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-II (2023-2025)

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 *				
MTRM301	**AECC**	**Research Methodology in Engineering**	**60**	**20**	**20**	0	0	**3**	**1**	**0**	**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):
The course has been developed with orientation towards research related activities and recognizing:
1. the ensuing knowledge as property.
2. To plan and design business research using scientific and statistical methods.

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to
1. Demonstrate understanding of research methodology.
2. Apply the statistical concepts in business research.
3. Validate statistical statements relating to business research.

SYLLABUS

UNIT–I **10HRS**
Business Research
1. An overview: Research process
2. Types of Research - Exploratory Research, Descriptive Research, Causal Research, Analytical Research
3. Problem formulation, Management problem v/s. Research problem
4. Approaches to Research
5. Importance of literature review
6. Business Research Design: Steps involved in a research design

UNIT–II **9HRS**
Sampling and Data Collection
1. Sampling and sampling distribution: Meaning, Steps in Sampling process
2. Types of Sampling - Probability and Non probability Sampling Techniques
3. Data collection: Primary and Secondary data – Sources – Advantages/Disadvantages
4. Data collection Methods: Observations, Survey, Interview and Questionnaire design, Qualitative Techniques of data collection. *

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UNIT–III **8HRS**

Measurement and Scaling Techniques

1. Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Criteria for good measurement
2. Attitude measurement – Likert′s Scale, Semantic Differential Scale, Thurstone-equal appearing interval scale

UNIT–IV **7HRS**

Statistical Tools for Data Analysis

1. Measures of central tendency - Mean, Median, Mode ,Quartiles, Deciles and Percentiles
2. Measures of Dispersion: Standard Deviation – Variance – Coefficient of Variance, Skewness
3. Correlation - Karl Pearson′s coefficient of Correlation, Rank Correlation
4. Regression: Method of Least Squares
5. Formulation of hypothesis
6. Testing of hypothesis
7. Type I and Type II Errors.
8. Parametric tests: Z-Test, t-test, F-test, Analysis of Variance – One-Way and Two-way classification.
9. Non parametric tests - Chi-Square test

UNIT–V **8HRS**

Report writing

1.Reporting Research
2.Types of reports
3.Characteristics of a research report

SUGESTED READINGS:

1. MalhotraNaresh K. (2008). Marketing Research. Pearson publishers, Latest Edition.
2. Zikmund, Babin,Carr,Griffin (2003). Business Research Methods. Cengage Learning, India, Latest Edition.
3. Cooper Donald R and Schindler Pamela S. (2006). Business Research Methods. McGraw-Hill Education, Latest
Edition.

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4. Anderson, Sweeney, William, Cam (2014). Statistics for Business and Economics. Cengage Learning, Latest
Edition.
5. Krishnaswami O. R., Ranganatham M. (2011). Methodology of Research in Social Sciences. Himalaya Publishing
House, Latest Edition.
6. Levin and Rubin (2008). Statistics for Management. Dorling Kindersley Pvt Ltd, Latest Edition.

7. Sekaran Uma (2003). Research Methods for Business. Wiley India, Latest Edition.
8. Gupta S. P. (2014). Statistical Methods. Sultan Chand and Sons, Latest Edition.
9. Aczel and Sounderpandian (2008). Complete Business Statistics. Tata-McGraw Hill,Latest Edition.
10. Kothari C. R. (2004). Research Methodology. VishwaPrakashan, Latest Edition.

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MTIT201N		**Data Security**	**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 impart the knowledge of encryption and decryption techniques and their applications in managing the security of data.

COURSE CONTENT

Unit I : Foundation Security Taxonomy, Domain of information security, security goals, security approaches, principles of security, security attacks, threats, vulnerabilities, malicious software′s, virus, worms, Trojan, spy wares, Applets/Active X,cookies. Security services, mechanisms and security models. Types of attacks, packet sniffing, packet spoofing, IPsniffing, IP spoofing, DNS spoofing attack.

Unit II : Classical Cryptographic Techniques
Cryptography terminologies, classical cryptography: substitution techniques, transposition techniques, playfair cipher, Hill cipher. Mathematics of cryptography: Integer arithmetic, modular arithmetic, Elucid theorem, Concept of symmetric and asymmetric key cryptography, stenography, digital watermarking, key range and size, possible types of attacks. Stream ciphers and Block cipher. Algorithm type and modes. Key distribution, Deffie Hellman key exchange, Man in the middle attack.

Unit III : Symmetric Key Algorithms
Computer based symmetric key cryptographic algorithms: Data Encryption Standard (DES), Double DES, meet in the middle attack, Triple DES, International Data Encryption Algorithm (IDEA), RC5, Blowfish, Advance Encryption Standard (AES).

Unit IV : Asymmetric Key Algorithms

Random number generation, Prime numbers. Fermat′s and Euler′s theorem. Principles of public key crypto systems.Computer based asymmetric key cryptographic algorithms: RSA algorithm. Principles of public key cryptosystems, symmetric and asymmetric key cryptography together. Concept of Digital Envelope, Digital signatures, message digests and its requirements.

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MTIT201N		**Data Security**	**60**	**20**	**20**	**30**	**20**	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
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Unit V : Public Key Crptosystems

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.

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.

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MTIT202N		Secure Wireless Network	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:

1 Provide students with enhance base of knowledge of wireless networking.
2 Learn Security Issues in different wireless networks and mitigation techniques
3 Develop a comprehensive knowledge of Tools and Techniques used in Management of
wireless Networks
4 Develop ability to carry out research in area of security in wireless Networks

COURSE CONTENT

Unit I : Foundation Review of wireless communication Technologies : Cellular Networks, Wireless LAN, Prersonal Area Networks,Adhoc and Sensor Networks, Challenges in Adhoc and Sensor networks: Constrained Resources, Security, Mobility

Unit II :Adaptability in Mobile computing, Mobility Management: Location Management Principles and Techniques, Data Dissemination and Management.

Unit III : Mobile and Wireless Security Issues, Approaches to security, Security in Wireless Personal Area Networks: Bluetooth Security Modes, Bluetooth Security Mechanisms, Authentication and Encryption in Bluetooth networks.

Unit IV :**Security in Wireless Local Area Networks**: WEP, WPA, IEEE802.11i, Security in Metropolitan Area Networks: IEEE 802.16 and Security.

Unit V :Security in Wide Area Networks: GSM Security, Four Generations of Wireless: 1G-4G, limitations and Security.Security in Ad hoc and Sensor networks.

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MTIT202N		Secure Wireless Network	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.

Text and Reference books:

[1] Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, S.K. Gupta, G. Richard
[2] III, L. Schwiebert, Mc Graw Hill, Ed.2005.
[3] Hacking Exposed : Mobile Secrets & Solutions, N.Bergman, M.Stanfield, J.Rose, J. Scambray.
[4] Building Secure Wireless Networks with 802.11, Jahanzeb Khan and Anis Khwaja, Wiley 2003.
[5] Ad Hoc Wireless Networks - Architectures and Protocols, C.Siva Ram Murthy and B.S.Manoj.,Prentice Hall, 2004
[6] Technical Papers.

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MTIT203N		**Cloud Security**	**60**	**20**	**20**	**0**	**0**	2	0	0	2

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. To understand Cloud concepts, introduction to IBM cloud,
2. To understand ISO 27017-Cloud Security, PCI
3. To Understand DSS Controls
4. To Understand Flips Levels and Learners will be able
5. To Understand how to work on containerization concept using Docker as a Tool and will work on Kubernetes.

Course Outcomes:

After the successful completion of this course students will be able to:
1. Set Cloud computing security guidelines set forth by ISO, NIST, ENISA and Cloud Security Alliance (CSA).
2. Design Cloud security architectures that assure secure isolation of compute, network and storage infrastructures/
3. Comprehensive data protection, end-to-end identity and access management
4. Monitoring and auditing processes and compliance with industry and regulatory mandates.
5. Fundamentals of cloud computing architectures based on current standards, protocols, And best practices

Syllabus:

Unit 1

- Cloud security model
- Introduction of IBM cloud
- Network parameters and cryptography

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MTIT203N		**Cloud Security**	**60**	**20**	**20**	**0**	**0**	2	0	0	2

Unit 2

- FIPS
- Management plan implementation
- What is forensic science
- Gap analysis
- Risk terminology
- The CSA STAR component and supply chain

Unit 3

- Key data function
- Access process and share
- Data dipression in the cloud security
- Threats to storage types: Gateway encryption key storage in cloud

Containerization data deidentification Anonymization DLP, DRM, SDN Dataprotection risk

Unit 4

- Key regulations for CSP Facilities
- BIA
- Phases and methodologies
- Threat modelling
- Software supply chain management

Unit 5

- Federated identity management
- WS federation
- O Auth 2.0
- Open id connect
- Database activity monitor
- Cloud secured development lifecycle
- Open web aap security project
- DRS performance monitoring
- IDS

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MTIT203N		**Cloud Security**	**60**	**20**	**20**	**0**	**0**	2	0	0	2

TEXT/REFERENCE BOOKS:

1. Cloud Computing Security: John R. Vacca
2. Cloud Security: A Comprehensive Guide to Secure Cloud
3. Computing: Russell Dean Vines, Ronald L. Kurtz

EXPERIMENT LIST

1. Configuring IBM Cloud account and create an application using Cloud Foundry Service on IBM Cloud.
2. Deploying an application on IBM Cloud using CLI
3. Deploying an application on IBM Cloud using Git
4. Implementation of containerization using Docker
5. Create a text to speech service using Node-Red
6. Create a Language Translator service using Node-Red
7. How to create I′d in salesforce Developer
8. Deploying and Create Object in Salesforce
9. Securing a web application with single sign-on
10. Configuring Identity and Access management service on cloud environment

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MTIT204N	**DSE**	**Information Theory and Coding**	60	20	20	0	0	3	0	0	3

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Course Educational Objectives (CEOs):

The student will have ability to:

1. Students should be able to calculate the information content of a random variable from its probability distribution relate condition and marginal entropies of variables interims of their coupled probabilities.
2. Channel capacities and properties using Shannon's Theorems construct efficient client codes for data on imperfect communication channels generalize the discrete concepts to continuous signals on continuous channels understand.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Students will be introduced to the basic notions of information and channel capacity.
2. Derive equations for entropy mutual information and channel capacity for all types of channels.
3. Design a digital communication system by selecting an appropriate error correcting codes for a particular application

Syllabus:

UNIT I **9HRS**

Introduction of Information Theory: Introduction, Measure of information, Average information content of symbols in long independent sequences, Average information content of symbols in long dependent sequences. Mark off statistical model for information source, Entropy and information rate of mark off source.

UNIT II **9HRS**

Source Coding: Encoding of the source output, Shannon‟s encoding algorithm. Communication Channels, Discrete communication channels, Continuous channels.

Fundamental Limits on Performance: Source coding theorem, Huffman coding, Discrete memory less Channels, Mutual information, Channel Capacity.

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MTIT204N	**DSE**	**Information Theory and Coding**	60	20	20	0	0	3	0	0	3

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UNIT III **9HRS**

Channel: Channel coding theorem, Differential entropy and mutual information for continuous ensembles, Channel capacity Theorem Introduction.

Introduction to Error Control Coding: Types of errors, examples, Types of codes Linear BlockCodes: Matrix description, Error detection and correction, Standard arrays and table look up forDecoding

UNIT IV **8HRS**

Cyclic Codes: Binary Cycle Codes, Algebraic structures of cyclic codes, Encoding using an (n-k) bitshift register, Syndrome calculation. BCH codes. RS codes, Golay codes, Shortened cyclic codes, Burst error correcting codes. Burst and Random Error correcting codes.

UNIT V **7HRS**

Convolution Codes: Convolution Codes, Time domain approach. Transform domain approach.

Text Books:

1. Information Theory, Coding and Cryptography, Ranjan Bose, TMH, III edition, 2017

References:

1. Digital Communications Glover and Grant, Pearson Ed. 2nd Ed 2008.
2. Information Theory and Coding, K. N. Hari Bhat, D. Ganesh Rao, Cengage, 2017.
3. Digital and analog communication systems, K. Sam Shanmugam, Wiley,1996.
4. Digital communication, Simon Haykin, Wiley, 2003.

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