I-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Course Objectives:

- To explain the objectives of information security and importance and application of each of confidentiality, integrity, authentication and availability. Understand various cryptography concepts and techniques.
- To illustrate various symmetric key and asymmetric key cryptographic algorithms.
- To define the basic requirements of message authentication, hashing algorithms and Kerberos.
- To describe E-Mail Security with PGP, S/MIME and enhancements made to IPv4 by IPSec.
- To discuss the requirements of SSL, TLS, SET and understand intrusion detection, Firewalls.

UNIT – I

Security Concepts: Introduction, 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. (Text Book: Page no: 9 – 52)

UNIT – II

Symmetric key Ciphers: Block Cipher principles, Feistel Cipher Structure, DES algorithm, AES algorithm, Multiple Encryption and Triple DES, Block cipher operation, Stream ciphers, RC4. Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange. (Text Book: Page no: 63 – 291)

UNIT – III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512). Message authentication codes: Authentication requirements, HMAC, Digital signatures. Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service. (Text Book : Page no: 313-490)

UNIT – IV

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations. (Text Book: Page no: 590-650)

UNIT – V

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Firewall Design principles, Trusted Systems, Intrusion Detection Systems (Online Chapters and Appendices: Chapter 22, Chapter 23), Wireless Network Security. (Text Book: Page no: 522-585)

Course Outcomes:

After the completion of this course, the students should be able to

1. Identifies various types of vulnerabilities, attacks, mechanisms and security services.
2. Compare and contrast symmetric and asymmetric encryption algorithms.
3. Implementation of message authentication, hashing algorithms and able to understand Kerberos.
4. Explore the attacks and controls associated with IP, transport level, web and E-mail security.
5. Develop intrusion detection system, solutions for wireless networks and designing of various types of firewalls.

6. Understand the various wireless network vulnerabilities and implements different types of cryptographic techniques to improve wireless network security.

TEXT BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R 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, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS03) CLOUD COMPUTING
(PROGRAM ELECTIVE-I)**

M.Tech: I-Semester

**L/T/P/C
3/0/0/3**

Objectives:

- To learn the new computing model this enables shared resources on demand over the network.
- To learn about the pay-per-use scenarios.
- To learn about the new kind of service models and deployment models.
- To learn about the virtualization technology.
- To learn the python programming or various services and models.
- To develop cloud applications in Python

UNIT-I

Principles of Parallel and Distributed Computing, Introduction to cloud computing, Cloud computing Architecture, cloud concepts and technologies, cloud services and platforms, Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and Map reduce.

UNIT-II

Cloud Platforms for Industry, Healthcare and education, Cloud Platforms in the Industry, cloud applications. Virtualization, cloud virtualization technology, deep dive: cloud virtualization, Migrating in to cloud computing, Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems,

UNIT-III

Cloud computing Applications: Industry, Health, Education, Scientific Applications, Business and Consumer Applications, Understanding Scientific Applications for Cloud Environments, Impact of Cloud computing on the role of corporate IT. Enterprise cloud computing Paradigm, Federated cloud computing Architecture, SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

UNIT-IV

Python Basics, Python for cloud, cloud application development in python, Cloud Application Development in Python. Programming Google App Engine with Python: A first real cloud Application, Managing Data in the cloud, Google app engine Services for Login Authentication, Optimizing UI and Logic, Making the UI Pretty: Templates and CSS, Getting Interactive. Map Reduce Programming Model and Implementations.

UNIT-V

Cloud management, Organizational Readiness and change management in the cloud age ,Cloud Security,Data security in the cloud, Legal Issues in the Cloud , Achieving Production Readiness for the cloud Services

Course Outcomes:

After the completion of this course the students should be able to :

1. Discuss main concepts, key strengths, and limitations for cloud computing.
2. Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Explain the issues on cloud computing along with security, privacy, and interoperability.
4. Choose and use the appropriate technology, methods on these issues.
5. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.
6. Provide the appropriate solutions on cloud computing based on the application.

TEXT BOOKS:

1. Cloud Computing: Raj Kumar Buyya , James Broberg, andrzejGoscinski, 2013 Wiley
2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola,selvi-2013.
3. Cloud Computing: ArshdeepBahga, Vijay Madiseti, 2014, University Press.
4. Cloud computing: Dr Kumar Saurab Wiley India 2011.

**VAAGDEVI COLLEGE OF ENGINEERING
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**(M20CS04) PYTHON PROGRAMMING
(PROGRAM ELECTIVE-I)**

M.Tech: I-Semester

L/T/P/C
3/ 0/ 0/ 3**Course Objectives:**

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

UNIT – I

Introduction to Python: What is Python?, What is Python Good For?, Python History, How does Python Execute a Program, Review of a Simple Program, Some of the Basic Commands, Variables, Statements, Input/Output Operations, Keywords, Variables, Assigning values, Standard Data Types, Strings, Operands and operators.

UNIT – II

Understanding the Decision Control Structures: The if Statement, A Word on Indentation, The if ... else Statement, The if ... elif ... else Statement,

Loop Control Statements: The while Loop, The for Loop, Infinite Loops, Nested Loops.

The break Statement, The continue Statement, The pass Statement, The assert Statement, The return Statement.

UNIT – III

Functions- Function Definition and Execution, Scoping, Arguments: Arguments are Objects, Argument Calling by Keywords, Default Arguments, Function Rules, Return Values.

Advanced Function Calling: The apply Statement, The map Statement, Indirect Function Calls, Anonymous Functions.

UNIT - IV

Lists: List, Creating List, Updating the Elements of a List, Sorting the List Elements. Storing Different Types of Data in a List, Nested Lists, Nested Lists as Matrices, List Comprehensions.

Tuples: Creating Tuple, Accessing the Tuple Elements, Basic Operations on Tuples, Functions to Process Tuples, Nested Tuples, Inserting Elements in a Tuple, Modifying Elements of a Tuple, Deleting Elements from a Tuple.

Sets: Creating Set, Basic Operations on Sets, Methods of Set.

Dictionaries: Operations on Dictionaries, Dictionary Methods, Using for Loop with Dictionaries, Sorting the Elements of a Dictionary using Lambdas, Converting Lists into Dictionary.

UNIT – V

Modules: Importing a Module, Tricks for Importing Modules, Packages.

Exceptions and Error Trapping: What is an Exception?, Exception Handling: try..except..else..., try..finally..., Exceptions Nest, Raising Exceptions, Built-In Exceptions.

Files: Working with Files and Directories, File Processing, Controlling File I/O.

Course Outcomes:

1. Defining the fundamentals of writing Python scripts.
2. Expressing the Core Python scripting elements such as variables and flow control structures.

3. Apply Python functions to facilitate code reuse.
4. Extending how to work with lists and sequence data.
5. Implement file operations such as read and write
6. Implementing and Adapting the code robust by handling errors and exceptions properly.

TEXT BOOKS:

1. The Complete Reference-Python by Martin C. Brown, McGrawHill
2. Python Bible- Complete Python Language Reference by Dave Brueck and Stephen Tanner

REFERENCE BOOKS:

1. Python Programming for Beginners by AdamStewart
2. Python Essential Reference (3rd Edition) by David M.Beazleyf

**VAAGDEVI COLLEGE OF ENGINEERING
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**(M20CS05) INTERNET OF THINGS
(PROGRAM ELECTIVE-I)**

M.Tech:I-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Objectives:

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

UNIT-I:

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT Enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoT – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT-II:

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCONF, YANG- ETCONF, YANG, SNMP NETCONF

UNIT-III:

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

UNIT-IV:

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

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web server – Web server for IoT, Cloud for IoT, Python web application framework Designing a REST ful web API

Course Outcomes:

After the completion of this course the students should be able to :

1. Describe the basic terminology, latest technology along with its applications.
2. Discuss the protocols based on the concepts such as machine to machine.
3. Illustrate the IOT devices using Python Scripting Language.
4. Develop an application with Raspberry PI platform which can be widely used in many applications of IoT devices.
5. Implement it widely that can be used in many applications of IoT devices.
6. Design a web application framework on REST ful web API.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay

Madisetti, Universities Press, 2015, ISBN: 9788173719547

2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.

2. Richardo. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.

3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

4. Machine Learning by Peter Flach , Cambridge.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY02)SECURE SOFTWARE DESIGN AND DEVELOPEMENT
(PROGRAM ELECTIVE-II)**

M.Tech: I-Semester

L/T/P/C

3/ 0/ 0/ 3

Prerequisites: Software Engineering, Software Testing Methodologies, Computer Networks, Database Management Systems, Network Security and Cryptography

Course Objectives:

- To fix software flaws and bugs in various software.
- To make students aware of various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic.
- Techniques for successfully implementing and supporting network services on an enterprise scale and heterogeneous systems environment.
- Methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws.

UNIT-I:

Secure Software Design-Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.

UNIT-II:

Enterprise Application Development- Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a problem using technologies used in enterprise system, Present software solution.

UNIT-III:

Enterprise Systems Administration-Design, implement and maintain a directory based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services(DNS/DHCP/Terminal Services/Clustering/Web/Email).

UNIT-IV:

Obtain the ability to manage and troubleshoot a network running multiple services, understand the requirements of an enterprise network and how to go about managing them.

UNIT-V:

Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws, Case study of DNS server, DHCP configuration and SQL injection attack.

Course Outcomes:

- Differentiate between various software vulnerabilities.
- Explain the Software process vulnerabilities for an organization.
- Demonstrate the Monitor resources consumption in software.
- Explain the Interrelate security and software development process.
- Discuss the Case study of DNS server, DHCP configuration and SQL injection attack.

Text Books:

1. Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett
2. Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY03)OPERATING SYSTEM SECURITY
(PROGRAM ELECTIVE-II)**

M.Tech: I-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisites:

Operating System, Computer Networks, Database Management System, Ethical Hacking and Cyber Security

Course Objectives:

- Students will learn and apply basic concepts and methodologies of System Administration and Security by building from the ground up a miniature corporate network.
- To know some basic security measures to take in system administration.
- To prepare for possible disasters, including an understanding of backup and restoration of file systems.

UNIT-I:

Overview of Operating Systems-Introduction, Computer system organization and architecture, Operating system structure and operations, Process Management, Memory Management, file systems management Protection and security, Scheduling Algorithms, Interprocess Communication(TB1)

UNIT-II:

Operating Systems Protection: Protection Goals, Protection Threats, Access Control Matrix, Access Control Lists(ACL's), Capability Lists(C-lists), Protection systems, Lampson's access matrix, mandatory protection systems, Reference monitor, Secure operating system definition(TB1)

UNIT-III:

Operating System Security-Security Goals, Security Threats, Security Attacks- Trojan Horses, Viruses and Worms, Buffer Overflow attacks and Techniques, Formal Aspects of Security, Encryption- Attacks on Cryptographic Systems, Encryption Techniques, Authentication and Password Security, Intrusion detection, malware defences, UNIX and Windows security(TB1)

UNIT-IV:

System Administration: Security Basics, Securing the Server Itself, Maintenance and Recovery, Monitoring and Audit, Introduction to Linux Systems, Configuration Management, Log Auditing and Vulnerability Assessment.(TB2)

UNIT-V:

Linux Networking: Networking Technologies: DHCP, DNS, NFS/ISCSI, SMTP, SNMP, LAMP, Firewall/IDS/SSH, Securing Linux. Case Studies: Security and ProtectionMULTICS, UNIX, LINUX and Windows, Windows and Linux Coexisting.(TB3)

Course Outcomes:

- Explain the overview of operating system
- Demonstrate the Access control matrix, access control list and Lampson's access matrix
- Identify the Encryption Techniques, Authentication and Password Security issues
- Identify the Encryption Techniques and apply the real time applications
- Know the role and responsibilities of a system administrator and Create and administer user accounts on both a Linux and Windows platform

Text Books :

1. Operating Systems: A Concept-Based Approach, 3rd Edition, Dhananjay M. Dhamdhare, McGraw-Hill, 2015
2. Windows Server 2003 Security, A Technical Reference, Roberta Bragg, Addison-Wesley 4. Linux Administration Handbook, Second Edition, Evi Nemeth, Garth Snyder, Trent R. Hein. Prentice Hall

Reference Books:

1. An Introduction to Operating Systems: Concepts and practice, 4th Edition, Promod Chandra P Bhat, Prentice Hall of India, 2014.
2. Operating System: Internals and Design Principles, 7th Edition, William Stalling, Prentice Hall, 2014
3. Linux System Administration, Tom Adelstein and Bill Lubanovic, First Edition, O'Reilly Media, Inc.

**VAAGDEVI COLLEGE OF ENGINEERING
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**(M20CS07) ARTIFICIAL INTELLIGENCE
(PROGRAM ELECTIVE-II)**

M.Tech: I-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Course Objectives

- To Understand Problem State space and Search Techniques.
- To analyse Issues related to Knowledge and its representation.
- To analyse data and predict the data.
- To understand working of Expert Systems.
- To Understand the Natural language processing.

UNIT - I:

Introduction to Artificial Intelligence: The AI problem domains, The underlying assumption, An AI technique, The level of the model, Criteria for success.

Problems, Problem Spaces and Search: Defining the problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search programs, Additional problems.

Heuristic Search Techniques: Generate-and-Test, Hill climbing, Best-first-search, Problem reduction, Constraint satisfaction, Means-Ends Analysis.

UNIT - II:

Knowledge Representation Issues: Knowledge representations and mappings, Approaches to knowledge representation, Issues in knowledge representation, The Frame problem.

Using Predicate Logic: Propositional Calculus, First order predicate calculus(FOPC), Syntax and semantics of FOPC , Representing simple facts in logic.

Representing Knowledge Using Rules: Procedural versus Declarative knowledge, Forward versus Backward Reasoning.

UNIT - III:

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning ,Dempster-Shafer theory.

Learning: Forms of Learning, Supervised Learning, Learning Decision Trees.

UNIT - IV:

Strong Method Problem Solving: Overview of Expert System Technology, Rule-Based Expert Systems, Model-Based, Case Based and Hybrid Systems, Planning. Parallel and Distributed Reasoning Systems

UNIT - V:

Understanding Natural Language: Role of Knowledge in Language Understanding, Deconstructing Language - A Symbolic Analysis, Syntax, Combining Syntax and Semantic Knowledge with ATN Parsers, Natural Language Applications.

Course Outcomes

Upon completion of course, the student will be able to learn the following

1. Remember various AI concepts like the AI technique, level of models, there underlying assumptions etc
2. Understand the concepts of AI search techniques
3. Apply knowledge Representation techniques
4. Analyze different structures of representation

5. Evaluate AI search techniques
6. Understand the concepts of Natural Language Processing.

Text books:

1. Elaine rich, Kevin knight, Shivashanker B Nair “Artificial Intelligence”, 3rd Edition, Tata McGraw-Hill, ISBN No: 9780070087705, 0070087709,2012.
2. Artificial Intelligence A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.
3. George F Luger, “Artificial Intelligence”, Fifth Edition, Pearson Education Asia., ISBN No: 9788131723272,2012.

Reference books:

1. RajendraAkerkar, “Introduction to Artificial Intelligence”, Second Edition 2014, PHI Learning, ISBN No:978-81-203-4997-1.
2. R.B. Mishra “ Artificial Intelligence”, PHI Learning , ISBN No: 978-81-203-3849-4,2010.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

(M20CY04) NETWORK SECURITY & CRYPTOGRAPHY LAB

M.Tech: I-Semester

**L/T/P/C
0/ 0/ 4/ 2**

Course Objective:

To clearly understand the security issues of computer networking and to simulate the network security algorithms implemented in C/C++/JAVA.

Course Outcomes:

- Implement the cipher techniques.
- Apply the mathematical foundation required for various cryptographic algorithms.
- Develop the various security algorithms.
- Use different open source tools for network security and analysis

Week – 1: Write a program to implement connection between two computers to exchange simple message.

Week – 2: Write a program to implement Ceaser Cipher.

Week – 3: a. Write a program to calculate modular arithmetic inverse Matrix.

b. Write a program to implement Hill Cipher.

Week – 4: Write a program to implement Playfair Cipher.

Week – 5: Write a program to implement Verman Cipher / One time pad.

Week – 6: Write a program to implement Vignere Cipher.

Week – 7: a. Write a program to generate subs keys from given 56-bitkey.

b. Write a program to perform XOR operation between two 32-bitwords.

c. Write a program to implement single round function of DES algorithm.

d. Write a program to implement (Encryption and Decryption) DESalgorithm.

Week – 8: a. Write a program to check whether the given no is primenumber or not .

b. Write a program to implementRSA algorithm.

Week – 9: a. Write a program to calculate primitive roots of givenprime number.

b. Write a program to implement Deffine - Hellman key exchange.

Week – 10: Write a program to implement MD5 and compare the message digest in receiver computer with differentinputs.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS10) CLOUD COMPUTING LAB
(PROGRAM ELECTIVE – I LAB)**

M.Tech:I-Semester

L/T/P/C
0/0/4/ /2

Objectives:

- To learn the new computing model this enables shared resources on demand over the network.
- To learn about the pay-per-use scenarios.
- To learn about the new kind of service models and deployment models.
- To learn about the virtualization technology.
- To learn the python programming or various services and models.
- To develop cloud applications in Python

Experiments:**Week 1:** Introduction to basic cloud computing concepts.**Week 2:** Draw a neat diagram of cloud computing Architecture.**Week 3:** Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.**Week 4:** Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.**Week 5:** Install a C compiler in the virtual machine and execute a sample program.**Week 6:** Show the virtual machine migration based on the certain condition from one node to the other.**Week 7:** Find procedure to install storage controller and interact with it.**Week 8:** Installation and Configuration of Hadoop.**Week 9:** Find procedure to set up the one node Hadoop cluster.**Week 10:** Mount the one node Hadoop cluster using FUSE.**Week 11:** Write a program to use the API's of Hadoop to interact with it.**Week 12:** Using Hadoop for counting word frequency with map reduce.**Week 13:** Write a word count program to demonstrate the use of Map and Reduce tasks**Week 14:** Installation & Configuration of Oracle Virtual box for windows xp & android.**Week 15:** Installing open Solaris as a guest OS to Sun xVM Virtual Box using the 7-Zip archive tool**Week 16:** Evaluation of performance of services over cloud: Google App & Amazon web services.**Course Outcomes:****After the completion of this course the students should be able to :**

1. Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
2. Explain the issues on cloud computing along with security, privacy, and interoperability.
3. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.
4. Provide the appropriate solutions on cloud computing based on the application.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****(M20CS11) PYTHON PROGRAMMING LAB
(PROGRAM ELECTIVE – I LAB)****M.Tech:I-Semester****L/T/P/C
0/0/4/2****Objectives:**

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

Week 1:

- a. Write a program to perform the arithmetic operators. Find out the student total marks and average
- b. Write a program to apply type conversion techniques in python. Convert from string to int, into float, float to string

Week 2:

- a. Write a program to display whether a student passed in a single subject or not using if statement
- b. Write a program to display the grade of a student based on the average of 3 subject marks using if-elif statement

Week 3:

- a. Write a program to display the reverse of a given number using while loop and for loop
- b. Write a program to display the factorial of a given number using while loop and for loop

Week 4:

- a. Write a program to display the prime numbers between 2 and n using while loop and for loop
- b. Write a program to print the average marks of 10 students using loops(input 3 subjects for each student)

Week 5:

- a. Write a program to define a function to display the grade of a student by using positional arguments(rno,sub1,sub2,sub3)
- b. Write a program to define a function to display total bill for a shopping by taking customer name and number of items as keyword arguments.

Week 6:

- a. Write a program to define a function to calculate the area of a circle using default arguments
- b. Write a program to display the reverse of a given number using recursive function.

Week 7:

- a. Write a program to convert a decimal number to binary number using recursive function.
- b. Write a program to perform the arithmetic operations using the functions to each operation. (add(),sub(),mul(),div())

Week 8:

- a. Write a program to perform bubble sort on a list without using the sort().
- b. Write a program to display the elements of a list in reverse order without using the reverse()

Week 9:

- a. Write a program to find a student name from the list of students
- b. Write a program to perform addition of 2 matrices using nested lists

Week 10:

- a. Write a program to perform multiplication of 2 matrices using nested lists
- b. Write a program to demonstrate the tuple operations

Week 11:

- a. Write a program to create a list and eliminate the duplicate values from the list
- b. Write a program to create 2 sets and perform union, intersection, set difference and symmetric difference operations on sets.

Week 12:

- a. Write a program to create a students dictionary with the rno as key and a list as the values of a key (name,sub1,sub2,sub3) and display a memo with total, avg, result and grade
- b. Write a program to create a package Shapes and perform the area calculation for different shapes(use one function for each shape)

Week 13:

- a. Write a program to create a package Calculator and perform various arithmetic operations (use one function for each operation like add(),mul(),sub(),div())
- b. Write a program to create module with packages like Shapes and Calculator and import the module into program, access the functions defined in the module.

Week 14:

- a. Write a program to create a file and save the details of a students (rno,name,sub1,sub2,sub3)
- b. Write a program to open a file of students and display the students details in tabular format like rno,name,sub1,sub2,sub3,total,avg,result,grade

Week 15:

- a. Write a program to perform demonstrate filename not exist exception
- b. Write a program to demonstrate the variable not available exception

Week 16:

- a. Write a program to demonstrate arithmetic exception
- b. Write a program to create a lambda function to display whether a person is eligible for voting or not.

Course Outcomes:

1. Expressing the Core Python scripting elements such as variables and flow control structures.
1. Apply Python functions to facilitate code reuse
2. Extending how to work with lists and sequence data.
3. Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS12) INTERNET OF THINGS LAB
(PROGRAM ELECTIVE – I LAB)**

M.Tech:I-Semester

**L/T/P/C
0/0 / 4/ 2**

Objectives:

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

Week-1:

Start Raspberry Pi and try various Linux commands in command terminal window:

ls, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.

Week-2:

Run some python programs on Pi like:

- a) Read your name and print Hello message with name
- b) Read two numbers and print their sum, difference, product and division.
- c) Word and character count of a given string
- d) Area of a given shape (rectangle, triangle and circle) reading shape and appropriate values from standard input Print a name 'n' times, where name and n are read from standard input, using for and while loops.
- e) Handle Divided by Zero Exception.
- f) Print current time for 10 times with an interval of 10 seconds.
- g) Read a file line by line and print the word count of each line.

Week-3:

Light an LED through Python program

Week-4:

Get input from two switches and switch on corresponding LEDs

Week-5:

Flash an LED at a given on time and off time cycle, where the two times are taken from a file.

Week-6:

Flash an LED based on cron output (acts as an alarm)

Week-7:

Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load.

Week-8:

Access an image through a Pi web cam.

Week-9: Control a light source using web page.

Week-10:

Implement an intruder system that sends an alert to the given email.

Week-11:

Get the status of a bulb at a remote place (on the LAN) through web.

Week-12:

Get an alarm from a remote area (through LAN) if smoke is detected. The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to thePi.

Course Outcomes:

After the completion of this course the student should be able to

1. Demonstrate the starting of Raspberry Pi and practice Linux commands in command terminal window.
2. Develop and run all basic python programs on RaspberryPi
3. Build real time applications on Light an LED using Pythonprogramming
4. Experiment with implementation of intruder system and various sensors like temperature, humidity,smoke.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

(M20MC01) RESEARCH METHODOLOGY & IPR

M.Tech:I Semester

L/T/P/C
2/ 0/ 0/ 2

Prerequisites: English

Course Objectives:

- To develop an understanding of IPR/ research methodology in the process of creation of patents through research.
- To develop further research capabilities.
- To learn better report writing skills and Patenting.

UNIT I:

RESEARCH METHODOLOGY: Objectives and Motivation of Research, Significance of Literature review, Types of Research, Research Approaches, and Research Methods verses Methodology, Research and Scientific Method, Importance of Research Methodology, Research Process, Criteria of Good Research.

UNIT II:

RESEARCH DESIGN: Meaning of Research Design, Need of Research Design, Feature of a Good Design Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Data collection methods, Collection of primary data, Secondary data, Data organization, Methods of data grouping, Diagrammatic representation of data, Graphic representation of data.

UNIT III:

RESEARCH REPORT WRITING: Format of the Research report, Synopsis, Dissertation, References/Bibliography/ Webliography, Research Proposal Preparation: Writing a Research Proposal and Research Report, Writing Research Grant Proposal.

UNITIV:

NATURE OF INTELLECTUAL PROPERTY: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

UNIT V:

PATENT RIGHTS: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. New Developments in IPR: Administration of Patent System.

Course Outcomes:

After the completion of this course the students should be able to :

1. Acquire knowledge on Research Design and statistical methods in research.
2. Analyze the various methods in Data Collection, Data Organization and different approaches of Data Representation.
3. Understand all the basic concepts required to prepare
 - a. Research synopsis
 - b. Dissertation
 - c. Writing a good research proposal
4. Interpret the Scope of Patent Rights and Administration of Patent System.

TEXT BOOKS:

1. C.R Kothari, "Research Methodology, Methods &Technique".New Age International Publishers, 2004.
2. R. Ganesan, "Research Methodology for Engineers", MJP Publishers, 2011.

3. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “Intellectual Property in New Technological Age”, Aspen Publishers, 2016.
4. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008.
5. Satarkar, S.V., “Intellectual property rights and copy right”. ESS Publications, 2000.

REFERENCES:

1. Ranjit Kumar, “Research Methodology: A Step by Step Guide for beginners”, SAGE Publications Ltd.
2. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20AC01)ENGLISH FOR RESEARCH PAPER WRITING
(AUDIT COURSE-I)**

M.Tech:I-Semester

L/T/P/C

2/ 0/ 0/ 0

Course Objectives:

- To understand the nuances of language and vocabulary in writing a Research Paper.
- To develop the content, structure and format of writing a research paper.
- To give the practice of writing a Research Paper.
- To enable the students to evolve original research papers without subjected to plagiarism.

UNIT I:

ACADEMIC WRITING: What is Research? - Meaning & Definition of a research paper– Purpose of a research paper – Scope – Benefits – Limitations – outcomes.

UNIT II:

RESEARCH FORMAT: Title – Abstract – Introduction – Discussion - Findings – Conclusion – Style of Indentation – Font size/Font types – Indexing – Citation of sources.

UNIT III:

RESEARCH METHODOLOGY: Methods (Qualitative – Quantitative) – Literature Review – Who did what – Criticizing, Paraphrasing & Plagiarism.

UNIT IV:

PROCESS OF WRITING A RESEARCH PAPER: Choosing a topic - Thesis Statement – Outline – Organizing notes - Language of Research – Word order, Paragraphs – Writing first draft –Revising/Editing - Typing the final draft

UNIT V:

HOW TO & WHERE TO GET PUBLISHED: Reputed Journals – National/International – ISSN No, No. of volumes, Scopes Index/UGC Journals – Free publications - Paid Journal publications – /Advantages/Benefits

Course Outcomes:

After the completion of this course the students should be able to :

1. Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper , its Scope and Benefits.
2. Understand the standard English formats .for scripting the best research paper.
3. Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism.
4. Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing.

TEXT BOOKS:

1. MLA Hand book for writers of Research Papers, East West Press Pvt. Ltd, New Delhi, 7th Edition.
2. C. R Kothari, Gaurav, Garg, Research Methodology Methods and Techniques, New Age International Publishers. 4th Edition.
3. LauriRozakis, Schaum’s Quick Guide to Writing Great Research Papers, Tata McGraw Hills Pvt. Ltd, New Delhi.
4. N. Gurumani, Scientific Thesis Writing and Paper Presentation, MJP Publishers

REFERENCES:

4. NPTEL: https://onlinecourses.nptel.ac.in/noc18_mg13/preview

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

(M20CS27) CYBER SECURITY

M.Tech:II-Semester

L/T/P/C

3/ 0/ 0/ 3

Prerequisites: Operating System, Data Communications and Computer Networks, Network Security and Cryptography.

Course Objectives:

- To introduce the methodologies and framework of ethical hacking for enhancing the security.
- To learn about cybercrimes and how they are planned.
- To learn the vulnerabilities of mobile and wireless devices.
- To learn about the cyber Law and legal perspectives.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cyber-crime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

(Text Book : Page no : 1 – 39)

UNIT – II

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

(Text Book : Page no : 45 –78)

UNIT – III

Cyber-crime : Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations-Organizational measurement for Handling mobile-Security policies and measures in mobile computing era.

(Text Book : Page no : 81-119)

UNIT – IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

(Text Book : Page no :125-170)

UNIT – V

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

(Text Book : Page no :495-522)

Course Outcomes:

After the completion of this course, the students should be able to

1. Outline key terms and concepts in cyber law, intellectual property and cyber crimes.
2. Explore the vulnerabilities, threats and cybercrimes posed by criminals.
3. Identify various security challenges phased by mobile devices.
4. Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.
5. Analyze and evaluate the cyber security needs of an organization.

6. Design operational and strategic cyber security risk management policies in order to adequately protect an organization's critical information and assets.

TEXT BOOK:

1. **Cyber Security:** Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRCPress.
2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J. David Irwin. CRC Press T&F Group

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

(M20CY05) WEB APPLICATION AND PENETRATING TESTING

M.Tech:II-Semester

L/T/P/C

3/ 0/ 0/ 3

Prerequisites:

Operating System, Computer Networks, Database Management System, Ethical Hacking and Cyber Security

Course Objectives:

- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To design security applications in the field of Information technology.
- To understand the fundamentals of database design, DB security and SQL extensions to security.
- To learn the basic concepts of Penetration testing.

UNIT-I:

Web application security-Basic principles and concepts, Authentication, Authorization, Browser security principles; XSS and CSRF, same origin policies, File security principles, Secure development and deployment methodologies, Web DB principles, OWASP – Top 10 -Detailed treatment, IoT security.

UNIT-II:

Database security-Introduction includes threats, vulnerabilities and breaches, Basics of database design, DB security, concepts, approaches and challenges, types of access controls, Oracle VPD. Discretionary and Mandatory access control-Principles, applications and poly instantiation, Database inference problem, types of inference attacks, distributed database, security levels, SQL-injection: types and advanced concepts

UNIT-III:

Relational Data Model-Security in relational data model, concurrency controls and locking, SQL extensions to security (oracle as an example), System R concepts, Context and control based access control, Hippocratic databases, Database watermarking, Database intrusion, secure data outsourcing.

UNIT-IV:

Mobile device security-Introduction, attack vector and models, hardware centric security aspects, SMS / MMS vulnerabilities, software centric security aspects, mobile web browser security. Application security: Concepts, CIA Triad, Hexad, types of cyber-attacks, Introduction to software development vulnerabilities, code analyzers – Static and dynamic analyzers.

UNIT-V:

Penetration testing-Principles and concepts, PT work flows and examples, blind tests, ethical hacking techniques, synthetic transactions, interface testing and fuzzing, SDLC phases and security mandates.

Course Outcomes:

- Explain threats, vulnerabilities and breaches to design database
- Discuss Relational Data Model and concurrency controls and locking, SQL extensions to security
- Demonstrate the Browser security principles.
- How to provide software centric security and mobile web browser security in real time applications
- Construct the penetrating testing workflows with examples.

Text Books:

1. Bryan and Vincent, —Web Application Security, A Beginners Guide ||,McGraw-Hill, 2011
2. Alfred Basta, Melissa Zgola, —Database Security||, Course Technology, 2012.

Reference Books:

1. Michael Gertz and SushilJajodia, —Handbook of Database Security— Applications and Trends, Springer, 2008.
2. BhavaniThuraisingham, —Database and Applications Security, Integrating Information Security and Data Management, Auerbach Publications, 2005.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS16) MACHINE LEARNING
(PROGRAM ELECTIVE-III)**

M.Tech:II-Semester

L/T/P/C
3/ 0/ 0/ 3

Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understand the issues raised by current research.

UNIT-I:

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation

UNIT- II:

Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts

UNIT-III:

models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning

UNIT-IV:

Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods. Distance Based Models: Introduction, Neighbours and exemplars, Nearest Neighbours classification, Distance Based Clustering, Hierarchical Clustering.

UNIT- V:

Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables. Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting

Course Outcomes:

After the completion of this course the students should be able to :

1. Discuss different application on Machine Learning problems.
2. Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.
3. Illustrate the basic theory focused on Machine Learning.
4. Improve the performance of Machine Learning algorithms with different parameters.
5. Analyze current research papers.
6. Understand the latest issues raised by current researchers.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.

2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS17) DIGITAL FORENSICS
(PROGRAM ELECTIVE-III)**

M.Tech:II-Semester

L/T/P/C
3/ 0/ 0/ 3

Objectives:

- To focus on the procedures for identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence.
- To provide hands on experience on various forensic tools and resources for system administrators and information system security officers.

UNIT-I

Introduction: Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology- Steps - Activities in Initial Response, Phase after detection of an incident

UNIT -II

Initial Response and forensic duplication 2.1 Initial Response & Volatile Data Collection from Windows system- Initial Response & Volatile Data Collection from Unix system - Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. 2.2 Duplicate/Qualified Forensic Duplicate of a Hard Drive.

UNIT -III

Preserving and Recovering Digital Evidence 3.1 File Systems: FAT, NTFS - Forensic Analysis of File Systems – Storage Fundamentals: Storage Layer, Hard Drives Evidence Handling: Types of Evidence, Challenges in evidence handling, Overview of evidence handling procedure.

UNIT -IV

Network Forensics Intrusion detection; Different Attacks in network, analysis Collecting Network Based Evidence - Investigating Routers - Network Protocols - Email Tracing- Internet Fraud.

UNIT -V

System investigation 5.1 Data Analysis Techniques - Investigating Live Systems (Windows & Unix) Investigating 5.2 Hacker Tools - Ethical Issues – Cybercrime.

Course Outcomes:

After the completion of this course the students should be able to :

1. Discuss digital forensics related to investigative process.
2. Explain the legal issues to prepare, perform digital forensic analysis based on the investigator's position.
3. Demonstrate the techniques, usage of digital forensics tools.
4. Elaborate digital forensics in detail.
5. Analyze the state of the practice, gaps in technology, policy, and legal issues.
6. Develop techniques used on Data Analysis, cybercrime.

Text Books:

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGrawHill, 2006
2. Peter Stephenson, "Investigating Computer Crime: A Handbook for Corporate Investigations", Sept 1999
3. Eoghan Casey, "Handbook Computer Crime Investigation's Forensic Tools and

Technology", Academic Press, 1st Edition,2001

References:

1. Skoudis. E., Perlman. R. Counter Hack: A Step-by-Step Guide to Computer Attacks and Effective Defenses.Prentice Hall Professional Technical Reference.2001
2. Norbert Zaenglein, "Disk Detective: Secret You Must Know to Recover Information From a Computer", Paladin Press,2000
3. Bill Nelson, Amelia Philips and Christopher Steuart, "Guide to computer forensics investigation "Course technology, 4thedition

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS18) BLOCK CHAIN TECHNOLOGY
(PROGRAM ELECTIVE-IV)**

M.Tech:II-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Objectives:

The objective of this course is to introduce blockchain technology, its history, development and usage with required fundamentals and in the light of blockchain applications.

UNIT I:

Blockchain 101: Distributed systems, the history of blockchain, introduction to blockchain, Features of blockchain, Applications of blockchain technology, tiers of blockchain technology, types of blockchain, CAP theorem and blockchain, benefits and limitations of blockchain (pages 1-34), Decentralization using blockchain, methods of decentralization (pages 34-39)

UNIT II:

Cryptographic primitives, asymmetric cryptography, public and private keys, cryptographic primitives hash functions, elliptic curve digital signature algorithm (ECDSA)(56-105)

UNIT III:

BIT COIN: Bitcoin, transactions, blockchain, the bitcoin network wallets (111-148)

Alternatives to Proof of work, difficulty adjustment and retargeting algorithms, bitcoin limitations.(163-176), Smart contracts(198-210),

UNIT IV Introducing solidity (297-308), introducing Web3, (309-353)

UNIT V:Hyperledger: projects, Hyperledger as a protocol, Fabric Hyperledger fabric (355-369) Scalability and other challenges: scalability, privacy, security (443-459).

Course Outcomes:

After the completion of this course the students should be able to

1. Introduce the fundamentals of blockchain, history, technology and decentralization.
2. Revise cryptographic concepts and its use in blockchain.
3. Define bitcoin and understand structure of blockchain
4. Understand alternatives to proof of work
5. Introduce smart contracts, solidity and Web3 to implement blockchain
6. Understand applications of blockchain and its challenges

Text book:

1. Mastering Blockchain, March 2017, by imran basher, packt publishing.

References:

1. Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015 (article available for free download) { curtain raiser kind of generic article, written by seasoned experts and pioneers}.
2. J.A.Garay et al, The bitcoin backbone protocol - analysis and applications EUROCRYPT 2015 LNCS VOL 9057, (VOLII), pp 281-310. (Also available at eprint.iacr.org/2016/1048). (serious beginning of discussions related to formal models for bitcoin protocols).
3. R.Pass et al, Analysis of Blockchain protocol in Asynchronous networks , EUROCRYPT 2017, (eprint.iacr.org/2016/454) . A significant progress and consolidation of several principles).
4. R.Pass et al, Fruitchain, a fair blockchain, PODC 2017 (eprint.iacr.org/2016/916).
5. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016. (Free download available)

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY06) ETHICS AND LAW OF CYBER SECURITY
(PROGRAM ELECTIVE-IV)**

M.Tech:II-Semester

L/T/P/C

3/0/0/3

Prerequisites: Cyber Security

Course Objective:

- To understand the basics of cyber law, its related issues and ethical laws of computer for different countries.

UNIT-I :

Introduction-Cyber Security and its problem-Intervention Strategies: Redundancy, Diversity and Autarchy.

UNIT-II :

Introduction to the Legal Perspectives of Cybercrimes and Cyber security, Cybercrime and the Legal Landscape around the World, Why Do We Need Cyber laws, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act.

UNIT-III :

Cybercrime and Punishment, Cyber law, Technology and Students: Indian Scenario.

UNIT-IV :

Private ordering solutions, Regulation and Jurisdiction for global Cyber security, Copy Right source of risks, Pirates, Internet Infringement, Fair Use, postings, criminal liability, First Amendments, Data Losing.

UNIT-V :

Ethics, Legal Developments, Cyber security in Society, Security in cyber laws case studies, General law and Cyber Law-a Swift Analysis.

Course Outcomes:

- Understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.
- Determine computer technologies, digital evidence collection, and evidentiary reporting in forensic acquisition.
- Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.
- Incorporate approaches for incident analysis and response.

Text books:

1. SunitBelapure and Nina Godbole, Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives, Wiley India Pvt. Ltd, 2011.

Reference books:

1. Mark F Grady, FransescoParisi, "The Law and Economics of Cyber Security", Cambridge University Press, 2006
2. Jonathan Rosenoer, "Cyber Law: The law of the Internet", Springer-Verlag, 1997.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY07) FIREWALL AND VPN SECURITY
(PROGRAM ELECTIVE-IV)**

M.Tech:II-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisites: Operating System, Computer Networks, Network Security & Cryptography

Course Objectives:

- Identify and assess current and anticipated security risks and vulnerabilities
- Develop a network security plan and policies
- Establish a VPN to allow IPSec remote access traffic
- Monitor, evaluate and test security conditions and environment
- Develop critical situation contingency plans and disaster recovery plan
- Implement/test contingency and backup plans and coordinate with stakeholders
- Monitor, report and resolve security problems

UNIT-I:

Firewall Fundamentals: Introduction, Types of Firewalls, Ingress and Egress Filtering, Types of Filtering, Network Address Translation (NAT), Application Proxy, Circuit Proxy, Content Filtering, Software versus Hardware Firewalls, IPv4 versus IPv6 Firewalls, Dual-Homed and Triple-Homed Firewalls, Placement of Firewalls.

UNIT-II:

VPN Fundamentals: VPN Deployment Models and Architecture, Edge Router, Corporate Firewall, VPN Appliance, Remote Access, Site-to-Site, Host-to-Host, Extranet Access, Tunnel versus Transport Mode, The Relationship Between Encryption and VPNs, Establishing VPN Connections with Cryptography, Digital Certificates, VPN Authorization.

UNIT-III:

Exploring the Depths of Firewalls: Firewall Rules, Authentication and Authorization, Monitoring and Logging, Understanding and Interpreting Firewall Logs and Alerts, Intrusion Detection, Limitations of Firewalls, Downside of Encryption with Firewalls, Firewall Enhancements, and Management Interfaces.

UNIT- IV:

Overview of Industrial Control Systems: Overview of SCADA, DCS, and PLCs, ICS Operation, Key ICS Components, Control Components, Network Components, SCADA Systems, Distributed Control Systems, Programmable Logic Controllers, Industrial Sectors and Their Interdependencies.

UNIT- V:

SCADA Protocols: Modbus RTU, Modbus TCP/IP, DNP3, DNP3 TCP/IP, OPC, DA/HAD, SCADA protocol fuzzing, Finding Vulnerabilities in HMI: software- Buffer Overflows, Shell code. Previous attacks Analysis- Stuxnet, Duqu.

Course Outcomes:

- To show the fundamental knowledge of Firewalls and its types
- Construct a VPN to allow Remote Access, Hashing, connections with Cryptography and VPN Authorization
- Elaborate the knowledge of depths of Firewalls, Interpreting firewall logs, alerts, Intrusion and Detection
- Infer the design of Control Systems of SCADA, DCS, PLC's and ICS's
- Evaluate the SCADA protocols like RTU, TCP/IP, DNP3, OPC, DA/HAD

Text Books:

1. Michael Stewart —Network Security, Firewalls, and VPNs| Jones & Bartlett Learning September 2010.
2. T. Macaulay and B. L. Singer, Cyber security for Industrial Control Systems: SCADA, DCS, PLC, HMI, and SIS, Auerbach Publications, 2011.
3. J. Lopez, R. Setola, and S. Wolthusen, Critical Infrastructure Protection Information Infrastructure Models, Analysis, and Defense, Springer-Verlag Berlin Heidelberg, 2012.

Reference Books:

1. J. Lopez, R. Setola, and S. Wolthusen, Critical Infrastructure Protection Information Infrastructure Models, Analysis, and Defense, Springer-Verlag Berlin Heidelberg, 2012.
2. Robert Radvanovsky and Jacob Brodsky, editors. Handbook of SCADA/Control Systems Security. CRC Press, 2013.
3. A.W. Colombo, T. Bangemann, S. Karnouskos, S. Delsing, P. Stluka, R. Harrison, et al. Industrial cloud-based cyber-physical systems Springer International Publishing, 2014.
4. D. Bailey, Practical SCADA for Industry. Burlington, MA: Newnes, 2003.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****(M20CY08) BIG DATA ANALYTICS
(PROGRAM ELECTIVE-IV)****M.Tech:II-Semester****L/T/P/C
3/0/0/3****Course Objectives:**

- To understand about big data
- To learn the analytics of Big Data
- To Understand the MapReduce fundamentals

UNIT – I

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

UNIT - II

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics;
Analytical Approach and Tools to Analyze Data: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

UNIT - III

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

UNIT - IV

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

UNIT - V

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;
Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools;

TEXT BOOKS:

1. BIG DATA and ANALYTICS, SeemaAcharya, SubhasininChellappan, Wiley publications.
2. BIG DATA, Black BookTM ,DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

REFERENCE BOOKS:

1. Rajiv Sabherwal, Irma Becerra- Fernandez,” Business Intelligence –Practice, Technologies and Management”, John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, “ Business Intelligence Roadmap”, Addison-Wesley It Service.
3. YuliVasiliev, “ Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting”, SPD Shroff, 2012.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY09) ETHICAL HACKING AND CYBER SECURITY LAB
(PROGRAM ELECTIVE-IV)**

M.Tech:II-Semester

**L/T/P/C
0/ 0/ 4/ 2**

Prerequisites:

Operating System, Computer Networks, Database Management System, Ethical Hacking and Cyber Security

Course Objectives:

- Student to get the knowledge about vulnerability and attacks, which makes the student to get the real world experience.
- To learn and implement Data leakage in a website database
- Student to get the knowledge about how to prepare vulnerability report and how to report it.

List of Programs

Week1. Installation Oracle Virtual Box and Installation of Kali Linux and windows operating systems into Virtual Box.

Week2. Implementation to gather information from any PC's connected to the LAN using whois, port scanners, network scanning, Angry IP scanners etc.

Week3. Implementation to scanning network, port and vulnerability of PC's connected to the LAN using Nmap and Znmap tools.

Week4. Implementation of Spoofing.

Week5. Installation and Configuration of Burpsuit.

Week6. Installation of OWASP broken web application into virtual box.

Week7. Implementation of basic Web Application Testing on OWASP broken web APPs VMs.

Week8. Installation of Metasploitable Linux VM into virtual box and setup sqli-lab-master.

Week9. Implementation of SQL injection in sqli-lab-master.

Week10. Preparing a report and report the vulnerability.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS24) DIGITAL FORENSICS LAB
(PROGRAM ELECTIVE – III LAB)**

M.Tech:II-Semester

L/T/P/C
0/0/4/2

Objectives:

- To focus on the procedures for identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence.
- To provide hands on experience on various forensic tools and resources for system administrators and information system security officers.

Week 1: Mr.X has lost his data on his device. Analyse different processes and Retrieve the lost data?

Week 2: Study and Perform various metadata techniques

Week 3: (a). Study and Perform email investigation techniques
(b). Perform various mobile forensic techniques

Week 4: (a). Perform how to grab the ip address of a suspect
(b). Study and Perform how to trace aip address

Week 5: Perform how to capture packets from a mobile phone

Week 6: Perform various Network forensic analysis in detail

Week 7: Perform Hashing process

Week 8: Perform various Open-source intelligence techniques

Week 9: (a). Study and Understand Cyber-Forensics experimentation methodology
(b). Develop a Certification Process for Cyber Forensic Technologies

Week 10: (a). Comparison of files using HEX editor and FC command
(b). Perform extraction of browser artifacts
(c) File carving using TESTDISK and PHOTOREC

Course Outcomes:

After the completion of this course the students should be able to :

1. Understand the methods available for retrieving the lost data.
2. Classify the various mobile forensic techniques and how to handle them.
3. Identify the different Open-source intelligence techniques
4. Demonstrate how to develop certification for Cyber Forensic.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CS23) MACHINE LEARNING LAB
(PROGRAM ELECTIVE– III LAB)**

M.Tech : II SEMESTER

L/T/P/C
0/0/4/2**Pre-requisites:** Knowledge of DAA and Programming for Problem solving**Course Objectives:**

- Understand the complexity of Machine Learning algorithms and their limitations.
- Understand modern notations in data analysis oriented computing.
- Capable of confidently applying common Machine Learning algorithms in practice and implementing their own.
- Capable of performing distributed computations.
- Capable of performing experiments in Machine Learning using real world data.

List of Programs :

Week-1: Write a program to represent each document as a vector uses term frequency to identify commonly used terms that help classify the documents from various documents

Week-2: Write a program to identify an object from a given set.

Week-3: Write a program to derive knowledge from a given dataset using Decision Support System.

Week-4 :Write a program to predict the future data based on past data(take past data as a data set)

Week-5 :Write a program to recognize authorized person from a given set using face recognition technique.

Week-6: Write a program to implement bayes theorem for support vector machine

Week-7: Experiment on “ to demonstrate least-square method”.

Week-8: Write a program to create and combine data frames to get whole data.

Week-9: Write a program to demonstrate data visualization based on user requirement.

Week-10: Write a program for finding the most specific hypothesis based on agiven set of training data samples. Read the data from .csv file

Week-11: Write a program to predict data on Insurance Fraud Detection based on given past historical data

Week-12: a) Write a R program to Create Pie-Chart.

b) Write a R Program to Demonstrate Scatterplots.

Week-13: a) Write a R Program to Create Line Chart.

b) Write a R Program to Create Multiple Line Chart.

Week-14: Write a R Program to Create Histograms

Week-15: Write a R Program to Create Boxplots

Week-16: Write a R Program to Create Bar Charts

Course Outcomes:**After the completion of this course the students should be able to :**

1. Discuss different application on Machine Learning problems.
2. Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.
3. Improve the performance of Machine Learning algorithms with different parameters.
4. Understand the latest issues raised by current researchers.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.

2. *The R Book*. Second Edition. *Michael J. Crawley*

3. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, ShaiShalev-Shwartz, Shai Ben-David, Cambridge.

2. Machine Learning in Action, Peter Harington, 2012, Cengage.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY10) BLOCK CHAIN TECHNOLOGY LAB
(PROGRAM ELECTIVE-III LAB)**

M.Tech:II-Semester

**L/T/P/C
0/ 0/ 4/ 2**

COURSE OBJECTIVES

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

- Understand how blockchain systems (mainly Bitcoin and Ethereum) work,
- To securely interact with them,
- Design, build, and deploy smart contracts and distributed applications,
- Integrate ideas from blockchain technology into their own projects.

COURSE OUTCOMES

1. Explain design principles of Bitcoin and Ethereum.
2. Explain Nakamoto consensus.
3. Explain the Simplified Payment Verification protocol.
4. List and describe differences between proof-of-work and proof-of-stake consensus.
5. Interact with a blockchain system by sending and reading transactions.
6. Design, build, and deploy a distributed application.
7. Evaluate security, privacy, and efficiency of a given Blockchain system.

Week1:Implementation of the basic cryptographic concepts for Blockchain.

Week2: Create and build a Bitcoin Wallet

Week3:Build a private Ethereum Wallet

Week4: Deploy and Invoke a smart contract.

Week5: Upgrade and debug a smart contract.

Week6:Test and publish a smart contract.

Week7: Create and build a crypto token.

Week8: Implement a hyperledger.

Week 9: Create a business network using hyperledger.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

(M20CY11)MINI PROJECT WITH SEMINAR

M.Tech: II-Semester

**L/T/P/C
2/0/0/0**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20AC02) STRESS MANAGEMENT
(AUDIT COURSE-II)**

M.Tech:II-Semester

**L/T/P/C
2/ 0/ 0/ 0**

UNIT-I:

UNDERSTANDING STRESS Meaning – Symptoms – Work Related Stress – Individual Stress – Reducing Stress -sources of stress –consequence of stress-burnout-symptoms of Burnout- stress verses Burnout-model of stress-strategies for coping stress (individual and organizational strategies) – casestudy

UNIT-II:

TIME MANAGEMENT Techniques – Importance of Planning the day –developing concentration – Prioritizing Beginning at the start – Techniques for conquering procrastination – Sensible delegation – Taking the right breaks – Learning to say “No”

UNIT-III:

CAREER PLATEAU Career plateau – Identifying Career plateaus – Structural and Content - Plateauing – Making a fresh start – Importance of Sabbaticals – Counseling out – Executive leaving Sustaining a marketable Career.

UNIT-IV:

CRISIS MANAGEMENT Implications – People issues – Structure issues – Environmental issues – Learning to keep calm - Preventing interruptions – Controlling crisis – Pushing new ideas – Empowerment – Work place Humour, Developing a sense of Humour – Learning to laugh – role of group cohesion and team spirit.

UNIT-V:

SELF DEVELOPMENT Improving personality – Leading with Integrity – Enhancing Creativity – Effective decision making – Sensible Communication – The Listening Game – Managing Self – Mediation for peace – Yoga for Life

Course Outcomes:

After the completion of this course the students should be able to :

1. Maintain a stress awareness log. Include identification of causes, symptoms, and analysis of effects.
2. Gather information on current stress management techniques and evaluate personal relevance.
3. Practice specific techniques, track effectiveness, and revise to meet personal preferences.
4. Choose an adaptable stress management plan for academic success incorporating selected techniques.

TEXT BOOKS

1. Bhatia R.L., The Executive Track: An Action Plan for Self Development Wheeler Publishing, New Delhi
3. Charavathy.S.K, “Human Values for Manager”, McGraw Hill/Henely Management Series

REFERENCES

1. Jeffr Davison, Managing Stress, Prentice Hall of India, NewDelhi
2. Jerrold S Greenberg, Comprehensive Stress Management, Jain Books,2009

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY12) INFORMATION WARFARE
(PROGRAM ELECTIVE-V)**

M.Tech:III-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Prerequisites:

Network Security and Cryptography, Cyber Security, Ethics and Laws of cyber Security.

Course Objective:

- This course addresses some of the unique and emerging policy, doctrine, strategy, and operational requirements of conducting cyber warfare at the nation-state level.
- It provides students with a unified battle-space perspective and enhances their ability to manage and develop operational systems and concepts in a manner that results in the integrated, controlled, and effective use of cyber assets in warfare.

UNIT-I :

Introduction and Models of Information Warfare- Information Resources, The Value of Resources, Players, The Offense, The Defense, A Dual Role, Offensive Information Warfare, Increased Availability to Offensive Player, Decreased Availability to Defensive Player, Decreased Integrity, Other Classification Schemes, Defensive Information Warfare, Types of Defense, Information Security and Information Assurance, The CIA Model and Authorization, Playgrounds to Battlegrounds, Play, Motivation, Culture, More than Child's Play, Intellectual Property Crimes, Fraud, Computer Fraud and Abuse. Fighting Crime, Individual Rights, National Security, Foreign Intelligence, War and Military Conflict, Terrorism, Netwars, Protecting National Infrastructures.

UNIT-II :

Open Sources- Open Source and Competitive Intelligence, Privacy, Snooping on People Through Open Sources, Web Browsing, Privacy Regulations, Piracy, Copyright Infringement, Trademark Infringement, Dark Sides.

UNIT-III :

Psyops and Perception Management- Lies and Distortions, Distortion, Fabrication, Hoaxes, Social Engineering, Denouncement, Conspiracy Theories, Defamation, Harassment, Advertising, Scams, Spam Wars, Censorship, United States Restrictions.

UNIT-IV :

Inside the Fence- Traitors and Moles, State and Military Espionage, Economic Espionage, Corporate Espionage, Privacy Compromises, Business Relationships, Visits and Requests, Fraud and Embezzlement, Bogus Transactions, Data Diddling, Inside Sabotage, Physical Attacks, Software Attacks, Penetrating the Perimeter, Physical Break-ins and Burglaries, Search and Seizure, Dumpster Diving, Bombs.

UNIT-V :

Computer Break-Ins and Hacking- Accounts, Getting Access, Tools and Techniques, A Demonstration, Network Scanners, Packet Sniffers, Password Crackers, Buffer Overflows and Other Exploits, Social Engineering, Covering up Tracks, Information Theft, Gathering Trophies, More than Trophies, Tampering, Web Hacks, Domain Name Service Hacks, Takedown, Remote Shutdown Extent.

Course Outcomes:

- Explain the theory of data, information and knowledge as they pertain to information warfare
- Apply strategies of using information as a weapon and a target
- Apply the principles of offensive and defensive information warfare for a given context
- Discuss the social, legal and ethical implications of information warfare
- Evaluate contemporary information warfare concepts for their application in a corporate environment

Text books:

1. Daniel Ventre, Cyberwar and Information Warfare, John Wiley & Sons.2012
2. Daniel Ventre, Information Warfare, Wiley - ISTE (2009) (ISBN 9781848210943).

Reference books:

1. Information Warfare and Security, Dorothy E. Denning, Denning Edition 1, 1998 AddisonWesley.
2. Dorothy Denning, Information Warfare and Security, Addison-Wesley (1998.)

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY13) INTRUSION DETECTION
(PROGRAM ELECTIVE-V)**

M.Tech:III-Semester

L/T/P/C

3/ 0/ 0/ 3

Prerequisites:

Network Security and Cryptography, Cyber Security, Ethics and Laws of cyber Security.

Course Objectives:

- To understand about the intruders.
- To know the intrusion detection and prevention policies

UNIT- I :

Introduction Understanding Intrusion Detection – Intrusion detection and prevention basics – IDS and IPS analysis schemes, Attacks, Detection approaches – Misuse detection – anomaly detection – specification-based detection – hybrid detection THEORETICAL FOUNDATIONS OF DETECTION: Taxonomy of anomaly detection system – fuzzy logic – Bayes theory – Artificial Neural networks – Support vector machine – Evolutionary computation – Association rules – Clustering

UNIT- II :

Architecture and Implementation Centralized – Distributed – Cooperative Intrusion Detection - Tiered architecture

UNIT- III :

Justifying Intrusion Detection Intrusion detection in security – Threat Briefing – Quantifying risk – Return on Investment (ROI)

UNIT- IV :

Applications and Tools Tool Selection and Acquisition Process - Bro Intrusion Detection – Prelude Intrusion Detection - Cisco Security IDS - Snorts Intrusion Detection – NFR security

UNIT- V :

Legal Issues and Organizations Standards Law Enforcement / Criminal Prosecutions – Standard of Due Care – Evidentiary Issues, Organizations and Standardizations.

Course Outcomes:

- Understating of various types of intruders and intrusion detection systems.
- Implementation of Intrusion detection architecture.
- Identifying the Security threats and risk assessment.
- Exploring tools used for intrusion detection system.
- Develop the understanding of organizations standards and its legal issues.

References:

1. Ali A. Ghorbani, Wei Lu, “Network Intrusion Detection and Prevention: Concepts and Techniques”, Springer, 2010.
2. Carl Enrolf, Eugene Schultz, Jim Mellander, “Intrusion detection and Prevention”, McGraw Hill, 2004
3. Paul E. Proctor, “The Practical Intrusion Detection Handbook “, Prentice Hall, 2001.
4. AnkitFadia and MnuZacharia, “Intrusiion Alert”, Vikas Publishing house Pvt., Ltd, 2007.
5. Earl Carter, Jonathan Hogue, “Intrusion Prevention Fundamentals”, Pearson Education, 2006.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20CY14) SOCIAL, WEB AND MOBILE ANALYTICS
(PROGRAM ELECTIVE-V)**

M.Tech:III-Semester

L/T/P/C

3/0/0/3

Prerequisites: Network Security and Cryptography, Cyber Security, Ethics and Laws of cyber Security.

Course Objectives:

- Apply multiple quantitative and qualitative methods (e.g., clickstream analysis, A/B testing, surveys, social network analysis) to analyze website traffic and social media initiatives
- Determine how captures data from Mobile Applications
- Different tools used for Mobile analytics
- Analysis of Mobile Applications

UNIT-I :

Overview of web & social media. Need of using analytics, Web analytics technical requirements. Social media environment, Impact of social media on business, how to leverage social media for better services, current analytics platforms, Open source vs licensed platform, choosing right specifications & optimal solution.

UNIT-II :

Overview, Web Analytics Vs Mobile Analytics, Social media Analytics Vs Mobile analytics, Need of mobile analytics. Basics of mobile computing – Smart phones, mobile browsers, Mobile applications, Bandwidth, transactions, sessions, handset types & operating systems, mobile operators & their services, WAP gateway or GGSN support, APNs or regional POPs support, Architecture components, mobile web-services, overview of mobile cloud.

UNIT-III :

Mobile as next customer experience frontier, Customer expectations, business impact & criticality, Core metrics for deeper behavior analysis, Integration of different channels – SMS, Instant messaging, chatting, apps, HTML5 enabled sites on browsers for unique experience, Multichannel campaigning optimization, considerations for best mobile services, Location based media & support.

UNIT-IV :

Mobile Handset Analysis, Mobile Handset Screen Resolution - supported screen resolutions of mobile handsets browsing site in terms of page views, visits and visitors, Mobile Operator Analysis - operator names and countries of subscribers browsing your site in terms of page views, visits and visitors. The types of statistics & reports --Bandwidth (total, average per visit, total per file type), Transactions (average per visit, number of downloads, page view breakdown), Sessions (entry page, average duration, click paths, referring search engine), Subscribers (browser type, user agent, operating system), Operating system (iOS, Android, Blackberry, etc.),

UNIT-V :

Mobile applications (YouTube, Facebook, Twitter, etc.), Content categorization (Adult, Video, Social, Ad Networks, etc.), Handsets (make, model, screen resolution), Mobile Operator (country of origin, operator name), Geo Location (Visitor location tracking, country of origin, RDNS lookup) Referrer tracking, Search term performance, Specific visitor behavior. Page views per visit by referrer/advert, Time spent on site by referrer/advert.

Course Outcomes:

- Apply best practices in Search Engine Optimization

- Apply ethical principles to the use of web and social media data
- Use different tool for capturing data from various resources
- Perform Mobile Application analysis using different tool and techniques
- Analysis report generation and presentations.

Text Books:

1. Mobile Analytics by IBM ICE Publications
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.
3. Professional Ethics: R. Subramanian, Oxford University Press, 2015.

Reference Books:

1. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e, Cengagelearning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20MA01)ADVANCED OPTIMIZATION
(OPEN ELECTIVE)**

M.Tech:III-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Course Objectives

- To understand the theory of optimization methods and algorithms developed for solving various types of optimization problems.
- To develop and promote research interest in applying optimization techniques in problems of Engineering and Technology.
- To apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems.

UNIT-I:

Single Variable Non-Linear Unconstrained Optimization: One dimensional Optimization methods:-Unimodal function, elimination methods, ,, Fibonacci method, golden section method, interpolation methods – quadratic & cubic interpolation methods.

UNIT-II:

Multi variable non-linear unconstrained optimization: Direct search method – Univariant method - pattern search methods – Powell's- Hook -Jeeves, Rosenbrock search methods- gradient methods, gradient of function, steepest decent method, Fletcher Reeves method, variable metric method.

UNIT-III:

Linear Programming: Formulation – Sensitivity analysis. Change in the constraints, cost coefficients, coefficients of the constraints, addition and deletion of variable, constraints. Simulation – Introduction – Types- steps – application – inventory –queuing systems

UNIT-IV:

Integer Programming: Introduction – formulation – Gomory cutting plane algorithm – Zero or one algorithm, branch and bound method Stochastic programming: Basic concepts of probability theory, random variables- distributions-mean, variance, correlation, co variance, joint probability distribution-stochastic linear, dynamicprogramming.

UNIT-V:

Geometric Programming: Polynomials – arithmetic – geometric inequality – unconstrained G.P constrained G.P (<= TYPE ONLY) Non-traditional optimization Techniques: Genetic Algorithms- Steps-Solving simple problems Comparisons of similarities and dissimilarities between traditional and non-traditional techniques Particle Swarm Optimization (PSO)- Steps(Just understanding)- Simulated Annealing-Steps-Simpleproblems.

Course Outcomes:

After the completion of this course the students should be able to :

1. Describe problem clearly, identify and analyze the individual functions.
2. Analyze study on solving optimization problem.
3. Translate verbal formula on optimization problem.
4. Design algorithms, reliably to find an approximate solution.
5. Compare the performance of an algorithm.
6. Discovery, study, understand and solve optimization techniques using algorithms.

REFERENCES:

1. Optimization theory & Applications / S.S. Rao/ New AgeInternational.
2. Engineering Optimization-Kalyan Deb/PHI
3. Introductory to operation Research / Kanan& Kumar /Springer
4. Optimization Techniques theory and practice / M.C.Joshi, K.M. Moudgalya/Narosa Publications
5. Operation Research / H.A. Taha/TMH
7. Optimization in operations research / R.L Rardin
8. Optimization Techniques /Benugundu&Chandraputla / PearsonAsia

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)****(M20CE27)WASTE MANAGEMENT
(OPEN ELECTIVE)****M.Tech:III-Semester****L/T/P/C
3/ 0/ 0/ 3**

Course Objective: This course covers various aspects of hazardous waste, biomedical waste and E-waste such as collection, segregation, recovery, labeling requirements, storage areas, treatment and disposal facilities.

UNIT-I:

Sources, Composition and characteristic of hazardous waste, Hazardous Waste (Management and Handling) Rules, 1989 and amendments, Federal Hazardous Waste Regulations under RCRA, Superfund, CERCLA and SARA. Toxicology, public health impact, Protocols, issues and challenges in transportation of hazardous waste.

UNIT-II:

Municipal Solid Waste Management – Fundamentals Sources; composition; generation rates; collection of waste; separation, transfer and transport of waste; treatment and disposal options Radioactive Waste Management – Fundamentals Sources, measures and health effects; nuclear power plants and fuel production; waste generation from nuclear power plants; disposal options

UNIT-III:

Characterization of medical waste- Bio-medical wastes (Management and Handling) Rules, 1998, Amendments and guidelines, segregation, packaging, storage, transport of infectious waste. Techniques of Biomedical waste management. Health and safety rules. Protocols, issues and challenges in transportation of Biomedical waste.

UNIT-IV:

Treatment method- Autoclave, Hydroclave, Microwave, Chemical Disinfection, Solidification and stabilization, Bioremediation, Thermal Conversion Technologies, accumulation and storage of hazardous waste, land disposal of hazardous waste, other treatment and disposal method. Common Hazardous Waste Treatment facilities (TSDF).

UNIT-V:

E-waste: Introduction, toxicity due to hazardous substances in e-waste and their impacts, domestic e-waste disposal, e-waste management, technologies for recovery of resource from electronic waste, guidelines for environmentally sound management of e-waste, occupational and environmental health perspectives of recycling e-waste in India.

Course Outcomes:

After the completion of this course the students should be able to :

1. Compare the subject from the technical, legal and economical points.
2. Learn solid waste management.
3. Describe environment for sound management.
4. Understand a municipal solid waste management system.
5. Plan a solid waste management system for decision makers.
6. Design an incineration facility.

Reference Books:

- Tchobanoglous G., Theisen H., Viquel S.A., “Integrated Solid Waste Management: Engineering, Principles and Management Issues”, Tata McGraw Hill Publishing Company Ltd., New Delhi.
- CPHEEO Manual on Municipal Solid Waste Management.
- Peavy H.S., Rowe D.R., Tchobanoglous G., “Environmental Engineering”, Tata McGraw Hill Publishing Company Ltd., New Delhi.
- Cunningham W.P., Cunningham M.A., “Principles of Environmental Science”, Tata McGraw Hill Publishing Company Ltd., New Delhi.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**(M20VL07) EMBEDDED SYSTEM DESIGN
(OPEN ELECTIVE)**

M.Tech:III-Semester

**L/T/P/C
3/ 0/ 0/ 3**

Course Objectives:

To explain various embedded system applications and design requirements.

- To construct embedded system hardware.
- To develop software programs to control embedded system.
- To generate product specification for embedded system.

UNIT-I:

Introduction to Embedded Systems: Embedded Systems, Processor Embedded into a System, Embedded Hardware Units and Devices in a System, Embedded Software, Complex System Design, Design Process in Embedded System, Formalization of System Design, Classification of Embedded Systems

UNIT-II:

8051 and Advanced Processor Architecture: 8051 Architecture, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts, Introduction to Advanced Architectures, Real World Interfacing, Processor and Memory organization - Devices and Communication Buses for Devices Network: Serial and parallel Devices & ports, Wireless Devices, Timer and Counting Devices, Watchdog Timer, Real Time Clock, Networked Embedded Systems, Internet Enabled Systems, Wireless and Mobile System protocols

UNIT-III:

Embedded Programming Concepts: Software programming in Assembly language and High Level Language, Data types, Structures, Modifiers, Loops and Pointers, Macros and Functions, object oriented Programming, Embedded Programming in C++ & JAVA

UNIT-IV:

Real – Time Operating Systems: OS Services, Process and Memory Management, Real – Time Operating Systems, Basic Design Using an RTOS, Task Scheduling Models, Interrupt Latency, Response of Task as Performance Metrics - RTOS Programming: Basic functions and Types of RTOSes, RTOS VxWorks, Windows CE

UNIT-V:

Embedded Software Development Process and Tools: Introduction to Embedded Software Development Process and Tools, Host and Target Machines, Linking and Locating Software, Getting Embedded Software into the Target System, Issues in Hardware-Software Design and Co- Design - Testing, Simulation and Debugging Techniques and Tools: Testing on Host Machine, Simulators, Laboratory Tools

Course Outcomes:

After the completion of this course the students should be able to :

1. Describe embedded systems, design, technology to explain its metrics or challenges.
2. Design custom single-purpose processors using combinational as well as sequential logic.
3. Discuss about optimizing single – purpose processors. Discuss about the basic architecture and operation of general purpose processors.
4. Define and distinguish between a timer and a counter, various types of timers and Universal Asynchronous Receiver/Transmitter. Explain controllers for LCD, Keypad and Stepper Motor.

5. Discuss common memory types ROM, RAM, advanced RAM. Explain microprocessor interfacing and arbitration methods, various protocols like serial, parallel.
6. Explain basics of interrupts, architectures like Round Robin, Real – Time Operating System architecture.

TEXT BOOK:

1. Embedded Systems, Raj Kamal, Second EditionTMH.
2. Introduction to Embedded Systems byK.V.Shibu.

REFERENCE BOOKS:

1. Embedded/Real-Time Systems, Dr. K.V.K.K. Prasad, dream Tech press
2. The 8051 Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Pearson.
3. The 8051 Microcontroller, Third Edition, Kenneth J. Ayala, Thomson.
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. Micro Controllers, Ajay V Deshmukhi, TMH.
6. Microcontrollers, Raj Kamal, Pearson Education.
7. Introduction to Embedded Systems, Shibu K. V, TMH.

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONMOUS)**

(M20CY15) PROJECT/DISSERTATION PHASE – I

M.Tech:III-Semester

**L/T/P/C
0/0/20/10**

**VAAGDEVI COLLEGE OF ENGINEERING
(AUTONMOUS)**

(M20CY16) PROJECT/DISSERTATION PHASE – II

M.Tech: IV-Semester

**L/T/P/C
0/0/32/16**