Vidya Pratishthan's
Kamalnayan Bajaj Institute of Engineering and Technology
(Autonomous Institute)

Faculty of Science and Technology

Board of Studies

Information Technology

Syllabus

Multi-Disciplinary Minor

(2024 Pattern)
(w.e.f. AY: 2025-26)

Syllabus: Multidisciplinary Minor Information Technology w. e. f. AY:2025-2026															
SEMESTER- III,IV,V,VI,VII															
Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks						Credits				
		TH	PR	TUT	CAA	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
IT24051	Cyber Security	2	2		10		60	30			100	2	1		3
IT24052	Full Stack Development	2	2		10		60	30			100	2	1		3
IT24053	Data Structure	2	2		10		60	30			100	2	1		3

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Engg. / 152 / 2008
PUNE (MS.)

Bucket of Multidisciplinary Minor Course

Multidisciplinary Minor Courses			
Course Code	**Course Name**	**Course Code**	**Course Name**
3 Credit MDM		**4 Credit MDM**	
AI24052	Data Science	GS24051	Nanotechnology
IT24051	Cyber security	ET24053	Internet of Things
IT24052	Full Stack Development	CE24051	Waste Management
EL24052	Industrial Automation	CO24052	High Performance Computing (Sem V+)
ET24051	Embedded Systems	CO24053	Computer Graphics & Gaming
EL24051	Solar Technology	ME24052	Robotics & Automation
GS24052	Linear Algebra and Statistics	AI24051	AI & Machine Learning
CO24053	Object Oriented Programming	CO24051	Cloud Computing
IT24054	Data Structure	ET24052	Drone Technology
ET24054	Microprocessor	ME24051	3-D Printing
		CE24052	Green building & smart cities

IT23051: Cyber Security

Course Code : IT23051	Course Credits: 03	Course type: MDM

Teaching Scheme			Evaluation Scheme					
TH	PR	TUT	CAA	ISE	ESE	TW	PR	OR
2	2	-	10	-	60	30	-	-

Prerequisite Course Mapping:

1. Basics of Computer Network
2. Basics of Computer Programming

Future Course Mapping: Cryptography and Network Security

Importance of Course: Students will able to learn terms in cyber security

Course Objectives:

1. To understand the basic approaches in cyber security and Information Security
2. To analyze the cryptography and networking terms
3. To understand about different types of hacking and cyber-crimes
4. To apply and analyze the issues related to cyber forensics

Course Outcomes:

1. Understand various basic approaches in cyber security and Information Security
2. Understand Cryptography and network basics
3. To analyze the types of hacking and cybercrimes.
4. Understand cyber forensics

Syllabus

Unit No.	Syllabus	Teaching Hours
I	**Introduction to Cyber Security,Information Security Basics** **Computer Security Concepts**: Confidentiality, Integrity & Availability (CIA), additional Security considerations, The challenges of Security, Threats, Attacks and Assets, Operational Model of Security; **Basics:** Symmetric and Asymmetric Cipher Model; Cryptography; Cryptanalysis and Brute-Force Attack. **Cyber Security Basics**: Introduction to Cyber Security, Need, Importance and challenges in Cyber Security, Cyberspace, Cyber threats, Cyber-warfare, Cyber Terrorism	6
II	**Network Fundamentals, Cryptography Basics** LAN, MAN, WAN, Wi-Fi, Network Protocols (TCP/IP, DNS, HTTP), Network Devices (Routers, Switches, Firewalls) **Cryptography Basics**: Encryption, Decryption, Types of Encryption (Symmetric Cipher-DES, Asymmetric Cipher-RSA, Diffie Hellman, Cryptographic Hash functions and Message Authentication codes)	6
III	**Cyber Crimes and Hacking** **Overview** of Cyber-Attacks and Vulnerabilities, Types of Threats – Malware, spyware, Sniffing, Gaining Access, Escalating Privileges, Executing Applications, Hiding Files, Covering Tracks, Worms, Trojans, Viruses, Backdoors. **Types of Cyber Crime**: cyber stalking, forgery, software piracy, cyber terrorism, phishing, computer vandalism, computer hacking, creating and distributing viruses over the internet, spamming, cross site scripting, online auction fraud, cyber-squatting,	6

	logic bombs, web jacking, internet time thefts, DoS attack, salami attack, data diddling, email spoofing. Types of Hacker, Hacking and Cracking, Hacking: Ethical issues, Ethical Hacking	
IV	**Cyber Forensics** **Introduction to Cyber Forensics:** What are cyber forensics, cyber forensics investigation process, digital evidence, challenges in cyber forensics; Web Attack Forensics: Intrusion forensics, database forensics, preventive forensics; Anti- forensics practices, Anti-forensics detection techniques, Network forensics analysis tools; Malware Forensics: Malware types, Malware Analysis, Tools for analysis; Email Forensics: e-mail Protocols, email crimes, email forensics; Bitcoin Forensics: crypto currency, crimes related to bitcoin	6

LIST OF PRACTICAL ASSIGNMENTS

1. Study of the features of firewalls in providing network security and to set Firewall Security in windows.
2. Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
3. Web Security Labs: set up a vulnerable web application (eg .OWASP WebGoat),Test for SQL injection and cross site scripting(XSS).Use Burp suite to scan for vulnerabilities. Study of different types of vulnerabilities for hacking a websites / Web Applications
4. Malware analysis labs: Analyse malware samples using tools like IDA Pro and OllyDbg .Understand malware behaviors and detection techniques.
5. Installation of Wire shark, tcp dump and observe data transferred in client server communication
6. Study of various attacks on mobile phones, laptops, web applications and IOT devices.
7. Case Study Kali Linux Operating system and security tools in it
8. Case study: Study nmap tool
9. Vulnerability analysis using Nessus tool
10. Packet scanning using Nessus tool

Text Books-

1. Nima Godbole, Sunit Belapure, Cyber Security- Understand Cyber Crimes, Computer Forensics and Legal Perspectives, Wiely India Pvt. Ltd, ISBN- 978-81-265-2179-1
2.K. Kumar, "Cyber Laws: Intellectual property & E Commerce, Security",1st Edition, Dominant Publisher, 2011.

Reference Books-

1. William Stallings, "Cryptography and network security principles and practices", Pearson, 6th Edition, ISBN: 978-93-325-1877-3
2. Atul Kahate, "Cryptography and Network Security", Mc Graw Hill Publication, 2nd Edition, 2008, ISBN: 978- 0-07-064823-4
3. Raghu Santanam, M. Sethumadhavan, "Cyber Security, Cyber Crime and Cyber Forensics: Applications and Perspectives", Information Science Reference Douglas Thomas; Brian Loader, "Cybercrime: Security and Surveillance in the Information Age", 1st Edition, Routledge, 2013.
4. D. Icove, K. Seger, and W. Von Storch, "Computer Crime: A Crime-Fighter's Handbook", O'Reilly, 1995.

IT23052: Full Stack Development

Course Code : IT23052	Course Credits: 03	Course type: MDM

Teaching Scheme			Evaluation Scheme					
TH	PR	TUT	CAA	ISE	ESE	TW	PR	OR
2	2	-	10	-	60	30	-	-

Prerequisite Course Mapping:

1. Academic level web application knowledge.

Future Course Mapping:

1. Website development
2. Core java programming and advanced java programming.

Importance of Course:

This course provides you hands-on experience and exposure to developing single page application for browsers. This course builds strong foundation which will help developer to use concepts for building responsive web application.

Course Objectives:

1. To familiarize students with Web Programming basic concepts.
2. To learn and understand Web scripting languages Develop java programming skill.
3. To explore the Front end & Backend web programming skills.
4. To understand and learn Mobile web development.
5. To understand the Java object oriented concepts.

Course Outcomes:

1. Develop Static and Dynamic website using technologies like HTML, CSS.
2. Demonstrate the use of web scripting languages.
3. Develop web application with AJAX Technologies.
4. Develop mobile website using JQuery Mobile.
5. Develop simple console based application using java.

Syllabus

Unit No.	Syllabus	Teaching Hours
I	**INTRODUCTION TO WEB:** Web Design Principles, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout, Design Concept, Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Audience requirement.	6 Hrs
II	**WEB TECHNOLOGIES** **HTML:** Getting started with HTML, Why HTML, Tags and Elements,	6 Hrs

	Attributes, Properties, Headings list, Links, Tables, Images, HTML Form, Media (Audio, Video), Semantic HTML5 Elements. **CSS:** Why CSS, Types of CSS, How to use CSS, Properties, Classes, Child-Class (Nested CSS), Colours, Text, Background, Border, Margin, Padding, Positioning (flex, grid, inline, block), Animation, Transition. **W3C:** What is W3C; How W3C handles/Supports Web Technologies.	
III	**WEB SCRIPTING LANGUAGES** **JavaScript:** Introduction to Scripting languages, Introduction to JavaScript (JS), JS Variables and Constants. **AJAX:** Why AJAX, Call HTTP Methods Using AJAX, Data Sending, Data Receiving, AJAX Error Handling. **JQUERY: Why** JQuery, How to Use, DOM Manipulation with JQuery.	**6 Hrs**
IV	**INTRODUCTION TO JAVA:** Features of java, JVM, compile time and run time environment, simple java program, data types, java class, object creation, defining method, constructor, inheritance, polymorphism, interface and abstract class.	**6 Hrs**

LIST OF PRACTICAL ASSIGNMENTS

1. Create a simple HTML file to demonstrate the use of various tags used.
2. Create a simple webpage of your choice using HTML.
3. Create a website/page using HTML/CSS/ Java Script about poultry and poultry products. Use photographs wherever required.
4. Write a JavaScript program to display the result of a student.
5. Create a simple webpage using AJAX.
6. Create a simple Mobile Website using jQuery Mobile.
7. Create a single inheritance.
8. Create a multiple inheritance.

Text Books:

1. Kogent Learning Solutions Inc, Web Technologies: HTML, JAVASCRIPT, PHP, JAVA, JSP, XML and AJAX, Blackbook, Dreamtech Press, Second Edition, ISBN: 9788177228496.
2. Raymond Camden, Andy Matthews, JQuery Mobile Web Development Essentials, Packt Publishing, Second Edition, 9781782167891.
3. "Herbert Schildt, "Java: The complete reference", Tata McGraw Hill, 7th Edition.

Reference Books:

1. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81- 265-1635-3
2. Dr.Hiren Joshi, Web Technology and Application Development, DreamTech, First,ISBN:978-93- 5004-088-1.
3. Steven M. Schafer, "HTML, XHTML and CSS", Wiley India Edition, Fourth Edition,978- 81-265- 1635-3
4. T. Budd, "Understanding OOP with Java", Pearson Education, 2nd Updated Edition.

Online Resources:

1. https://www.tutorialspoint.com/ajax/index.htm.
2. https://www.udemy.com/ajax/online-course.
3. https://archive.nptel.ac.in/courses/106/105/106105185/#

DATA STRUCTURES

Course Code : IT24053	Course Credits: 03	Course type: MDM

Teaching Scheme			Evaluation Scheme					
TH	PR	TUT	CAA	ISE	ESE	TW	PR	OR
2	2	-	10	-	60	30	-	-

Prerequisite Course Mapping:
1.Basics of Programming and Problem Solving

Future Course Mapping:
1.Operating System
2.Database Management Systems

Importance of Course: This course will be useful in getting technical knowledge that will be required for software building and in day to day life.

Course Objectives:
1.To understand the standard and abstract data representation methods.
2.To understand various data structures, operations on it and the memory requirements.
3.To understand various data searching and sorting methods.
4.To understand various algorithmic strategies to approach the problem solution.

Course Outcomes:
1. **Understand** the basic terminologies in data structure and Algorithms.
2. **Apply** the concept of array to represent data.
3. **Evaluate** the various searching and sorting techniques.
4. **Differentiate** stack and queue data structures as per applicability.

UNIT No.	Syllabus	Teaching Hours
I	**Introduction:** Data structure, Abstract Data Types (ADT), Data Structure Classifications: Linear and Non-linear, Static and Dynamic, Persistent and Ephemeral data structures. **Algorithms:** Introduction to algorithm, Characteristics of algorithm, Algorithm design tools: Pseudo-code and flowchart.	6
II	**Concept of Sequential Organization:** Overview of Array, Array as an Abstract Data Type, Operations on Array, Merging of two arrays, Storage Representation and their Address Calculation: Row major and Column Major, Multidimensional Arrays: Two-dimensional arrays, n-dimensional arrays. **Sparse Matrix:** Sparse matrix representation using array, Sparse matrix addition, Transpose of sparse matrix	6
III	**Searching:** Search Techniques-Sequential Search/Linear Search and Binary Search. **Sorting:** Types of Sorting-Internal and External Sorting, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Shell Sort, Comparison of Sorting Methods.	6
IV	**Basic concept Stack**, stack Abstract Data Type, Representation of Stacks Using Sequential Organization, stack operations, Multiple Stacks, Applications of Stack. **Basic concept of Queue**, Queue as Abstract Data Type, Representation of Queue using Sequential organization, Queue Operations, Circular Queue and its advantages, Deque-Basic concept, Types.	7

List of Practical Assignments:
1. Implement set operations using arrays and perform union, intersection, difference, symmetric difference.
2.Implement following Matrix operations
a. addition

b. multiplication
c. transpose

3.Implement following Sparse Matrix operations
a. addition
b. simple transpose
c. fast transpose

4. Write a program to store roll numbers of student in array who attended training program in random order. Write functions for searching whether particular student attended training program or not, using Linear search and binary search.

5. Write a program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using
a. Selection Sort
b. Bubble sort and display top five score.

6. Write a program to implement quick sort algorithm.

7. Write program to implement stack using array.

8.Write program for simulating job queue. Write functions to add job and delete job from queue using linear queue.

Text Books :

1.Horowitz and Sahani, "Fundamentals of Data Structures in C++", University Press, ISBN 10: 0716782928 ISBN 13: 9780716782926.
2.G A V Pai, "Data Structures and Algorithms"‖, McGraw-Hill Companies, ISBN -9780070667266
3.Sartaj Sahani, "Data Structures, Algorithms and Applications in C++"‖, Second Edition, University.

Reference Books:

1. Steven S S. Skiena, "The Algorithm Design Manual", Springer, 2nd ed. 2008 Edition, ISBN- 13: 978-1849967204, ISBN-10: 1849967202.
2. M. Weiss, "Data Structures and Algorithm Analysis in C++", 2nd edition, Pearson Education, 2002, ISBN-81-7808-670-0.
3. Brassard and Bratley, "Fundamentals of Algorithmic", Prentice Hall India/Pearson Education, ISBN.

Online Resources:

1.https://nptel.ac.in/courses/106106133.

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