

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT (Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATEGOR Y	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MBAI301C	AECC	Advance Human Values	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
 ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

Course Objective The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of “right” and “good” in individual, social and professional context.

Course Outcomes (COs):

1. Help the students to understand right conduct in life.
2. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect personal and professional life.

SYLLABUS:

Unit I: Inculcating Values at Workplace

1. Values: Concept, Sources, Essence
2. Classification of Values.
3. Values in Indian Culture and Management: Four False Views, Value Tree
4. Eastern and Western Values; Values for Global Managers

Unit II: Professional Ethics

1. Ethics: Concept, Five Ps of Ethical Power, Organisational Tools to Cultivate Ethics
2. Theories of Ethics: Teleological and Deontological
3. Benefits of Managing Ethics in an Organisation
4. Ethical Leadership

Unit III: Indian Ethos and Management Style

1. Indian Ethos and Workplace
2. Emerging Managerial Practices
3. Ethical Considerations in Decision Making and Indian Management Model
4. Core Strategies in Indian Wisdom and Ethical Constraints

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT (Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATEGOR Y	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MBAI301C	AECC	Advance Human Values	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
 ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit IV: Human Behavior – Indian Thoughts

1. Guna Theory
2. Sanskara Theory
3. Nishkama Karma
4. Yoga: Types, Gains; Stress and Yoga

Unit V: Spirituality and Corporate World

1. Spirituality: Concept, Paths to Spirituality
2. Instruments to achieve spirituality
3. Vedantic Approach to Spiritual and Ethical Development
4. Indian Spiritual Tradition.

Suggested Readings

1. Kausahl, Shyam L. (2006). Business Ethics – Concepts, Crisis and Solutions. New Delhi: Deep and Deep Publications Pvt. Limited
2. Murthy, C.S.V. (2012). Business Ethics –Text and Cases. Himalaya Publishing House: Mumbai
3. Chakraborty, S. K. (1999). Values and Ethics for Organizations. Oxford university press
4. D.Senthil Kumar and A. SenthilRajan (2008). Business Ethics and Values. Himalaya Publishing House: Mumbai

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
IT(Information Security)
SEMESTER-I (2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTIT101N		Applied Cryptography	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective:

To impart the knowledge of encryption and decryption techniques and their applications in managing the security of data.

COURSE CONTENT

Unit I : Modular Arithmetic and Multiplicative Group

Modular Arithmetic for advanced cryptography, Multiplicative group of integers ,order of an element in generator of , extended Euclidean algorithm, Pohlig-Hellman and Pollard-Rho algorithm for computing DLP,Integer factorization problems, Pollard-Rho factoring algorithm.

Unit II : Tools for Symmetric key & Public key Cryptography

Shannon ciphers and perfect security, computational ciphers and semantic security, efficient adversaries and attack games, trapdoor function schemes, trapdoor function pair schemes, ElGamal cryptographic system, ElGamal digital signatures, fun applications.

Unit III : Block Ciphers and Their Attacks

Polynomial arithmetic, finite field $GF(2^n)$, constructing block cipher in practice, sophisticated attacks on blockciphers, case study block cipher AES: AES structure, AES transformation functions, AES key expansions, AES Implementation, fun applications.

Unit IV : Cryptanalysis, IDS and Attacks

Intrusion detection system (IDS), cross site scripting attacks, SQL injection attacks, fault injection attacks, side channel attacks, algorithmic attacks.

Unit V : Asymmetric Key Cryptosystems

MD5 Message Digest Algorithm, Message authentic codes, Hash functions, Secure Hash Algorithms, Hash based message authentic code. Elliptical Curve Cryptography (ECC). Problems with the public key exchange.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2021-2025)

COURSE CODE	CATEG ORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTIT101N		Applied Cryptography	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Text and Reference books:

- [1] Douglas R. Stinson;” Cryptography Theory and Practice” ; Chapman & Hall/CRC
- [2] Williams Stallings; “Cryptography & Network Security” ; Pearson Education.
- [3] Mathew Bishop; Introduction to computer Security; Addison-Wisley
- [4] Atul Kahate; “Cryptography and Network Security” ; Tata McGraw-Hill.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATE GORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessme nt*	END SEM University Exam	Teachers Assessme nt*				
MTIT102N		Secure Computing Techniques	60-	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

This course aims to provide an understanding of the various security attacks and knowledge to recognize and remove common coding errors that lead to vulnerabilities. It gives an outline of the techniques for developing a secure application

Syllabus:

Unit-I: Introduction Security: CIA (AIC) Triad, Viruses, Trojans, and Worms In a Nutshell, Security Concepts- exploit, threat,vulnerability, risk, attack. Malware Terminology: Rootkits, Trapdoors, Botnets, Key loggers, Honeypots. Active and Passive Security Attacks, IP Spoofing, Tear drop, DoS, DDoS, XSS, SQL injection, Smurf, Man in middle, Format String attack. Types of Security Vulnerabilities: buffer overflows, invalidated input, race conditions, access-control problems, weaknesses in authentication, authorization, or cryptographic practices. Access Control Problems.

Unit-II: Secure Software Development Cycle & Threat Modelling

Need for Secure Systems: Proactive Security development process, Secure Software Development Cycle (S-SDLC) Security issues while writing SRS, Design phase security, Development Phase, Test Phase, Maintenance Phase,Writing Secure Code – Best Practices SD3 (Secure by design, default and deployment), Security principles and Secure Product Development Timeline. Identifying the Threats by Using Attack Trees and rating threats using DREAD, Risk Mitigation Techniques and Security Best Practices. Security techniques, authentication, authorization. Defence in Depth and Principle of Least Privilege.

Unit – III: Secure Coding Techniques

Protection against DoS attacks, Application Failure Attacks, CPU Starvation Attacks, Insecure Coding Practices in Java Technology: ARP Spoofing and its countermeasures. Buffer Overrun-Stack overrun, Heap Overrun, ArrayIndexing Errors,FormatString Bugs. Security Issues in C/C++ Language: String Handling, Avoiding Integer Overflows and Underflows and Type Conversion Issues- Memory Management Issues, Code Injection Attacks,Canary based countermeasures using StackGuard and Propolice. Socket Security, Avoiding Server Hijacking, Securing RPC, ActiveX and DCOM. Secure coding issues in Android Applications, Language Specific issues like C/C++, Perl, Python, Scripting Languages, Ada, Java, PHP etc.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATE GORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assesse ment*	END SEM University Exam	Teachers Assesse ment*				
MTIT102N		Secure Computing Techniques	60-	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit – IV: Database and Web-specific issues

SQL Injection Techniques and Remedies, Race conditions, Time of Check Versus Time of Use and its protection mechanisms. Validating Input and Interprocess Communication, Securing Signal Handlers and File Operations. XSS scripting attack and its types – Persistent and Non persistent attack XSS Countermeasures and Bypassing the XSS Filters.

Unit – V: Testing Secure Applications

Security code overview, secure software installation. The Role of the Security Tester, Building the Security Test Plan. Testing HTTP-Based Applications, Testing File-Based Applications, Testing Clients with Rogue Servers.

Text and Reference books:

- [1] Writing Secure Code, Michael Howard and David LeBlanc, Microsoft Press, 2nd Edition, 2004
- [2] Buffer Overflow Attacks: Detect, Exploit, Prevent by Jason Decker, Syngress, 1st Edition, 2005
- [3] Threat Modeling, Frank Swiderski and Window Snyder, Microsoft Professional, 1st Edition, 2004.
- [4] Secure Programming HOWTO by David A. Wheeler
- [5] Secure Coding: Principles & Practices by Mark G. Graff, Kenneth R. van Wyk

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATE GORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTIT103N		Advanced Database Management Systems	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective:

To enhance the understanding of practical issues related to advance topics of Database systems.

COURSE CONTENT

Unit I : Introduction to Data Warehousing and Data Mining

Introduction to Knowledge discovery process, OLTP, OLAP, Data Mining: Functionalities, Process, Schemas and Applications etc.; Data Warehouse : Construction and other issues.

Unit II : Transaction Processing and Concurrency Control

Introduction, Properties; Schedules, Types of Schedules, Characterizing Schedules, Serializability, Two-phase locking, Dealing with Deadlock and Starvation, Time Stamp Ordering and Multi version Concurrency control etc.

Unit III : Data Storage, Indexing and Physical Database Design

Types of Files, Introduction to Hashing, Multilevel Indexes, B-trees, B+ -trees, Indexes on Multiple Keys, Overview of Physical Database Design and Database Tuning in Relational Databases

Unit IV : Query Optimization

Introduction to Query Optimization, Overview of algorithms used in External Sorting and other SQL operations, Use of Heuristics, Cost Estimation and Selectivity used in Query Optimization, Semantic Query Optimization etc.

Unit V : Distributed Databases and Security

Concepts, Types and Query Processing in Distributed Databases, Data Fragmentation, Replication and Allocation Techniques, Introduction to Database Security Issues, Access Control Policy, Statistical Database Security etc.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATE GORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTIT103N		Advanced Database Management Systems	60	20	20	30	20	3	0	2	4

Text and Reference books:

- [1] Fundamentals of Database Systems, Elmasri and Navathe, Pearson Education, 6th Edition, 2014.
- [2] Data Mining Concepts and Techniques, Han and Kamber, Morgan Kauffman, 3rd Edition, India, 2012.
- [3] Database System Concepts, Silberchatz, Korth, Sudarshan, Mcgraw Hill, 6th Edition, 2010.
- [4] Database Systems : A practical Approach to Design, Implementation, and Management, Connolly and Begg, Pearson Education, 6th Edition, 2014.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY								
			END SEM University Exam	Two Term Exam	Teachers Assessment* END SEM University	Teachers Assessment* END SEM University	Teachers Assessment* END SEM University				
MTIT104N		Secure Software Engineering	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
 *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

1. Know the importance and need for software security.
2. Know about various attacks.
3. Learn about secure software design.
4. Understand risk management in secure software development.
5. Know the working of tools related to software security.

UNIT I

NEED OF SOFTWARE SECURITY AND LOW-LEVEL ATTACKS

Software Assurance and Software Security - Threats to software security - Sources of software insecurity - Benefits of Detecting Software Security - Properties of Secure Software – MemoryBased Attacks: Low-Level Attacks Against Heap and Stack - Defense Against Memory-Based Attacks

UNIT II

SECURE SOFTWARE DESIGN

Requirements Engineering for secure software - SQUARE process Model - Requirements elicitation and prioritization- Isolating The Effects of Untrusted Executable Content – Stack Inspection – Policy Specification Languages – Vulnerability Trends – Buffer Overflow – Code Injection - Session Hijacking. Secure Design - Threat Modeling and Security Design Principles

UNIT III

SECURITY RISK MANAGEMENT

Risk Management Life Cycle – Risk Profiling – Risk Exposure Factors – Risk Evaluation andMitigation – Risk Assessment Techniques – Threat and Vulnerability Management

UNIT IV

SECURITY TESTING

Traditional Software Testing – Comparison - Secure Software Development Life Cycle – Risk Based Security Testing – Prioritizing Security Testing With Threat Modeling – Penetration Testing– Planning and Scoping - Enumeration – Remote Exploitation – Web Application Exploitation -Exploits and Client Side Attacks – Post Exploitation – Bypassing Firewalls and Avoiding Detection- Tools for Penetration Testing

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY								
			END SEM University Exam	Two Term Exam	Teachers Assessment* END SEM University	Teachers Assessment* END SEM University	Teachers Assessment* END SEM University				
MTIT104N		Secure Software Engineering	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V

SECURE PROJECT MANAGEMENT

Governance and security - Adopting an enterprise software security framework - Security and project management - Maturity of Practice

PRACTICAL

1. Implement the SQL injection attack.
2. Implement the Buffer Overflow attack.
3. Implement Cross Site Scripting and Prevent XSS.
4. Perform Penetration testing on a web application to gather information about the system, then initiate XSS and SQL injection attacks using tools like Kali Linux.
5. Develop and test the secure test cases
6. Penetration test using kali Linux

TEXT BOOKS:

1. Julia H. Allen, “Software Security Engineering” , Pearson Education, 2008
2. Evan Wheeler, “Security Risk Management: Building an Information Security Risk Management Program from the Ground Up” , First edition, Syngress Publishing, 2011
3. Chris Wysopal, Lucas Nelson, Dino Dai Zovi, and Elfriede Dustin, “The Art of Software Security Testing: Identifying Software Security Flaws (Symantec Press)” , Addison-Wesley Professional, 2006

REFERENCES:

1. Robert C. Seacord, “Secure Coding in C and C++ (SEI Series in Software Engineering)” , Addison-Wesley Professional, 2005.
2. Jon Erickson, “Hacking: The Art of Exploitation” , 2nd Edition, No Starch Press, 2008.
3. Mike Shema, “Hacking Web Apps: Detecting and Preventing Web Application Security Problems” , First edition, Syngress Publishing, 2012

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020

IT(Information Security)
SEMESTER-I (2023-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY								
			END SEM University Exam	Two Term Exam	Teachers Assessment* END SEM University	Teachers Assessment*					
MTIT104N		Secure Software Engineering	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

4. Bryan Sullivan and Vincent Liu, “Web Application Security, A Beginner's Guide” ,
Kindle
Edition, McGraw Hill, 2012
5. Lee Allen, “Advanced Penetration Testing for Highly-Secured Environments: The
Ultimate
Security Guide (Open Source: Community Experience Distilled)” , Kindle Edition,
Packt
Publishing,2012
6. Jason Grembi, “ Developing Secure Software ” .

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore