GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN

JODHPUR

SEMESTER SCHEME-2020-21

(SESSION 2021-2022 & ONWARDS)

TEACHING AND EXAMINATION SCHEME AND SYLLABUS

CYBER FORENSICS AND INFORMATION SECURITY

(CI)

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Curriculum Development Cell
Board of Technical Education, Rajasthan
W-6 Residency Road,
Jodhpur

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR

TEACHING AND EXAMINATION SCHEME

(SEMESTER SCHEME-2020-21)

FOR DIPLOMA **III SEMESTER (CYBER FORENSICS AND INFORMATION SECURITY) (CI)**

SESSION 2021-2022 & ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration							Total Marks	Credits
			Hours per week				End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU/Assi	PR(S)		
PC	*CI 3001	Computer Programming	4	--	--	4	60	3	--	--	20	20	--	100	4
PC	$CI 3002	Information Security	4	--	--	4	60	3	--	--	20	20	--	100	4
PC	*CI 3003	Data Structures	2	--	--	2	60	3	--	--	20	20	--	100	2
PC	**CI 3004	Computer System Organisation	3	1	--	4	60	3	--	--	20	20	--	100	4
PC	CI 3005	Digital Forensics	3	1	--	4	60	3	--	--	20	20	--	100	4
PC	*CI 3006	Computer Programming Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	CI 3007	Information Security & Digital Forensics Lab	--	--	4	4	--	--	40	3	--	--	60	100	2
PC	*CI 3008	Data Structures Lab	--	--	2	2	--	--	40	3	--	--	60	100	1
SI	CI 3009	Summer Internship – I (4 weeks after II Sem.)	--	--	--	--	--	--	100	--	--	--	--	100	2
VS	+CI 3333	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	**16**	**2**	**14**	**32**	**300**	**--**	**220**	**--**	**100**	**100**	**280**	**1000**	**27**
													Grand Total :	**1000**	**27**

1. L : Lecture
2. T : Tutorial
3. P : Practical
4. TH : Marks for End Semester Exam for Theory
5. PR : Marks for End Semester Exam for Practical
6. CT : Marks for class tests (Internal Assessment)
7. TU/Assi : Marks for tutorials/Assignment (Internal Assessment)
8. PR(S) : Marks for practical and viva (Internal Assessment)

1. +CI 3333 is same in all branches of Engineering

2. *CI 3001, *CI 3003, *CI 3006, *CI 3008 are same as CB/CS/IT 3001, CB/CS/IT 3003, CB/CS/IT 3006, CB/CS/IT 3008 respectively

3. $CI 3002 is same as CB3002

4. **CI3004 is same as CB/CS 3004

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR

TEACHING AND EXAMINATION SCHEME

FOR DIPLOMA **IV SEMESTER (CYBER FORENSICS AND INFORMATION SECURITY) (CI)**

(SEMESTER SCHEME-2020-21)

SESSION 2021-2022 & ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time				Distribution of Max. Marks/ Duration							Total Marks	Credits
			Hours per week				End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU/Assi	PR(S)		
PC	CI 4001	Operating System Security	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	**CI 4002	Introduction to DBMS	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	**CI 4003	Computer Networks	2	--	--	2	60	3	--	--	20	20	--	100	2
PC	CI 4004	Discrete Structure	3	--	--	3	60	3	--	--	20	20	--	100	3
PC	^CI 4005	Web Technologies	2	--	--	2	60	3	--	--	20	20	--	100	2
PE	CI 4006	**Programme Elective-I** **CI 40061-** Cyber Crimes ^^**CI 40062-** Cyber Laws	3	1	--	4	60	3	---	---	20	20	--	100	4
PC	**CI 4007	Operating System Lab	--	--	2	2	--	--	40	3	--	--	60	100	1
PC	**CI 4008	Introduction to DBMS Lab	--	--	2	2	--	--	40	3	--	--	60	100	1
PC	**CI 4009	Computer Networks Lab	--	--	2	2	--	--	40	3	--	--	60	100	1
PC	^CI 4010	Web Technologies Lab	--	--	2	2	--	--	40	3	--	--	60	100	1
PR	CI 4011	Minor Project	--	--	4	4	--	--	40	--	--	--	60	100	2
AU	+CI 4222	Essence of Indian Knowledge and Tradition	2	--	--	2	--	--	--	--	--	--	--	--	--
VS	+CI 4444	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	**18**	**1**	**16**	**35**	**360**	**--**	**200**	**--**	**120**	**120**	**400**	**1200**	**25**
												Grand Total :		**1200**	**25**

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3. P : Practical
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8. PR(S) : Marks for practical and viva (Internal Assessment)

1. +CI 4222 and +CI 4444 are same in all branches of Engineering

2. **CI 4002 , **CI 4007,**CI4008 and **CI 4009 are same as CS/IT 4002 , CS/IT 4007, CS/IT 4008 and CS/IT 4009 respectively

3.*CI 4003 is same as CB/CS/IT 4003

4. ^CI 4005 and ^CI 4010 are same as CB/CS 4005and CB/CS 4010 respectively

5. ^^CI 40062 is same as IT40062

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

Note:Students will go for 6 Weeks Summer Internship in the Summer Vacations after Fourth Semester. The assessment of the Summer Internship will be done in Fifth Semester

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR

TEACHING AND EXAMINATION SCHEME

FOR DIPLOMA V SEMESTER (CYBER FORENSICS AND INFORMATION SECURITY) (CI)

(SEMESTER SCHEME-2020-21)

SESSION 2022-2023 & ONWARDS

Subject Category	Subject Code	Subjects	Distribution of Time (Hours per week)				Distribution of Max. Marks/ Duration							Total Marks	Credits
							End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU/Assi	PR(S)		
PC	CI 5001	Cyber Forensics	2	1	--	3	60	3	--	--	20	20	--	100	3
PC	**CI 5002	Internet of Things	2	1	--	3	60	3	--	--	20	20	--	100	3
OE	*CI 5100	**Open Elective-I** ***CI 51001**- Economic Policies in India ***CI 51002**- Engineering Economics & Accountancy	3	--	--	3	60	3	--	--	20	20	--	100	3
PE	CI 5003	**Programme Elective - II** ****CI50031**- Data Sciences: Data Warehousing and Data Mining **CI 50032**- Database Security	3	--	--	3	60	3	--	--	20	20	--	100	3
PE	CI 5004	**Programme Elective - III** **CI50041**- Scripting Language (Python) **CI 50042**- Mobile Application Security	3	--	--	3	60	3	--	--	20	20	--	100	3
PE	CI 5005	**Programme Elective – II Lab** $**CI50051**- Scripting Language (Python) Lab $**CI 50052**- Cyber Forensics LAB	--	--	4	4	--	--	40	3	--	--	60	100	2
SI	CI 5006	Summer Internship - II (6 weeks after IV Sem.)	--	--	--	--	--	--	100	--	--	--	--	100	3
PR	CI 5007	Major Project	--	--	2	2	--	--	--	--	--	--	--	--	--
VS	CI 5555	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	**13**	**2**	**10**	**25**	**300**		**140**		**100**	**100**	**160**	**800**	**22**
											Grand Total :			**800**	**22**

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8. PR(S) : Marks for practical and viva (Internal Assessment)

1.+CI 51001, *CI 51002 and *CI 5555 are same in all branches of Engineering

2.**CI 5002, **CI 50031 are same as CS/ IT 5002 and CS/ IT 50031 respectively

3. $CI50051 and $CI50052 are same as CB 50051and CB50052 respectively

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

Note:Major Project will be continued and Assesed in VI Semester

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN, JODHPUR

TEACHING AND EXAMINATION SCHEME

(SEMESTER SCHEME-2020-21)

FOR DIPLOMA **VI SEMESTER (CYBER FORENSICS AND INFORMATION SECURITY) (CI)**

SESSION 2022-2023 & ONWARDS

Category	Subject Code	Subjects	Distribution of Time (Hours per week)				Distribution of Max. Marks/ Duration							Total Marks	Credits
							End Semester Exam				Internal Assessment				
			L	T	P	Tot	TH	Hrs.	PR	Hrs.	CT	TU/Assi.	PR(S)		
HS	*CI 6111	*Entrepreneurship and Start-ups	3	1	--	4	60	3	--	--	20	20	--	100	4
OE	*CI 6200	**Open Elective-II** ***CI 62001**- Project Management ***CI 62002**- Renewable Energy Technologies	3	--	--	3	60	3	--	--	20	20	--	100	3
OE	*CI 6300	**Open Elective-III** ***CI 63001**- Product Design ***CI 63002**- Disaster Management	3	--	--	3	60	3	--	--	20	20	--	100	3
AU	*CI 6333	Indian Constitution	2	--	--	2	--	--	--	--	--	--	--	--	--
PE	CI 6001	**Programme Elective IV** **CI 60011**- Ethical Hacking **CI 60012**- Network Forensics	2	--	--	2	60	3	--	--	20	20	--	100	2
PE	CI 6002	**Programme Elective IV-Lab** **CI 60021**- Ethical Hacking Lab **CI 60022**- Digital Forensics Tools Lab	--	--	2	2	--	--	40	--	--	--	60	100	1
PR	CI 6003	Major Project	--	--	6	6	--	--	40	--	--	--	60	100	4
SE	CI 6004	Seminar	1	--	--	1	--	--	--	--	--	--	100	100	1
VS	*CI 6666	Anandam (Joy of Giving)	--	--	1	1	--	--	--	--	--	--	100	100	2
		Students Centered Activities	0	0	3	3	--	--	--	--	--	--	--	--	--
		Total	**14**	**1**	**12**	**27**	**240**	**--**	**80**	**--**	**80**	**80**	**320**	**800**	**20**
													Grand Total :	**800**	**20**

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2. T : Tutorial
3. P : Practical
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5. PR : Marks for End Semester Exam for Practical
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7. TU/Assi : Marks for tutorials Assignment (Internal Assessment)
8. PR(S) : Marks for practical and viva (Internal Assessment)

1. CI 6111, *CI 62001, *CI 62002, *CI 63001, *CI 63002, CI 6333 and *CI 6666 are same in all branches of ***Engineering***

Student Centered Activities will be graded as A, B, C & D on the basis of attendance and interest of the student in learning.

GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

III SEMESTER

(SESSION 2021-2022 & ONWARDS)

COMPUTER PROGRAMMING

Course Code	:	CI 3001(Same as CB/CS/IT 3001)
Course Title	:	Computer Programming
Number of Credits	:	4 (L:4; T:0; P:0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

Toenablestudent,developstructuredsolutionstoproblemsandimplementingthemusingcomputers.Thisinvolvestwo parts:i)Formulatingasolutionforagivenproblemasawell-definedsequence of actions, and ii) Expressing solution in a machine-readable form or a programming language. For the second part, we will learn the common units of programming languages. The first part can only be learned through the repeated practice of solvingproblems.

COURSE OUTCOMES

Student should be able to computationally formulate basic problems and write code snippets to execute them. The focus of the course as mentioned above should be on example-based learning. The basic nitty gritties can be skipped, however, the application part should be clear. For instance, when to use an array, when to use loop and when to use conditional statements.

COURSE CONTENTS

ThelanguageofchoicewillbeC.ThefocuswillbeonproblemsolvingandproblemwheretheseideaS can be applied. The main focus of the class will to take examples of problems where these ideas can beemployed.

1. Introduction to Problem Solving
- 1.1. Computational way of thinking
- 1.2. Variables
- 1.3. Representation

2. Operators and Formatting
- 2.1. Introduction to Operators
  - 2.1.1. Arithmetic Operators
  - 2.1.2. Relational Operators
  - 2.1.3. Logical and Bitwise Operators
- 2.2. Input, Output, Formatting and File I/O

3. Control Statements
- 3.1. Conditional Statements
- 3.2. Repeat Statements
  - 3.2.1. Loops
  - 3.2.2. Nested Loops

4. Arrays
- 4.1. Arrays and Memory Organization
- 4.2. Strings
- 4.3. Multidimensional Arrays
- 4.4. Functions and Parameter Passing

5. Recursion
- 5.1. Introduction to Recursion
- 5.2. Recursive solutions

REFERENCE BOOKS:

1. Let Us C, YashavantKanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna PublishingHouse
3. C Programming Absolute Beginner's Guide, Dean Miller and GregPerry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall ofIndia
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGELearning.
7. Outline of Programming with C, Byron Gottfried, Schaum,McGraw-Hill

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INFORMATION SECURITY

Course Code	:	CI 3002(Same as CB 3002)
Course Title	:	INFORMATION SECURITY
Number of Credits	:	4(L: 4, T: 0, P:0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To learn basic concepts of information security and cryptography. Students will also learn CIA triad, various threats and attacks and security technologies.

COURSE OUTCOMES

After completing this course, students should be able to:

- Demonstrate the importance of information security in a computer-driven world
- Understand the CIA triad of Confidentiality, Integrity and Availability
- Understand defined threats and attacks
- Explain the usage of Common Key cryptography and Public Key cryptography
- Plan for Security technologies& implement best practices

COURSE CONTENTS

1. Introduction

1.1 The History of Information Security
1.2 What is security: Key concepts, characteristics of information
1.3 CNSS Security Model
1.4 Components of an Information System
1.5 CIA Triad
1.6 Security in the SDLC
1.7 Need for Security

2. Threats and Attacks

2.1 Malware
2.2 Social Engineering Attacks
2.3 Network Threats
2.4 Physical Security: Introduction, Physical Access Controls

3. Planning for Security

3.1 Introduction
3.2 Information Security Planning and Governance
3.3 Information Security Policy, Standards
3.4 Information Security Best Practices

4. Security Technology

4.1 Access Control
4.2 Firewalls
4.3 Protecting Remote Connections in Remote Access
4.4 Virtual Private Networks (VPNs)
4.5 Intrusion Detection and Prevention Systems
4.6 Honeypots, Honeynets, and Padded Cell Systems

5. Cryptography

5.1 Introduction & Terminology
5.2 Cipher Methods:Substitution Cipher,Transposition Cipher
5.3 Cryptography Tools: Public Key Infrastructure, Digital Signatures& Digital Certificates

REFERENCE BOOKS:

1. Principles of Information Security,Sixth Edition, Michael E. Whitman & Herbert J. Mattord, Cengage Learning
2. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole , Published by Wiley India Pvt. Ltd, second edition.

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DATA STRUCTURES

Course Code	:	CI 3003(Same as CB/CS/IT 3003)
Course Title	:	Data Structures
Number of Credits	:	2 (L: 2, T: 0, P:0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To provide strong foundation for implementing programming language to formulate, analyze and develop solutions related to various data structures problems.

COURSE OUTCOMES

Have a good understanding of Data Structures and its applications in algorithms.

COURSE CONTENTS

1. Introduction to Data Structures

- 1.1. Basic Terminology
- 1.2. Classification of Data Structures
- 1.3. Operations on Data Structures.

2. Linear Data Structures

- 2.1. Stacks
  - 2.1.1. Introduction to Stacks
  - 2.1.2. Array Representation of Stacks
  - 2.1.3. Operations on a Stack
  - 2.1.4. Applications of Stacks
    - 2.1.4.1.Infix-to-Postfix Transformation
    - 2.1.4.2.Evaluating Postfix Expressions.
- 2.2. Queues
  - 2.2.1. Introduction to Queues
  - 2.2.2. Array Representation of Queues
  - 2.2.3. Operations on a Queue
  - 2.2.4. Types of Queues
    - 2.2.4.1. DeQueue
    - 2.2.4.2. Circular Queue
  - 2.2.5. Applications of Queues-Round Robin Algorithm.

3. Linked Lists

- 3.1. Introduction to Linked List
  - 3.1.1. Singly Linked List
    - 3.1.1.1. Representation in Memory
    - 3.1.1.2. Operations on a Single Linked List
- 3.2. Circular Linked Lists
- 3.3. Doubly Linked Lists
- 3.4. Linked List Representation and Operations of Stack
- 3.5. Linked List Representation and Operations of Queue.

4. Non Linear Data Structures

- 4.1. TREES
  - 4.1.1. Basic Terminologies
  - 4.1.2. Definition and Concepts of Binary Trees
  - 4.1.3. Representations of a Binary Tree using Arrays and Linked Lists
  - 4.1.4. Operations on a Binary Tree
    - 4.1.4.1. Insertion
    - 4.1.4.2. Deletion
    - 4.1.4.3. Traversals
  - 4.1.5. Types of Binary Trees.
- 4.2. GRAPHS
  - 4.2.1. Graph Terminologies
  - 4.2.2. Representation of Graphs

4.2.2.1. Set
4.2.2.2. Linked
4.2.2.3. Matrix
4.2.3. Graph Traversals

REFERENCE BOOKS:

1. Data Structures, R.S. Salaria, Khanna Book Publishing, NewDelhi
2. Data Structures Using C, ReemaThareja, Oxford University PressIndia.
3. Classic Data Structures, SamantaDebasis, Prentice Hall ofIndia.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press,India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning,India.
6. DataStructuresandAlgorithms:Concepts,TechniquesandApplications,G.A.V.Pai,McGraw- Hill Education,India.

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COMPUTER SYSTEM ORGANISATION

Course Code	:	CI 3004 (Same as CB/CS 3004)
Course Title	:	Computer System Organization
Number of Credits	:	4(L: 3, T: 1, P:0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To have a thorough understanding of the basic structure and operation of a digital computer, its architectures and computational designs.

COURSE OUTCOMES

Haveagoodunderstandingoffunctioningofcomputersystemassuchanditsvarioussubcomponents.Studentwillbeabletounderstandcomputingrequirementforaspecificpurpose,analyze performance bottlenecks of the computing device and choose appropriate computing device for a given use case.

COURSE CONTENTS

1. Structure of Computers

1.1. Computer Functional units
1.2. Von-Neumann architecture
1.3. Bus structures
1.4. Basic Operational Concepts
1.5. Data representation (Fixed and Floating point)
1.6. Error detecting codes.
1.7. Register Transfer and Micro Operations
  1.7.1. Register transfer
  1.7.2. Bus and memory transfers
  1.7.3. Arithmetic micro-operations
  1.7.4. Logic micro-operations
  1.7.5. Shift micro-operations
  1.7.6. Arithmetic logic shift unit.

2. Micro Programmed Control

2.1. Control memory
2.2. Address sequencing
2.3. Design of control unit
2.4. Computer Arithmetic
  2.4.1. Addition and Subtraction
  2.4.2. Multiplication and Division algorithms
  2.4.3. Floating-point arithmetic operation
  2.4.4. Arithmetic Pipeline
  2.4.5. Instruction Pipeline
  2.4.6. RISC Pipeline
  2.4.7. Vector Processing
  2.4.8. Array Processors.

3. Introduction to Microprocessor Architecture

3.1. Instruction Set Architecture design principles fromprogrammer's perspective.
3.2. One example microprocessor (Intel, ARM, etc).

4. AssemblyLanguageProgramming

4.1. Simpleprograms
4.2. Assemblylanguageprogramsinvolving
  4.2.1. logical
  4.2.2. branch
  4.2.3. call instructions
  4.2.4. sorting
  4.2.5. evaluation of arithmetic expressions
  4.2.6. string manipulation
  4.2.7. assembler directives
  4.2.8. procedures andmacros.

5. Memory and Digital Interfacing

5.1. addressing and address decoding

5.2. Interfacing of:

5.2.1. RAM

5.2.2. ROM

5.2.3. EPROM

REFERENCE BOOKS:

1. Computer System Architecture, M. Moris Mano, Pearson/PHIIndia.
2. Microprocessors Interface, Douglas V.Hall, TataMcGraw-Hill.
3. Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky,McGraw-Hill
4. Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing, A.K.Ray, K.M.Bhurchandi, Tata McGraw-Hill, New Delhi,India.
5. Computer Organization and Design: A Hardwar/Software Interface (MIPS Edition) by Patterson andHennessy.

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DIGITAL FORENSICS

Course Code	CI 3005
Course Title	Digital Forensics
Number of Credits	4(L: 3, T: 1, P: 0)
Prerequisites	-
Course Category	PC

COURSE OBJECTIVES

TheobjectiveofthiscourseistopreparethestudentwiththefoundationsofDigital Forensics. AsoundgraspofDigital ForensicsisessentialforanyCyber Forensics and Information Security Engineer.Almostallprogramming involves Digital Forensics with Mobile and Cloudat some level.

COURSE OUTCOMES

After learning the course, the students should be able to

1. Understand and analyze the forensics in PC and in network
2. Analyze the forensics after the attack
3. Report and document the attack

COURSE CONTENTS

1. Introduction to Digital Forensic

1.1. What is digital forensics
1.2. Forensic Science
1.3. Digital forensic approaches and best practices

2. Internet and E-Mail Examinations

2.1 E-Mail
2.2 Chat and Messaging Logs
2.3 Peer-to-Peer
2.4 Search Engine Activity
2.5 Internet History
2.6 Social Networking and Gaming
2.7 Malware and Viruses

3. Mobile forensics

3.1. Mobile phone technology
3.2. How a call is made
3.3. Forensic challenges
3.4. Forensic process
3.5. Digital cell phone investigation
3.6. Geographic positioning systems
3.7. Cameras &Common extraction types
3.8. Information sources and location information

4. Cloud computing and digital forensics

4.1. Infrastructure as a service
4.2. Platform as a service
4.3. Software as a service.
4.4. Incident response
4.5. Virtualization
4.6. Security benefits of cloud

5. Report writing and presentation

5.1. Introduction
5.2. Report content and considerations
5.3. Sample reports
5.4. Presenting and testifying

6. Social media & Social Engineering forensics

6.1. Introduction to social media
6.2. Social networking
6.3. Micro blogs

6.4. Multimedia sharing
6.5. Instant messaging and communication
6.6. Blogs, Event coordination, Location identification
6.7. Search, Wikis
6.8. Web conferencing
6.9. Virtual worlds
6.10. Social engineering forensics

Anti-forensics

6.11. Anti-forensic definition and concepts
6.12. Anti-forensic methods
6.13. Eliminate trails
6.14. Hide evidence
6.15. Destroy evidence
6.16. Mobile anti-forensics

REFERENCE BOOKS:

1. Digital Forensics Explained,Second Edition, Greg Gogolin, CRC Press
2. Digital Forensics, Edited by André Årnes, John Wiley & Sons Ltd

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COMPUTER PROGRAMMING LAB

Course Code	:	CI 3006(Same as CB/CS/IT 3006)
Course Title	:	Computer Programming Lab
Number of Credits	:	2(L: 0, T: 0, P: 4)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

ThisLabcourseisintendedtopracticewhatistaughtintheoryclassof‟ComputerProgramming'and become proficient in computer programming. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listedbelow.

COURSE OUTCOMES

Student should be able to write code snippets, and then compile, debug and execute them.

COURSE CONTENTS

S.No.	Topics for Practice
1	Familiarization with programming environment (Editor, Compiler, etc.)
2	Programs using I/O statements and various operators
3	Programs using expression evaluation and precedence
4	Programs using decision making statements and branching statements
5	Programs using loop statements
6	Programs to demonstrate applications of n dimensional arrays
7	Programs to demonstrate use of string manipulation functions
8	Programs to demonstrate parameter passing mechanism
9	Programs to demonstrate recursion
10	Programs to demonstrate use of pointers
11	Programs to demonstrate command line arguments
12	Programs to demonstrate dynamic memory allocation
13	Programs to demonstrate file operations

The language of choice will be C. This is a skill course. More you practice, better it will be.

REFERENCE BOOKS:

1. Let Us C, YashavantKanetkar
2. Problem Solving and Programming in C, R.S. Salaria, Khanna PublishingHouse
3. C Programming Absolute Beginner's Guide, Dean Miller and GregPerry
4. The C Programming Language, Kernighan and Ritchie, Prentice Hall ofIndia
5. Programming in ANSI C, E. Balagurusamy, Tata McGraw-Hill
6. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGELearning.

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INFORMATION SECURITY & DIGITAL FORENSICS LAB

Course Code	CI 3007
Course Title	Information Security & Digital Forensics Lab
Number of Credits	2(L: 0, T: 0, P: 4)
Prerequisites	-
Course Category	PC

COURSE OBJECTIVES

This Lab course is intended to get practical exposure of basic Information Security & Digital Forensics like Cryptography algorithms, Cipher, Digital Signature and Basics of Kali Linux etc.

COURSE OUTCOMES

Get the skill to provide security services like authentication confidentiality to the real systems. Get the knowledge to solve security issues in day to day life. Also understand the working principle of Hash Functions, FTK Image Tool and Reporting using Autopsy Tool.

COURSE CONTENTS

S.No.	Topics for Practice
1	Breaking the Shift Cipher
2	Breaking the Mono-alphabetic Substitution Cipher
3	One-Time Pad and Perfect Secrecy
4	Message Authentication Codes
5	Cryptographic Hash Functions and Applications
6	Diffie-Hellman Key Establishment
7	Public-Key Cryptosystems (PKCSv1.5)
8	Digital Signatures
9	Installing Kali Linux on identified Lab machine
10	Create evidence image using FTK Imager tool
11	Using Autopsy Tool to analyze the evidence image and generate report

Lecturer may choose any one scripting language. This is a skill course. More student practice and tryto find solution on their own, better it will be.

REFERENCE BOOKS:

1 Principles of Information Security, Sixth Edition, Michael E. Whitman & Herbert J. Mattord, Cengage Learning
2 Digital Forensics Explained, Second Edition, Greg Gogolin, CRC Press
3 http://cse29-iiith.vlabs.ac.in/Introduction.html
4 "Practical Cyber Forensics An Incident-Based Approach to Forensic Investigations" by Niranjan Reddy, APRESS

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DATA STRUCTURES LAB

Course Code	CI 3008(Same as CB/CS/IT 3008)
Course Title	Data Structures Lab
Number of Credits	1(L: 0, T: 0, P: 2)
Prerequisites	-
Course Category	PC

COURSE OBJECTIVES

This Lab course is intended to practice whatever is taught in theory class of 'Data Structures', 'Algorithms' and is an extension of previous course on 'Computer Programming'. Students should work on problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listed below. This Lab course requires a good coordination between theory course in Data Structures and Algorithms.

COURSE OUTCOMES

Student will be able to write programs for creating and doing different operations on various data structures. Student will be able to use/implement various algorithms learnt in the course on Algorithms. In summary student will have a good command over Data Structures and its applications in Algorithms.

COURSE CONTENTS

S.No.	Topics for Practice
1	Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique
2	Search operation in a given list of integers using binary search technique
3	Write a program to implement insertion sorting for a given random data
4	Write a program to implement bubble sorting for a given random data
5	Write a program to implement quick sorting for a given random data
6	Write a program to implement selection sorting for a given random data
7	Write a program to implement heap sorting for a given random data
8	Write a program to implement single linked list
9	Write a program to implement double linked list
10	Write a program to implement circular linked list
11	Write a program to Implement Stack operations using array and linked list
12	Write a program to Implement Queue operations using array and linked list.
13	Write a program to implement Breadth First Search (BFS)
14	Write a program to implement Depth First Search (DFS)
15	Write a program to implement a binary tree of integers

Use'C'asprogramminglanguageforthepurpose.Thisisaskillcourse.Morestudentpracticeandtryto find solution on their own, better it will be.

REFERENCE BOOKS:

1. Data Structures, R.S. Salaria, Khanna BookPublishing
2. Data Structures Using C, ReemaThareja, Oxford University PressIndia.
3. Classic Data Structures, SamantaDebasis, Prentice Hall ofIndia.
4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press,India.
5. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning,India.
6. DataStructuresandAlgorithms:Concepts,TechniquesandApplications,G.A.V.Pai,McGraw- Hill Education,India.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

IV SEMESTER

(SESSION 2021-2022 & ONWARDS)

OPERATING SYSTEMS SECURITY

Course Code	CI 4001
Course Title	Operating Systems Security
Number of Credits	3 (L: 3, T: 0, P :0)
Pre-requisites	---
Course Category	PC

COURSE LEARNING OBJECTIVES:
To learn the fundamentals of an operating system with Linux operating system distribution. The aim is to provide knowledge of customization of Linux operating system and administration with the security features and shell scripting

COURSE OUTCOMES:
Students should be able to demonstrate basic knowledge about Operating System, be able to apply OSconceptssuchasprocesses,memoryandfilesystemstosystemdesign,abletoconfigureOSinan efficient and securemanner

1. Introduction to the Operating System
Types of operating System Overview of Linux operating system: Linux features, Linux Distributions, Linux Kernel, Linux file system, Linux Pros and Cons, Windows OS v/s Linux OS, Desktop environment, introduction to LVM, Package management

2. The Shell Interface and Text Editors Introduction to Shell, Running Commands, Recalling Commands, Connecting and Expanding Commands, Shell Variable, types of Editors, Introduction to vi: Moving 9 around in the text, deleting, copying, and changing text, searching for files with find and grep

1. Working with shell scripts Overview of shell scripts, command line arguments, logical operators, if conditional, numeric Comparison, string Comparison, case conditional, computation and string handling, while loop, for loop, set and shift, here document(<<), trap, debugging shell scripting

4. User Administration and Networking Managing Local User(create, Delete, permissions to User), Managing groups, introduction to computer network, Desktop Sharing, Network Configuration and Troubleshooting commands

5. Linux Security for System Administration Introduction to linux security, firewall, linux security tools: Wireshark, NMAP, Malware, Snort, NIKTO, Metasploit framework, SPIKE, Ollydbg debugger, Linux-based security distros

REFERENCE BOOKS:

1. Linux Bible By Christopher Negus and Christine Bresnaham, Publication Wiley-India, Edition 8
2. OperatingSystemConcepts,SilberschatzandGalvin,WileyIndiaLimited
3. UNIXConceptsandApplications,SumitabhaDas,McGraw-HillEducation
4. Operating Systems, Internals and Design Principles, Stallings, Pearson Education,India
5. Operating System Concepts, Ekta Walia, Khanna PublishingHouse
6. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall ofIndia
7. Operating systems, Deitel&Deitel, Pearson Education,India

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INTRODUCTION TO DBMS

Course Code	CI 4002(Same as CS/IT 4002)
Course Title	Introduction to DBMS
Number of Credits	3 (L: 3, T: 0, P:0)
Prerequisites	CS 3002 Scripting Language
Course Category	PC

COURSE LEARNING OBJECTIVES:

It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modeling, relational database design and database query languages.

COURSE OUTCOMES:

After completing the course, the students will understand

1. How to design a database, database-based applications
2. How to use a DBMS
3. The critical role of database system in designing several information system-based software systems or applications.

COURSE CONTENT:

As a part of the lab, project work is included.

1. INTRODUCTION

- 1.1. Introduction
- 1.2. Components of DBMS
- 1.3. Advantage of DBMS
- 1.4. Database System v/s File System
- 1.5. Database System Concepts and Architecture
- 1.6. Application Architecture of DBMS
- 1.7. Overall Dabatase Structure

2. DATA MODELLING

- 2.1. Data Modeling using the Entity-Relationship Model
- 2.2. Notations of ER Diagram
- 2.3. Mapping Constraints
- 2.4. Keys
- 2.5. The Enhanced Entity-Relationship (EER) model

3. RELATION

- 3.1. The Relational Data Model and Relational Database Constraints
- 3.2. Codd's Rule of DBMS
- 3.3. ER/EER to Relational Model map- ping
- 3.4. Relational Algebra
- 3.5. Relational Calculus

4. SQL

- 4.1. SQL-99
  - 4.1.1. Schema definition,
  - 4.1.2. Constraints
  - 4.1.3. Queries and Views
- 4.2. Security
- 4.3. Introduction to SQL programming Techniques

5. FUNCTIONAL DEPENDENCIES

- 5.1. Functional dependencies and normalization for relational databases
  - 5.1.1. Normalization Concepts
  - 5.1.2. Normal Forms (1NF, 2NF, 3NF, BCNF)
- 5.2. Relational database design algorithms and further dependencies.

5.2.1. Multi-Valued Dependancy and 4NF
5.2.2. Join Dependancy and 5NF

REFERENCE BOOKS:

1. Fundamentals of Database Systems, Elmasri&Navathe, PearsonEducation
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, TataMcGraw-Hill.
3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw- Hill, New Delhi,India.
4. Introduction to Database Systems, C.J.Date, PearsonEducation
5. Introduction to SQL, Rick F.VanderLans, PearsonEducation

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COMPUTER NETWORKS

Course Code	CI 4003(Same as CB/CS/IT 4003)
Course Title	Computer Networks
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	-
Course Category	PC

COURSE LEARNING OBJECTIVES:

Understand functioning of computer networks and popular networking protocols

COURSE OUTCOMES:

1. Understanding of computer networks, issues, limitations, optionsavailable.
2. Understanding of the care that needs to be taken while developing applications designed to work over computernetworks
3. Able to configure basic LAN and connect computers toit.

COURSE CONTENT:

1. COMPUTER NETWORKS
- 1.1. Introduction to computer networks
- 1.2. Network Models
- 1.3. OSI Reference Model
- 1.4. TCP/IP Model

2. MEDIA
- 2.1. Transmission media
  - 2.1.1. Principles
  - 2.1.2. Issues and examples
- 2.2. Wired media – coaxial, utp, stp, fiber optic cables
- 2.3. Wireless media – hf, vhf, uhf, microwave, ku band
- 2.4. Network topologies
- 2.5. Data link layer
  - 2.5.1. Design issues
  - 2.5.2. Example protocols (ethernet, wlan, bluetooth)
  - 2.5.3. Switching techniques

3. ROUTING
- 3.1. Network layer
  - 3.1.1. Design issues
  - 3.1.2. Example protocols (ipv4)
- 3.2. Routing
  - 3.2.1. Principles/issues,
  - 3.2.2. Algorithms (distance-vector, link-state) and protocols (rip, ospf)

4. TRANSPORT LAYER
- 4.1. Transport layer
  - 4.1.1. Design issues,
  - 4.1.2. Example protocols (tcp)
- 4.2. Application layer protocols (smtp, dns).

5. NETWORK DEVICES
- 5.1. Functioning of Network Devices
  - 5.1.1. NIC, Hub, Switch, Router, WiFi Devices
- 5.2. Network Management System and example protocol (SNMP).

REFERENCE BOOKS:

1. Computer Networks, 4th Edition (or later), Andrew S. Tanenbaum,PHI
2. TCP/IP Illustrated, Volume-1, W. Richard Stevens, AddisionWesley

3. Data and Computer Communications, William Stallings,PHI
4. An Engineering Approach to Computer Networking, S. Keshav, AddisionWesley/Pearson
5. An Integrated Approach to Computer Networks, Bhavneet Sidhu, Khanna PublishingHouse

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DISCRETE STRUCTURES

Course Code	CI 4004
Course Title	Discrete structures
Number of Credits	3 (L: 3, T: 0, P:0)
Prerequisites	-
Course Category	PC

COURSE LEARNING OBJECTIVES:

This course develops techniques of investigation and problem solving strategies also develop spatial concepts and ability to use them.

COURSE OUTCOMES:

By end of this module students should be able to enhance the students' ability to think logically and mathematically andbe able to describe Basic Mathematics concept like set theory, Matrices and Graph theory

COURSE CONTENTS:

1. SET THEORY

Introduction, Representation of sets, Universal set, Empty set, Finite set, Infinite set, Subset, Disjoint set, Equality of two sets, Equivalent sets, power set, Venn diagram, Set operations: Union, Intersection, Difference, Symmetric difference, Complements

2. MATRICES

Introduction, Unit matrix, Square matrix, Transpose of a matrix, Invertible matrices, Diagonal and Anti diagonal elements of matrices, zero matrix, row and column matrix, Symmetric matrix, Skew symmetric matrix, Upper and Lower triangular matrix.

3. GRAPH THEORY

Introduction, Graph and multi graphs, Finite graphs, Trivial graph, Sub graph, Hamiltonian graphs, Eulerian Graph, Complete,.Software Testing Basics,

4. FUNCTION

Introduction, Definition , Domain, Co-Domain and Range of Function, Types of Function: In to Function, On to Function, One to One Function , Many to One Function, One to One Correspondence and its Examples.

REFERENCE BOOKS:

1. Discrete Mathematics by Seymour Lipschutz and Marc Lipson.-Mc Graw Hill, Third Edition
2. Fundamentals of Discrete Mathematical Structures III Edition, ISBN: 978-81-203-5074-8, Author: Prof. K. R. Chowdhary, PHI

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WEB TECHNOLOGIES

Course Code	CI 4005 (Same as CB/CS 4005)
Course Title	Web Technologies
Number of Credits	2 (L: 2, T: 0, P:0)
Prerequisites	-
Course Category	PC

COURSE LEARNING OBJECTIVES:

To provide basic skills on tools, languages and technologies related to website development. Learnings from this course may be used in the Mini Project and summer internship.

COURSE OUTCOMES:

Student will be able to develop/build a functional website with full features.

COURSE CONTENTS:

1. INTRODUCTION TO WWW

- 1.1 Protocols and programs
  - 1.1.1 Secure connections,
  - 1.1.2 Application and development tools
- 1.2 The web browser
- 1.3 What is server
- 1.4 Setting up UNIX and LINUX web servers
- 1.5 Logging users
- 1.2 Dynamic IP Web Design
  - 1.2.1 Web site design principles
  - 1.2.2 Planning the site and navigation

2. WEB SYSTEMS ARCHITECTURE

- 2.1 Architecture of Web based systems
  - 2.1.1 Client/server (2-tier) architecture
  - 2.1.2 3-Tier architecture
- 2.2 Building blocks of fast and scalable data access Concepts
  - 2.2.1 Caches-Proxies- Indexes-Load Balancers- Queues
- 2.3 Web Application architecture(WAA)

3. JAVASCRIPT

- 3.1 Client side scripting
- 3.2 What is Javascript
- 3.3 Simple Javascript
- 3.4 Variables
- 3.5 Functions,conditions
- 3.6 Loops and repetition

4. ADVANCE SCRIPTING

- 4.1 Javascript and objects
  - 4.1.1 Javascript own objects
  - 4.1.2 DOM and web browser environments, forms and validations
- 4.2 DHTML
  - 4.2.1 Combining HTML, CSS and Javascript
- 4.3 Ajax
- 4.4 Introduction to XML
- 4.5 Introduction to Web Services

5. PHP

- 5.1 Server side scripting
  - 5.1.1 Arrays
  - 5.1.2 Function and forms

5.1.3 Advance php

6. Databases
   - 6.1 Basic command with php examples
   - 6.2 Connection to server, creating database
   - 6.3 Selecting a database
   - 6.4 Listing database
   - 6.5 Listing table- names creating a table
   - 6.6 Inserting data
   - 6.7 Altering tables, queries, deleting database, deleting data and tables
   - 6.8 Phpmyadmin and databasebugs

REFERENCE BOOKS:

1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson,
2. "Internet &World Wide Web How To Program", Deitel, Deitel, Goldberg, PearsonEducation
3. "Web programming- Building Internet Application", ChrisBales
4. Web Applications: Concepts and Real World Design,Knuckles.

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CYBER CRIMES

Course Code	CI 40061
Course Title	Cyber Crimes
Number of Credits	4 (L: 3, T: 1, P:0)
Prerequisites	--
Course Category	PE

COURSE LEARNING OBJECTIVES:
To understand the fundamentals of cyber security. Students will also learn various categories of cybercrime, cyber attacks on mobile, tools and techniques used in cyber crime.

COURSE OUTCOMES:
After completing this course, students should be able to:
Identify and classify cyber crime
Understand different attacks on mobile devices and apply various security measurement on it
Differentiate various types of cybercrimes and identify the cyber-attack and its methods
Understand key terms and concepts in cyber law

COURSE CONTENTS:

1. **Introduction to Cybercrime:** Basics of cybercrime, Cybercrime Trend, Cybercrime and Information Security, Cybercriminals, Classifications of cybercrime, Cyberdefamation

2. **Cyberoffenses and Cybercrime on mobile :**Categories of Cybercrime, Active Attacks, Passive Attacks, Social Engineering, Cyberstalking, Cyber-attacks on mobile , Security measurements on portable device

3. **Cybercrime in action**:Tools and Methods used in cybercrime, Phishing and identity theft.

4. **Information Technology Act**
   - 4.1. Information Technology Act, 2000 (I.T. Act, 2000): Including all the amendments till date
   - 4.2. Transmission of electronic documents
   - 4.3. Evidentiary presumptions of a secured electronic document
   - 4.4. Certifying Authority (CA)
   - 4.5. Controller of Certifying Authorities.
   - 4.6. Suspension of Certifying Authority
   - 4.7. Digital Signature

REFERENCE BOOKS:
1. Cyber Security : Understanding Cyber Crimes , Computer Forensics and Legal Perspectives By Nina Godbole, Sunit Belapur , Wiley
2. Information Security and Cyber Laws, Sarika Gupta, Khanna PublishingHouse
3. Cyber Security for Beginners by Raef Meeuwisse ,Cyber Simplicity Ltd.

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CYBER LAWS

Course Code	:	CI40062 (Same as IT 40062)
Course Title	:	Cyber Laws
Number of Credits	:	4(L: 3, T: 1, P: 0)
Prerequisites	:	-----
Course Category	:	PE

COURSE LEARNING OBJECTIVES:

To provide an understanding of the basic structure of cyber laws and their impact on every day living in the cyber society. The essential ingredients of a website for the bank. It tells how ISP and cyber café management should work. In view of the social purpose behind the course it is meant to inculcate the knowledge about "Cyber Crimes" and inter alias build some awareness about behavioral aspects that lead to negative behavior in the society.

COURSE OUTCOMES:

Student will have general idea about the cyber contracts, cyber-crimes, cyber privacy, cyber laws and will be able to explore further. To provide an understanding of the basic structure of cyber laws and their impact on every day living in the cyber society. To aware students of the nature of the cyber space, how internet functions, what are the nature of properties created on the internet, how to use digital signatures. Dealing with virus and other cyber-crimes. How banks function in the E-era.

COURSE CONTENT:

1. NET

1.1 Information Technology and Legal Response : Introduction
1.2 We, Cyberspace and Our Lives
1.3 The Nature of the Net
1.4 Features of the Net
1.5 Geographical Indeterminacy

2. CYBER CRIMES

2.1 Cyber crimes: Introduction
2.2 Cyber Crime – A perspective
2.3 The Problem: Current Forms of Computer Crime
- 2.3.1 Infringements of Privacy
- 2.3.2 Economic offences
- 2.3.3 Computer Hacking
- 2.3.4 Software Piracy and other forms of Product Piracy
- 2.3.5 Computer Sabotage and Computer Extortion
- 2.3.6 Computer Fraud
- 2.3.7 Illegal and harmful contents

3. CYBER CONTRACTS

3.1 Cyber contracts: Introduction
3.2 Essentials of a contract
- 3.2.1 Intention to be bound
- 3.2.2 Offer and Acceptance
- 3.2.3 Concept of offer
- 3.2.4 Offer by and to whom
- 3.2.5 Statements which are not offers

3.3 Termination of offer
3.4 Quality of acceptance
3.5 Consideration
3.6 Capacity of the parties
3.7 Consent
3.8 Unlawful agreements
3.9 Persons bound by contract
3.10 Performance and frustration
3.11 Subsequent Events and Frustration

3.12 Remedies for Breach of Contract
3.12.1 Damages
3.12.2 Specific Performance
3.12.3 Injunctions

4. CYBER PRIVACY

4.1 Cyber Privacy: Introduction
4.2 Policy approaches to privacy concerns
4.2.1 Market approach
4.2.2 Human rights approach
4.2.3 Contract approach
4.3 Platform for Privacy Preferences Project (P3P)

5. CYBER INTELLECTUAL PROPERTY RIGHTS

5.1 Cyber Intellectual Property Rights: Introduction
5.2 Concept of Intellectual Property Rights
5.3 The Impact of Electronic Commerce on Intellectual Property
5.3.1 The Protection Of Copyright And Related Rights In The Digital Environment
5.3.2 Overview of the Issues
5.3.3 Technological protection measures
5.3.4 Future Work in the protection of Copyright and related rights

6. INFORMATION TECHNOLOGY ACT

6.1 Information Technology Act, 2000 (I.T. Act, 2000): Including all the amendments till date
6.2 Transmission of electronic documents
6.3 Evidentiary presumptions of a secured electronic document
6.4 Certifying Authority (CA)
6.5 Controller of Certifying Authorities.
6.6 Suspension of Certifying Authority
6.7 Digital Signature

REFERENCE BOOKS:

1 Cyber Law for Every Netijen in India Na. Vijayashankar
2 Cyber Law Simplified Vivek Sood, TMH

OPERATING SYSTEMS LAB

Course Code	CI 4007 (Same as CS/IT 4007)
Course Title	Operating Systems Lab
Number of Credits	1 (L: 0, T: 0, P: 2)
Prerequisites	CS 3003 Data Structures
Course Category	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice and do experiment on concepts taught in theory class of 'Operating Systems' and gain insight into functioning of the Operating Systems.

COURSE OUTCOMES:

Students should be able to demonstrate basic knowledge about Operating System, be able to apply OSconceptssuchasprocesses,memoryandfilesystemstosystemdesign,abletoconfigureOSinan efficient and secure manner, and become an advance user of operatingsystem.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Revision practice of various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir.
2	Implement two way process communication using pipes
3	Implement message queue form of IPC
4	Implement shared memory and semaphore form of IPC
5	Simulate the CPU scheduling algorithms - Round Robin, SJF, FCFS, priority
6	Simulate Bankers algorithm for Deadlock Avoidance and Prevention
7	Simulate all FIFO Page Replacement Algorithm using C program
8	Simulate all LRU Page Replacement Algorithms using C program
9	Simulate Paging Technique of Memory Management
10	Practice various commands/utilities such as catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio, mount, umount, find, umask, ulimit, sort, grep, egrep,fgrep cut, paste, join, du, df , ps, who, etc and many more.

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Operating System Concepts, Silberschatz, Abraham and Galvin, Peter, Wiley IndiaLimited
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-HillEducation
3. Operating System Concepts, Ekta Walia, Khanna PublishingHouse

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INTRODUCTION TO DBMS LAB

Course Code	CI 4008 (Same as CS/IT 4008)
Course Title	Introduction to DBMS Lab
Number of Credits	1 (L: 0, T: 0, P:2)
Prerequisites	CI 3006 Computer Programming Lab
Course Category	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice whatever is taught in theory class of 'Introduction to DBMS'. Afewsamplecasestudiesarelistedwithsomesuggestedactivities.Morecasestudiesmaybeadded to this list. You need to develop these case studies, apply all relevant concepts learnt in theory class asthecourseprogress,identifyactivities/operationsthatmaybeperformedonthedatabase.Itwill be a good idea to also use concepts learnt in the course on SoftwareEngineering/SSAD.

COURSE OUTCOMES:

After completing the course, the students will understand

1. How to design a database, database-based applications
2. How to use a DBMS
3. The critical role of database system in designing several information system-based software systems or applications.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Case Study-1: Employee database – 'Create' employee table, 'Select' and display an employee matching a given condition, 'Delete' duplicate records, delete rows using triggers, insert and update records, find net salary, etc.
2	Case Study-2: Visitor Management database
3	Case Study-3: Students Academic database
4	Case Study-4: Inventory Management System database
5	Case study-5: Bank Operations database
6	CaseStudy-6:BusOperator (Roadways) –Dorelatedactivitiessuchasprepare E-RModel, Relational Model, do Normalization, Create Tables, Insert data, Delete Data, Query database, create stored procedures,etc.

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Elmasri&Navathe, Fundamentals of Database Systems, PearsonEducation
2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill, New Delhi,India.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw- Hill, New Delhi,India.
4. Introduction to Database Systems, C.J.Date, PearsonEducation
5. Introduction to SQL, Rick F.VanderLans, PearsonEducation

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COMPUTER NETWORKS LAB

Course Code	CI 4009 (Same as CS/IT 4009)
Course Title	Computer Networks Lab
Number of Credits	1 (L: 0, T: 0, P:2)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

This Lab course is intended to practice whatever is taught in theory class of 'Computer Networks'. Some of the things that should necessary be covered in lab are listed below:

COURSE OUTCOMES:

1. Understanding of computer networks, issues, limitations, optionsavailable.
2. Able to configure basic small LAN and connect computers toit.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Showing various types of networking cables and connectors, identifying them clearly
2	Looking at specifications of cables and connectors of various companies on Internet, find out differences.
3	Makingpatchcordsusingdifferenttypesofcablesandconnectors-crimping,splicing,etc
4	Demonstration of different type of cable testers, using them for testing patch cords pre- pared by the students in Lab and standard cables prepared by professionals
5	Configuring computing devices (PC, Laptop, Mobile, etc) for network, exploring different options and their impact – IP address, gateway, DNS, security options, etc
6	Showing various networking devices – NICs, Hub, Switch, Router, WiFi access point, etc.
7	Looking at specifications of various networking devices various companies on Internet, find out differences.
8	Setting up a small wired LAN in the Lab
9	Setting up a small wireless LAN in the Lab

This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Cisco press books onCCNA
2. User manual of networking devices available in thelab
3. Wiki pages on networkingdevices

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WEB TECHNOLOGIES LAB

Course Code	CI 4010 (Same as CB/CS 4010)
Course Title	Web Technologies Lab
Number of Credits	1 (L: 0, T: 0, P:2)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

ThisLabcourseisintendedtopracticewhateveristaughtintheoryclassof'WebTechnologies'.Some of the things that should necessary be covered in lab are listedbelow:

COURSE OUTCOMES:

Student will be able to program web applications using and will be able to do the following:

1. Use LAMP Stack for webapplications
2. Use Tomcat Server for Servlets andJSPs
3. WritesimpleapplicationswithTechnologieslikeHTML,Javascript,AJAX,PHP,Servletsand JSPs
4. Connect to Database and getresults
5. Parse XML files using Java (DOM and SAXparsers)

Student will be able to develop/build a functional website with full features.

COURSE CONTENTS:

S.No.	Topics for Practice
1	Coding Server Client Programs
2	Developing Web Application using HTML, JavaScript
3	Developing Advanced Web Application Programs using CSS
4	Practicing PHP : Basics
5	Practicing PHP : Web Application Development
6	Practicing PHP: MySql - tiered Applications
7	Developing a fully functional Web Service Application using all the technologies learned in this course.

REFERENCE BOOKS:

1. "Web Technologies--A Computer Science Perspective", JeffreyC.Jackson,
2. "Internet &World Wide Web How To Program", Deitel, Deitel, Goldberg, PearsonEducation
3. "Web programming- Building Internet Application", ChrisBales
4. Web Applications: Concepts and Real World Design,Knuckles

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ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Course Code	CI 4222(Same in All Branches of Engg.)
Course Title	Essence of Indian Knowledge and Tradition
Number of Credits	0(L-2,T-0, P-0)
Prerequisites	None
Course Category	AU

COURSE CONTENTS:

Basic Structure of Indian Knowledge System:

1. वेद,
2. उनवेद (आयुवेद,धनुवेद,गन्धवेद,स्थानत्यआदद)
3. वेदथाथांग (शिक्था, कलन, ननरुत, व्थाकरण, ज्योनतषछथांद),
4. उनथाङग (धर्मशथास्न, र्ीर्थाथांसथा, नुरथाण, तकशरथास्न)
   - •Modern Science and Indian Knowledge System
   - •Yoga and Holistic Health care
   - •Case Studies.

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. V. Sivarama Krishna, " Cultural Heritage of India- Course Material", Bhartiya Vidya Bhavan, Mumbai, fifth Edition, 2014.
2. Swami Jitatmanand, " Modern Physics and Vedant", Bhartiya Vidya Bhavan.
3. Fritz of Capra, " The wave of Life".
4. Fritz of Capra, " Tao of Physics".
5. V N Jha, " Tarka sangraha of Annam Bhatta, International" Cinmay Foundation, Velliarnad, Amakuam.
6. R N Jha, " Science of Consciousness Psychotheraphy and Yoga Practices" Vidya nidhiPrakasham, Delhi, 2016.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

V SEMESTER

(SESSION 2021-2022 & ONWARDS)

CYBER FORENSICS

Course Code	CI 5001
Course Title	Cyber Forensics
Number of Credits	3(L: 2, T: 1, P: 0)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

To cover the concepts of advanced cyber forensics like operating system forensic, network forensic and mobile forensic. It enables the students to gain in-depth knowledge in the field of Advanced Cyber forensics.

COURSE OUTCOMES:

After Learning the Course, the Students Should be able to

- Understand and Analyze the Forensics in Pc and in Network
- Analyze the Forensics after the Attack
- Report and Document the Attack
- learn investigation tools and techniques, analysis of data to identify evidence, Technical Aspects & Legal Aspects

COURSE CONTENT:

1. Introduction to Cyber Forensics

1.1 What is Cyber Forensics?
1.2 Forensics Investigation Process
1.3 Digital Evidence
1.4 Brief about Cybercrimes
1.5 Case studies
1.6 Challenges in Cybercrimes

2. Windows Forensics

2.1. Digital Evidence in Windows
2.2. Volatile Evidence Artifacts
2.3. Non-volatile Artifacts
2.4. File System
2.5. Time line Analysis

3. Linux Forensics

3.1. Popular Linux Distributions
3.2. File System
3.3. Forensic Process for Linux Systems& Artifacts
3.4. Linux Distributions Used for Forensic Analysis
3.5. Case studies

4. Anti-forensics Practices

4.1 Data Wiping and Shredding
4.2 Trail Obfuscation
4.3 Data hiding & Steganography
4.4 Anti-Forensics Detection Techniques
4.5 Case studies

5. NetworkForensics

5.1 The OSI Model
5.2 Forensic Footprint
5.3 Seizure of Networking Devices
5.4 Network Forensic Artifacts

6. Mobile Forensics

6.1 Acquisition Protocol
6.2 Rooting & Debug Bridging in android
6.3 Manual Extraction
6.4 Physical Acquisition
6.5 Chip-Off and Micro-read

7. Malware Analysis

7.1 Static Analysis
7.2 Dynamic Analysis
7.3 Tools
7.4 Challenges

REFERENCE BOOKS:

1 Practical Cyber Forensics An Incident-Based Approach to Forensic Investigations, Niranjan Reddy, APRESS

2 CYBER FORENSICS, A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, 2nd Edition, Albert J. Marcella, Jr. Doug Menendez, Auerbach Publications.

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INTERNET OF THINGS

Course Code	CI 5002(Same as CS/IT 5002)
Course Title	Internet of Things
Number of Credits	3(L: 2, T: 1, P: 0)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

COURSE OUTCOMES:

Students will have good understanding of various aspect of IoT, know some tools and have basic implementation skills.

COURSE CONTENTS:

1. IOT
- 1.1 Introduction to IoT;
- 1.2 Sensing;
- 1.3 Actuation

2. IOT NETWORKING
- 2.1 Basics of IoT Networking,
- 2.2 Communication Protocols,
- 2.3 Sensor networks

3. PROGRAMMING
- 3.1 Introduction to Arduino programming,
- 3.2 Integration of Sensors/Actuators to Arduino

4.
- 4.1 Implementation of IoT with Raspberry Pi;
- 4.2 Data Handling Analytics

5. CASE STUDY
- 5.1 Case Studies: Agriculture, Healthcare, Activity Monitoring

REFERENCE BOOKS:

1. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
3. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
4. "Internet of Things: A Hands-on Approach", by ArshdeepBahga and Vijay Madisetti (Universities Press)
5. *Internet of Things: Architecture and Design Principles, Raj Kamal,* McGraw Hill
6. Research papers

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ECONOMIC POLICIES IN INDIA

Course Code	CI 51001(Same in All Branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approach estotheproblemsofunemployment,poverty,incomegeneration,industrializationfromdifferentperspec-tives
CO4	Abletoidentifytheproblemsandcapabletodecidetheapplicationforfuturedevelopment
CO5	Analyzeeconomicissuesandfindsolutionstocomplexeconomicproblemsandtakecor-recteconomicjudgment

COURSE CONTENTS:

1. BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:

1.1. Economic History of India;
1.2. Nature of Indian Economy
1.3. Demographic features and Human Development Index,
1.4. Problems of Poverty, Unemploy-ment, Inflation, income inequality, Blackmoney in India.

2. SECTORAL COMPOSITION OF INDIAN ECONOMY:

2.1. Issues in Agriculture sector in India,
2.2. land reforms
2.3. Green Revolution
2.4. agriculture policies of India,

3. INDUSTRIAL DEVELOPMENT,

3.1. Small scale and cottage industries,
3.2. Industrial Policy,
3.3. Public sector in India,
3.4. Service sector in India.

4. ECONOMIC POLICIES:

4.1. Economic Planning in India,
4.2. Planning commission v/s NITI Aayog,
4.3. Five Year Plans,
4.4. Monetary policy in India,
4.5. Fiscal Policy in India,
4.6. Centre state Finance Relations,
4.7. Finance commission in India
4.8. LPG policy in India

5. EXTERNAL SECTOR IN INDIA

5.1. India's foreign trade value composition and direction,
5.2. India Balance of payment since 1991,
5.3. FDI in India,
5.4. Impact of Globalization on Indian Economy,
5.5. WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand &Co.Ltd. New Delhi.
2. Mishra S. K &V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

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ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	CI 51002 (Same in All Branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

•To acquire knowledge of basic economicst of a cilitate the process of economic decision making.
•To acquire knowledge on basic financial management aspects.
•To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting datafor managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS

1. INTRODUCTION:
- 1.1. Managerial Economics;
- 1.2. Relationship with other disciplines;
- 1.3. Firms: Types, objectives and goals;
- 1.4. Managerial decisions;
- 1.5. Decision analysis.

2. DEMAND & SUPPLY ANALYSIS:
- 2.1. Demand;
  - 2.1.1. Types of demand;
  - 2.1.2. Determinants of demand;
  - 2.1.3. Demand function;
  - 2.1.4. Demand elasticity;
  - 2.1.5. Demand forecasting;
- 2.2. Supply;
  - 2.2.1. Determinants of supply;
  - 2.2.2. Supply function;
  - 2.2.3. Supply elasticity.

3. PRODUCTION AND COST ANALYSIS:
- 3.1. Production function;
- 3.2. Returns to scale;
- 3.3. Production optimization;
- 3.4. Least cost input; Iso quants;
- 3.5. Managerial uses of production function;
- 3.6. Cost Concepts;
  - 3.6.1. Cost function;
  - 3.6.2. Types of Cost;
  - 3.6.3. Determinants of cost;
  - 3.6.4. Short run and Long run cost curves;
  - 3.6.5. Cost Output Decision;
  - 3.6.6. Estimation of Cost.

4. PRICING:

4.1. Determinants of Price;
4.2. Pricing under different objectives and different market structures;
4.3. Price discrimination;
4.4. Pricing methods in practice;
4.5. Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

5.1. Balance sheet and related concepts;
5.2. Profit & Loss Statement and related concepts;
5.3. Financial Ratio Analysis;
5.4. Cash flow analysis;
5.5. Funds flow analysis;
5.6. Comparative financial statements;
5.7. Analysis & Interpretation of financial statements;
5.8. Investments;
5.9. Risks and return evaluation of investment decision;
5.10. Average rate of return;
5.11. Payback Period;
5.12. Net Present Value;
5.13. Internal rate of return,

REFERENCE BOOKS:

1. Mc Guigan, Moyer and Harris,' Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition,2005.
3. Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
4. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, NewDelhi, 2007.
5. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson SouthWestern, 4th Edition, 2001.

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DATA SCIENCES: DATA WAREHOUSING AND DATA MINING

Course Code	CI 50031(Same as CS/IT 50031)
Course Title	Data Sciences: Data Warehousing and Data Mining
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

Introduce students to the domain of Data Warehousing and Data Mining

COURSE OUTCOMES:

Student will have general idea about Data Warehousing and Data Mining techniques, will be able to explore further and effectively use related tools**.**

COURSE CONTENTS:

1. INTRODUCTION

- 1.1. Motivation,
- 1.2. Importance,
- 1.3. Definitions,
- 1.4. Kind of Data,
- 1.5. Data Mining Functionalities,
- 1.6. Kinds of Patterns,
- 1.7. Classification of Data Mining Systems,
- 1.8. Data Mining Task Primitives,
- 1.9. Integration of A Data Mining System with A Database or Data Warehouse System,
- 1.10. Major Issues in Data Mining,
- 1.11. Types of Data Sets and Attribute Values,
- 1.12. Basic Statistical Descriptions of
  - 1.12.1. Data,
  - 1.12.2. Data Visualization,
  - 1.12.3. Measuring Data Similarity.
- 1.13. PREPROCESSING:
  - 1.13.1. Data Quality,
  - 1.13.2. Major Tasks in Data Preprocessing,
  - 1.13.3. Data Reduction,
  - 1.13.4. Data Transformation and Data Discretization,
  - 1.13.5. Data Cleaning and Data Integration.

2. DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING

- 2.1. Data Warehouse basic concepts,
- 2.2. Data Warehouse Modeling - Data Cube and OLAP,
- 2.3. Data Warehouse Design and Usage,
- 2.4. Data Warehouse Implementation,
- 2.5. Data Generalization by Attribute-Oriented Induction,
- 2.6. Data Cube Computation.

3. PATTERNS, ASSOCIATIONS AND CORRELATIONS

- 3.1. Mining Frequent Patterns,
- 3.2. Associations and Correlations:
  - 3.2.1. Basic Concepts,
  - 3.2.2. Efficient and Scalable Frequent Item set Mining Methods,
  - 3.2.3. Pattern Evaluation Methods,
  - 3.2.4. Applications of frequent pattern and associations.
- 3.3. Frequent Patterns and Association Mining:
  - 3.3.1. A Road Map,
  - 3.3.2. Mining Various Kinds of Association Rules,
  - 3.3.3. Constraint-Based Frequent Pattern Mining,
  - 3.3.4. Extended Applications of FrequentPatterns

4. CLASSIFICATION

- 4.1. Basic Concepts,
- 4.2. Decision Tree Induction,
- 4.3. Bayesian Classification Methods,
- 4.4. Rule-Based Classification,

4.5. Model Evaluation and Selection,
4.6. Techniques to Improve Classification Accuracy:
  4.6.1. Ensemble Methods,
  4.6.2. Handling Different Kinds of Cases in Classification,
  4.6.3. Classification by Neural Networks,
  4.6.4. Support Vector Machines,
  4.6.5. Pattern-Based Classification,
  4.6.6. Lazy Learners (or Learning from Your Neighbors).

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5. CLUSTER ANALYSIS

5.1. Basic Concepts of Cluster Analysis,
5.2. Clustering Structures,
5.3. Major Clustering Approaches,
  5.3.1. Partitioning Methods,
  5.3.2. Hierarchical Methods,
  5.3.3. Density-Based Methods,
  5.3.4. Model-Based Clustering,
5.4. Why outlier analysis,
5.5. Identifying and handling of outliers,
5.6. Outlier Detection Techniques.
5.7. WEB MINING:
  5.7.1. Basic concepts of web mining,
  5.7.2. different types of web mining,
  5.7.3. PAGE RANK Algorithm,
  5.7.4. HITS Algorithm

REFERENCE BOOKS:

1. Jiawei Han, MichelineKamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
3. AmiteshSinha, Data Warehousing, Thomson Learning, India.
4. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

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DATABASE SECURITY

Course Code	CI 50032
Course Title	Database Security
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

The objective of the course is to provide fundamentals of database security. Various access control techniques mechanisms were introduced along with application areas of access control techniques. To study the different models involved in database security and their applications in real time world to protect the database and information associated with them.

COURSE OUTCOMES:

After completion of this course, the students will be able:

1. understand and characterize modern techniques of database information security threats and techniques for database security assessment.

2. analyze information in a database to identify information security incidents

3. understand and use the main tools for database management systems monitoring.

4. Apply new methods of a database protection and use tools for database security assessment

COURSE CONTENTS:

1. Introduction
- 1.1. Introduction to Access Control
- 1.2. Purpose and fundamentals of access control

2. Access Control: Properties & Policies
- 2.1. Policies of Access Control, Models of Access Control, and Mechanisms,
- 2.2. Discretionary Access Control (DAC), Non- Discretionary Access Control,
- 2.3. Mandatory Access Control (MAC).
- 2.4. Capabilities and Limitations of Access Control Mechanisms: Access Control List (ACL) and Limitations, Capability List and Limitations.

3. Core RBAC Features
- 3.1. Role-Based Access Control (RBAC) and Limitations, Core RBAC
- 3.2. Hierarchical RBAC, Statically Constrained RBAC
- 3.3. Dynamically Constrained RBAC, Limitations of RBAC
- 3.4. Comparing RBAC to DAC and MAC Access Control policy
- 3.5. Integrating RBAC with enterprise IT infrastructures: RBAC for WFMSs, RBAC for UNIX and JAVA environments.

4. Security in Cloud
- 4.1 Cloud Data Security: Recent trends in Database security and access control mechanisms.
- 4.2 Cloud Data Audit: Intro, Audit, Best Practice, Key management, Cloud Key Management Audit.

REFERENCE BOOKS:

1. Role Based Access Control: David F. Ferraiolo, D. Richard Kuhn, Ramaswamy Chandramouli.
2. Advanced System Security Topics, https://www.coursera.org/lecture/advanced-system-security-topics/role-based-access-control-rbac-bYvzS.

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SCRIPTING LANGUAGE (PYTHON)

Course Code	:	CI 50041
Course Title	:	Scripting Languages (Python)
Number of Credits	:	3(L:3, T: 0, P:0)
Prerequisites	:	-
Course Category	:	PC

COURSE OBJECTIVES

To learn how to work with a scripting language.

COURSE OUTCOMES

At the end of the course student will be able to build program with a scripting language and will be able to learn any other scripting language on their own.

COURSE CONTENTS

1. Introduction, Variables and Data Types

1.1 History
1.2 Features
1.3 Setting up path
1.4 Installation and Working with Python/Perl
1.5 Basic Syntax
1.6 Understanding Python variables
1.7 Numeric data types
1.8 Using string data type and string operations
1.9 Basic Operators
1.10 Understanding coding blocks
1.11 Defining list andlist slicing
1.12 Other Data Types (Tuples, List, Dictionary -Python, Arrays, Associative Arrays)

2. Control Structures

2.1 Conditional blocks using if
2.2 else and elif
2.3 For loops and iterations
2.4 while loops
2.5 Loop manipulation using continue, break and pass
2.6 Programming using conditional and loops block

3. Functions, Modules and Packages

3.1 Organizing codes using functions
3.2 Organizing projects into modules
3.3 Importing own module as well as external modules
3.4 Understanding Packages

4. File I/O, Text Processing, Regular Expressions

4.1 Understanding read functions
4.2 Understanding write functions
4.3 Programming using file operations
4.4 Powerful pattern matching and searching
4.5 Power of pattern searching using regex

5. Frameworks

5.1 Overview of Django
5.2 Django Design Philosophy
5.3 Creating a simple Django Project
5.4 Django App life cycle

REFERENCE BOOKS:

1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University
5. Introduction to Computation and Programming Using Python. John V. Guttag, MIT Press.

6. Beginning Python using Python 2.6 and Python 3, James Payne,Wroxpublishing
7. Practical Programming: An Introduction to Computer Science using Python3, Paul Gries, The PragmaticBookshelf

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MOBILE APPLICATION SECURITY

Course Code	CI 50042
Course Title	Mobile Application Security
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

To teaches how to understand mobile apps security for Android and understands the different types of securities in Mobile Applications. Students are expected to work on a project as part of the course.

COURSE OUTCOMES:

After successful completion of this course, student will be able to

1. Understand and analyze the different types of attacks
2. Analyze the Android OS Security.
3. Understand the fundamentals of Web & Mobile Applications Security.
4. Explain the Mobile application security controls.

COURSE CONTENTS:

1. MOBILE ISSUES AND DEVELOPMENT STRATEGIES
- 1.1. Top Issues Facing Mobile Devices
- 1.2. Tips for Secure Mobile Application Development

2. ANDROID SECURITY
- 2.1. Development and Debugging on Android
- 2.2. Android's Securable IPC Mechanisms
- 2.3. Android's Security Model
- 2.4. Android Permissions Review
- 2.5. Creating New Manifest Permissions
- 2.6. Android Security Tools

3. WAP AND MOBILE HTML SECURITY
- 3.1. Basics
- 3.2. Authentication on WAP/Mobile HTML Sites
- 3.3. Encryption
- 3.4. Application Attacks on Mobile HTML Sites
- 3.5. WAP and Mobile Browser Weaknesses

4. BLUETOOTH SECURITY
- 4.1. Overview of the Technology
- 4.2. Bluetooth Technical Architecture
- 4.3. Bluetooth Security Features
- 4.4. Threats to Bluetooth Devices and Networks

5. SMS SECURITY
- 5.1. Overview of SMS and MMS
- 5.2. Protocol Attacks
- 5.3. Application Attacks

6. MOBILE GEOLOCATION
- 6.1. Geolocation Methods& Implementation
- 6.2. Risks of Geolocation Services
- 6.3. Geolocation Best Practices

7. ENTERPRISE SECURITY ON THE MOBILE OS
- 7.1. Device Security Options
- 7.2. Secure Local Storage
- 7.3. Security Policy Enforcement
- 7.4. Encryption
- 7.5. Application Sandboxing, Signing, and Permissions

7.6. Buffer Overflow Protection

REFERENCE BOOKS:

1. Mobile Application Securityby Himanshu Dwivedi, Chris Clark & David Thiel, Mc Graw Hill Publication
2. ANDROID SECURITY: ATTACKS AND DEFENSES by Abhishek Dubey and Anmol Mishra, CRC Press, Taylor & Francis Group

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SCRIPTING LANGUAGE (Python) LAB

Course Code	CI50051 (Same as CB 50051)
Course Title	Scripting Language (Python)Lab
Number of Credits	2(L: 0, T: 0, P: 4)
Prerequisites	-
Course Category	PC

COURSE OBJECTIVES

This Lab course is intended to practice whatever is taught in theory class of 'Scripting Languages' and become proficient in scripting. Computer programming is all about regular practice. Students should work on solved and unsolved problems listed in the text books, and the problems given by the teacher. Some of the topics that should necessary be covered in lab are listedbelow.

COURSE OUTCOMES

At the end of the course student will be able to build program with a scripting language and will be able to learn any other scripting language on their own.

COURSE CONTENTS

S.No.	Topics for Practice
1	Practice basic coding syntax
2	Write and execute scripts based on data types
3	Write and execute Python scripts with conditionals and loops
4	Write and execute Scripts based on Functions and Modules
5	File Processing scripts
6	Write and execute Regular Expressions
7	Write and execute SQL Queries

Lecturer may choose any one scripting language. This is a skill course. More student practice and try to find solution on their own, better it will be.

REFERENCE BOOKS:

1. Taming Python by Programming, Jeeva Jose, Khanna PublishingHouse
2. Starting Out with Python, Tony Gaddis, Pearson
3. Core Python Programming, Wesley J. Chun, Prentice Hall
4. Python Programming: Using Problem Solving Approach, Reema Thareja,Oxford University Press
5. Introduction to Computation and Programming Using Python. John V. Guttag, MITPress.
6. Beginning Python using Python 2.6 and Python 3, James Payne, Wroxpublishing
7. Practical Programming: An Introduction to Computer Science using Python3, Paul Gries, The Pragmatic Bookshelf

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CYBER FORENSICS LAB

Course Code	CI 50052(Same as CB 50052)
Course Title	Cyber Forensics LAB
Number of Credits	1(L: 0, T: 0, P: 2)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

To correctly define and cite appropriate instances for the application of Cyber forensics Correctly collect and analyze Cyber forensic evidence. Identify the essential and up-to-date concepts, algorithms, protocols, tools, and methodology of Cyber Forensics.

COURSE CONTENT:

Windows forensics tools	1. Create evidence image using FTK Imager tool
	2. Using Autopsy Tool to analyze the evidence image and generate report
	3. Recover deleted files from a Windows system using Recuva recovery tool
	4. Use Regshot tool to take two Registry snapshots and then compare them
Linux forensics tools	5. Using linuxfdisk command for Partitions Listing
	6. Create a memory dump image of Linux system using LiME tool
	7. Raw Image Analysis with 'The Sleuth Kit' tool
Anti-forensics tools	8. Encrypt some files on your system using VeraCrypt utility
	9. Hide some data of your choice into a picture using SilentEye utility
	10. Use Stegdetect tool (Linux) to analyze an image for steganographic content
Mobile Forensics	11. Image Extraction of an Android Device
	12. Android Malware Analysis

REFERENCE BOOKS:

1 Case studies of book "Practical Cyber Forensics An Incident-Based Approach to Forensic Investigations" by Niranjan Reddy, APRESS

2 CYBER FORENSICS, A Field Manual for Collecting, Examining, and Preserving Evidence of ComputerCrimes, 2nd Edition, Albert J. Marcella, Jr. Doug Menendez, Auerbach Publications.

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GOVERNMENT OF RAJASTHAN

BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

VI SEMESTER

(SESSION 2021-2022 & ONWARDS)

ENTREPRENEURSHIP AND START-UPS

Course Code	CI 6111(Same in All Branches of Engg.)
Course Title	Entrepreneurship and Start-ups
Number of Credits	4 (L-3 ,T-1, P-0)
Prerequisites (Course code)	None
Course Category	HS

COURSE LEARNING OBJECTIVES:

1. Acquiring Entrepreneurial spirit and resourcefulness.
2. Familiarization with varioususesofhuman resource for earning dignified means of living.
3. Understanding the concept and process of entrepreneurship-its contribution and role in the growth and development of individual and the nation.
4. Acquiring entrepreneurial quality, competency, and motivation.
5. Learning the process and skills of creation and management of entrepreneurial venture.

LEARNING OUTCOME:

Upon completion of the course, these student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. StrategicMarketing Planning
6. New Productor Service Development
7. Business Plan Creation

COURSE CONTENTS:

1. INTRODUCTION TO ENTREPRENEURSHIP AND START–UPS

1.1. Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
1.2. Types of Business Structures,
1.3. Similarities / differences between entrepreneurs and managers.

2. BUSINESS IDEAS AND THEIR IMPLEMENTATION

2.1. Discovering ideas and visualizing the business
2.2. Activity map
2.3. Business Plan

3. IDEA TO START-UP

3.1. Market Analysis– Identifying the target market,
3.2. Competition evaluation and Strategy Development,
3.3. Marketing and accounting,
3.4. Risk analysis

4. MANAGEMENT

4.1. Company's Organization Structure,
4.2. Recruitment and management of talent.
4.3. Financial organization and management

5. FINANCING AND PROTECTION OF IDEAS

5.1. Financing methods available for start-ups in India
5.2. Communication of Ideas to potential investors– Investor Pitch
5.3. Patenting and Licenses

6. EXIT STRATEGIES FOR ENTREPRENEURS ,BANKRUPTCY, AND SUCCESSION ANDHARVESTING STRATEGY

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	The Startup Owner's Manual: The Step by-Step Guide for Building a Great Company	Steve Blank and Bob Dorf	K & S Ranch ISBN–978-0984999392
2.	The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses	Eric Ries	Penguin UK ISBN–978-0670921607
3.	Demand: Creating What People Love Before They Know They Want It	Adrian J. Slywotzky with Karl Weber	Headline Book Publishing ISBN–978-0755388974
4.	The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business	Clayton M. Chris Tensen	Harvard business ISBN:978-142219602

SUGGESTEDSOFTWARE/LEARNINGWEBSITES:

1. https://www.fundable.com/learn/resources/guides/startup
2. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatehstructure/
3. https://www.finder.com/small-business-finance-tips
4. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

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PROJECT MANAGEMENT

CourseCode	CI62001(Same in All Branches of Engg.)
CourseTitle	Project Management
NumberofCredits	3(L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

1. To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.
2. To develop an understanding of key project management skills and strategies.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand the importance of projects and its phases.
CO2	Analyze projects from marketing, operational and financial perspectives.
CO3	Evaluate projects based on discount and non-discount methods.
CO4	Develop network diagrams for planning and execution of a given project.
CO5	Apply crashing procedures for time and cost optimization.

COURSE CONTENTS

1. CONCEPT OF A PROJECT:
- 1.1. Classification of projects
- 1.2. Importance of project management
- 1.3. The project Life cycle
- 1.4. Establishing project priorities (scope-cost-time)
- 1.5. Project priority matrix
- 1.6. Work break down structure.

2. CAPITAL BUDGETING PROCESS:
- 2.1. Planning -Analysis-Selection-Financing-Implementation-Review.
- 2.2. Generation and screening of project ideas
- 2.3. Market and demand analysis
- 2.4. Demand forecasting techniques.
- 2.5. Market planning and marketing research process
- 2.6. Technical analysis

3. FINANCIAL ESTIMATES AND PROJECTIONS:
- 3.1. Cost of projects
- 3.2. Means of financing
- 3.3. Estimates of sales and production-cost of production
- 3.4. Working capital requirement and its financing
- 3.5. Profitability project , cash flow statement and balance sheet.
- 3.6. Breakeven analysis.

4. BASIC TECHNIQUES IN CAPITAL BUDGETING:
- 4.1. Non discounting and discounting methods
- 4.2. pay-back period
- 4.3. Accounting rate of return
- 4.4. Net present value
- 4.5. Benefit cost ratio
- 4.6. Internal rate of return.
- 4.7. Project risk.
- 4.8. Social cost benefit analysis andeconomic rate of return.
- 4.9. Non-financial justification of projects**.**

5. PROJECT ADMINISTRATION:
- 5.1. Progress payments,
- 5.2. Expenditure planning,

5.3. Project scheduling and network planning,
5.4. Use of Critical Path Method(CPM),
5.5. Schedule of payments and physical progress,
5.6. time-cost trade off.
5.7. Concepts and uses of PERT
5.8. Cost as a function of time,
5.9. Project Evaluation and Review Techniques
5.10. Cost mechanisms.
5.11. Determination of least cost duration.
5.12. Post project evaluation.
5.13. Introduction to various Project management softwares.

REFERENCE BOOKS

1. Project planning, analysis, selection, implementation and review –Prasannachandra–Tata McGraw Hill
2. Project Management – the Managerial Process– Clifford F. Gray & Erik W. Larson-McGrawHill
3. Project management- David I Cleland- Mcgraw Hill International Edition, 1999
4. Project Management– Gopala krishnan– Mcmillan India Ltd.
5. Project Management- Harry – Maylor – Peason Publication

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RENEWABLE ENERGY TECHNOLOGIES

CourseCode	CI 62002(Same in All Branches of Engg.)
CourseTitle	Renewable Energy Technologies
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

1. To understand present and future scenario of world energy use.
2. To understand fundamentals of solar energy systems.
3. To understand basics of wind energy.
4. To understand bio energy and its usage in different ways.
5. To identify different available non-conventional energy sources.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand present and future energy scenario of the world.
CO2	Understand various methods of solar energy harvesting.
CO3	Identify various wind energy systems.
CO4	Evaluate appropriate methods for Bio energy generations from various Bio wastes.
CO5	Identify suitable energy sources for a location.

COURSE CONTENTS

1. INTRODUCTION:

1.1. World Energy Use;
1.2. Reserves of Energy Resources;
1.3. Environmental Aspects OF Energy Utilisation;
1.4. Renewable Energy Scenario in India and around the World;
1.5. Potentials; Achievements/ Applications;
1.6. Economics of renewable energy systems.

2. SOLAR ENERGY:

2.1. Solar Radiation;
2.2. Measurements of Solar Radiation;
2.3. Flat Plate and Concentrating Collectors;
2.4. Solar direct Thermal Applications;
2.5. Solar thermal Power Generation
2.6. Fundamentals of Solar Photo Voltaic Conversion;
2.7. Solar Cells;
2.8. Solar PV Power Generation;
2.9. Solar PV Applications.

3. WIND ENERGY:

3.1. Wind Data and Energy Estimation;
3.2. Types of Wind Energy Systems;
3.3. Performance; Site Selection;
3.4. Details of Wind Turbine Generator;
3.5. Safety and Environmental Aspects.

4. BIO-ENERGY:

4.1. Bio mass direct combustion;
4.2. Bio mass gasifiers;
4.3. Bio gas plants;
4.4. Digesters;
4.5. Ethanol production;
4.6. Bio diesel;
4.7. Cogeneration;
4.8. Bio mass Applications.

5. OTHER RENEWABLE ENERGY SOURCES:

5.1. Tidal energy;
5.2. Wave Energy;
5.3. Open and Closed OTEC Cycles;
5.4. Small Hydro Geothermal Energy;
5.5. Hydrogen and Storage;
5.6. Fuel Cell Systems;
5.7. Hybrid Systems.

REFERENCE BOOKS

1. Non-Conventional Energy Sources, Rai. G. D., Khanna Publishers, New Delhi, 2011.
2. Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN SponLtd.,UK,2 006.
3. Solar Energy, Sukhatme. S. P., Tata Mc Graw Hill Publishing CompanyLtd. ,New Delhi, 1997.
4. Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996.
5. Fundamental of Renewable Energy Sources, G N Tiwari and M K Ghoshal, Narosa, New Delhi, 2007.
6. Renewable Energy and Environment A Policy Analysis for India ,NHRavindranath, U K Rao, B Natarajan, P Monga, Tata McGraw Hill.
7. Energy and The Environment, R A Ristinen and J JKraushaar, second edition, John Willey & Sons, New York, 2006.
8. Renewable Energy Resources, J W T widell and A D Weir, ELBS, 2006.

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PRODUCT DESIGN

CourseCode	CI 63001(Same in All Branches of Engg.)
CourseTitle	Product Design
NumberofCredits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES

1. To acquire the basic concepts of product design and development process
2. To understand the engineering and scientific process in executing a design from concept to finished product
3. To study the key reasons for design or redesign.

COURSE OUTCOMES

At the end of the course, the student will be able to:

CO1	Understand the basic concepts of product design and development process.
CO2	Illustrate the methods to define thecustomer needs.
CO3	Describe an engineering design and development process.
CO4	Understand the intuitive and advanced methods used to develop and evaluate a concept.
CO5	Apply modelling and embodiment principles in product design and development process.

COURSE CONTENTS

1. DEFINITION OF A PRODUCT

1.1. Types of product;
1.2. Levels of product;
1.3. Product-market mix;
1.4. New prod-uct development (NPD) process;
1.5. Idea generation methods;
1.6. Creativity;
  1.6.1. Creative attitude;
  1.6.2. Creative design process;
1.7. Morpho logical analysis;
1.8. Analysis of inter-connected decision areas;
1.9. Brain storming.

2. PRODUCT LIFECYCLE;

2.1. The challenges of Product development;
2.2. Product analysis;
2.3. Product characteristics;
2.4. Economic considerations;
2.5. Production and Marketing aspects;
2.6. Characteristics of successful Product development;
2.7. Phases of a generic product development process;
2.8. Customer need identification;
2.9. Product development practices and industry-product strategies.

3. PRODUCT DESIGN

3.1. Design by evolution;
3.2. Design by innovation;
3.3. Design by imitation;
3.4. Factors affecting product design;
3.5. Standards of performance and environmental factors;
3.6. Decision making and iteration;
3.7. Morphology of design (different phases);
3.8. Role of aesthetics in design.

4. INTRODUCTION TO OPTIMIZATION IN DESIGN

4.1. Economic factors in design;
4.2. Design for safety and reliability;
4.3. Role of computers in design;

4.4. Modeling and Simulation;
4.5. The role of models in engineering design;
4.6. Mathematical modeling;
4.7. Similitude and scale models;
4.8. Concurrent design;
4.9. Six sigma and design for six sigma;
4.10. Introduction to optimization in design;
4.11. Economic factors and financial feasibility in design;
4.12. Design for manufacturing;
4.13. Rapid Proto typing (RP);
4.14. Application of RP in product design;
4.15. Product Development versus Design.

5. DESIGN OF SIMPLE PRODUCTS DEALING WITH VARIOUS ASPECTS OF PRODUCT DEVELOPMENT;

5.1. Design Starting from need till the manufacture of the product

REFERENCE BOOKS

1. Product Design and Development, Karl T.Ulrichand Steven D.Eppinger, TataMc Graw–Hill edition.
2. Engineering Design– George E. Dieter.
3. An Introduction to Engineering Design methods Vijay Gupta.
4. Merie Crawford: New Product management, McGraw-Hill Irwin.
5. Chitale A K and Gupta R C," Product Design and Manufacturing", Prentice Hall of India, 2005.
6. Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pears on education.

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DISASTER MANAGEMENT

Course Code	CI 63002(Same in All Branches of Engg.)
Course Title	Disaster Management
Number of Credits	3 (L: 3, T: 0 ,P :0)
Prerequisites	NIL
Course Category	OE

COURSE LEARNING OBJECTIVES

Following are the objectives of this course:

1. To learn about various types of natural and man-made disasters.
2. To know pre and post-disaster management for some of the disasters.
3. To know about various information and organizations in disaster management in India.
4. To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

1.1. After competing this course, student will be:
1.2. Acquainted with basic information on various types of disasters
1.3. Knowing the precautions and awareness regarding various disasters
1.4. Decide first action to be taken under various disasters
1.5. Familiarised with organization in India which are dealing with disasters
1.6. Able to select IT tools to help in disaster management

COURSE CONTENTS

1. UNDERSTANDING DISASTER

1.1. Understanding the Concepts and definitions of Disaster,
1.2. Hazard,
1.3. Vulnerability,
1.4. Risk,
1.5. Capacity–Disaster and Development,
1.6. Disaster management.

2. TYPES, TRENDS, CAUSES, CONSEQUENCES AND CONTROL OF DISASTERS

2.1. Geological Disasters (earth quakes, land slides,tsunami, mining);
2.2. Hydro-Meteorological Di-sasters (floods, cyclones, lightning, thunder-storms, hailstorms, avalanches, droughts, cold and heat waves)
2.3. Biological Disasters (epidemics, pestattacks, forestfire);
2.4. Technological Disasters (chemical, industrial, radiological, nuclear)
2.5. Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters)
2.6. Global Disaster Trends
2.7. Emerging Risks of Disasters
2.8. Climate Change and Urban Disasters.

3. DISASTER MANAGEMENT CYCLE AND FRAME WORK

3.1. Disaster Management Cycle
3.2. Paradigm Shift in Disaster Management.
3.3. Pre-Disaster
3.4. Risk Assessment and Analysis,
3.5. Risk Mapping,
3.6. Zonation and Microzonation,
3.7. Prevention and Mitigation of Disasters,
3.8. Early Warning System
  3.8.1. Preparedness,
  3.8.2. Capacity Development;
  3.8.3. Awareness.
3.9. During Disaster
  3.9.1. Evacuation
  3.9.2. Disaster Communication
  3.9.3. Search and Rescue
  3.9.4. Emergency Operation Centre

3.9.5. Incident Comm and System
3.9.6. Relief and Rehabilitation
3.10. Post-disaster
3.10.1. Damage and Needs Assessment,
3.10.2. Restoration of Critical Infra structure
3.10.3. Early Recovery Reconstruction and Redevelopment;
3.10.4. IDNDR, Yokohama Stretegy, Hyogo Frame-work of Action.

4. DISASTER MANAGEMENT IN INDIA

4.1. Disaster Profile of India
4.2. Mega Disasters of India and Lessons Learnt.
4.3. Disaster Management Act 2005
4.4. Institutional and Financial Mechanism,
4.5. National Policy on Disaster Management,
4.6. National Guidelines and Plans on Disaster Management;
4.7. Role of Government (local, state and national),
4.8. Non-Government and Inter Governmental Agencies

5. APPLICATIONS OF SCIENCE AND TECHNOLOGY FOR DISASTER MANAGEMENT

5.1. Geo informatics in Disaster Management (RS, GIS, GPS and RS).
5.2. Disaster Communication System (Early Warning and Its Dissemination).
5.3. Land Use Planning and Development Regulations,
5.4. Disaster Safe Designs and Constructions,
5.5. Structural and Non Structural Mitigation of Disasters
5.6. S & T Institutions for Disaster Management in India

REFERENCES

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guide lines for Disaster Management
2. Bhandani, R. K., An over view on natural & man-made disasters and their reduction, CSIR, New Delhi
3. Srivastava, H. N., and Gupta G. D. , Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4. Alexander, David, Natural Disasters, Kluwer Academic London
5. Ghosh, G .K. ,Disaster Management, APH Publishing Corporation
6. Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

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INDIAN CONSTITUTION

CourseCode	CI 6333(Same in All Branches of Engg.)
CourseTitle	Indian Constitution
NumberofCredits	0 (L:2,T:0;P:0)
Prerequisites(Coursecode)	None
CourseCategory	AU

COURSE CONTENT

1. THE CONSTITUTION –
- 1.1. Introduction
- 1.2. The History of the Making of the Indian Constitution
- 1.3. Preamble and the Basic Structure, and its interpretation
- 1.4. Fundamental Rights and Duties and their interpretation
- 1.5. State Policy Principles

2. UNION GOVERNMENT
- 2.1. Structure of the Indian Union
- 2.2. President– Role and Power
- 2.3. Prime Minister and Council of Ministers
- 2.4. Lok Sabha and Rajya Sabha

3. STATE GOVERNMENT
- 3.1. Governor– Role and Power
- 3.2. Chief Minister and Council of Ministers
- 3.3. State Secretariat

4. LOCAL ADMINISTRATION
- 4.1. District Administration
- 4.2. Municipal Corporation
- 4.3. Zila Panchayat

5. ELECTION COMMISSION
- 5.1. Role and Functioning
- 5.2. Chief Election Commissioner
- 5.3. State Election Commission

SUGGESTED LEARNING RESOURCES:

S.No.	Title of Book	Author	Publication
1.	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi, 2008
2.	The Constitution of India	B.L.Fadia	Sahitya Bhawan; New edition(2017)
3.	Introduction to the Constitution of India	D DBasu	Lexis Nexis; Twenty-Third 2018 edition

SUGGESTED SOFTWARE / LEARNING WEBSITES:
1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/

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ETHICAL HACKING

Course Code	CI 60011
Course Title	Ethical Hacking
Number of Credits	3(L: 3, T: 0, P:0)
Prerequisites	
Course Category	PE

COURSE LEARNING OBJECTIVES:

To understand various foot printing techniques and tools. Recognize the characteristics of the enumeration phase of an attack and effective countermeasures. Determine the techniques and tools used in system hacking. Describe the characteristics of trojan's, worms, and malware

COURSE OUTCOMES:

After learning the course, the students should be able to

1. Describe and understand the basics of the ethical hacking
2. Perform the foot printing and scanning
3. Demonstrate the techniques for system hacking
4. Determine the signature of different attacks and prevent them
5. Detect and prevent the security attacks in different environments

COURSE CONTENTS:

1. Fundamentals

1.1 Introduction to Ethical Hacking
1.2 Hacking Terminology, Hacker Classifications, Attack Types
1.3 Hacking Phases

2. Footprinting and Reconnaissance

2.1 Footprinting: Passive, Active
2.2 Footprinting Methods and Tools: Search Engines, Website and E-mail Footprinting

3. Scanning and Enumeration

3.1 Scanning Methodology: Identifying Targets, Port Scanning, Evasion, Vulnerability Scanning
3.2 Enumeration Techniques: Banner Grabbing, SNMP Enumeration

4. Sniffing and Evasion

4.1 Active and Passive Sniffing
4.2 Sniffing Tools and Techniques: MAC Flooding, ARP Poisoning, DHCP Starvation, Spoofing
4.3 Evasion & It's Techniques: Firewall, Honeypots

5. Attacking a System

5.1 Methodology
5.2 Hacking Steps: Authentication and Passwords, Password Attacks, Privilege Escalation and Executing Applications, Hiding Files and Covering Tracks

SUGGESTED LAB WORK:

This is a skill course. Topics/tools taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should explore features of various tools introduced during the course and become comfortable with their use. Teacher should give weekly tasks as assignment.

REFERENCE BOOKS:

1. CEH Certified Ethical Hacker All in One Exam Guide by Matt Walker, 4TH EDITION, Mc Graw Hill.
2. CEH V10, Certified Ethical Hacker, Study Guide by Ric Messier, SYBEX, John Wiley & Sons

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NETWORK FORENSICS

Course Code	CI 60012
Course Title	Network Forensics
Number of Credits	4(L: 3, T: 1, P:0)
Prerequisites	Operating Systems, Computer Networks
Course Category	PE

COURSE LEARNING OBJECTIVES:

To understand various network forensic aspects for analyzing network security breach

COURSE OUTCOMES:

Student will understand basic concepts of network forensics, learn tools, and will be able to do basic forensic investigations and handle security incidents.

COURSE CONTENTS:

1.

1.1. Review of Networking concepts and Protocols
1.2. Introduction to Network Forensics
1.3. Various aspects of Network Forensics

2.

2.1. Introduction to Network Forensic Tools and techniques
2.2. Wireshark
2.3. TCP Dump
2.4. Syslog
2.5. NMS
2.6. Promiscuous Mode
2.7. Network Port Mirroring
2.8. Snooping
2.9. Scanning tools

3.

3.1. Understanding and Examining Data Link Layer
  3.1.1. Physical Layer
  3.1.2. Ethernet Switch Logs
  3.1.3. MAC Table
  3.1.4. ARP Table, etc.
3.2. Understanding and Examining Network Layer
  3.2.1. Router Logs
  3.2.2. WiFi Device logs
  3.2.3. Firewall logs,

4.

4.1. Understanding audit features of OS and applications
4.2. Enabling and Examining Server logs
4.3. User activity logs
4.4. Browser history analysis
4.5. Proxy server logs
4.6. Antivirus logs
4.7. Email logs

5.

Limitations and challenges of network forensics due to
5.1. Encryption
5.2. Spoofing
5.3. Mobility
5.4. Storage limitations
5.5. Privacy laws, etc.

SUGGESTED LAB WORK:

This is a skill course. Topics/tools taught in the class should be practiced in the Lab same week and practiced regularly during the semester till student becomes confident about it. Students should explore features of various tools/applications introduced during the course. Teacher should give weekly tasks as assignment.

REFERENCE BOOKS:

1. Manuals of OS, application software, networkdevices
2. RFCs of various networking protocols(https://www.ietf.org/)
3. https://www.sans.org/
4. https://www.cert-in.org.in/
5. Handbook of Digital Forensics and Investigation, Eoghan Casey, Elsevier AcademicPress
6. Cyber Forensics, Albert Marcella and Doug Menendez, CRCPress
7. Computer Forensics (5 volume Set) mapping to CHFI (Certified HackingForensics Investigator), by EC-Council

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ETHICAL HACKING LAB

Course Code	CI 60021
Course Title	Ethical Hacking Lab
Number of Credits	1(L: -, T: 0, P: 2) Lab
Prerequisites	CI 60012
Course Category	PE

COURSE LEARNING OBJECTIVES:

Following are the objectives of this course:

1. Ethical Hacking Lab ethically penetrates into network systems using various tools to test the strength of a network.
2. To explain how to test, scan, hack and secure networks and systems.
3. Get in-depth theoretical knowledge and rich practical experience in hacking test networks.

COURSE OUTCOMES:

After completion of , students would be able to:

1. Understand the core concepts related to different types of Footprinting Methods and Tools.
2. Understand the core concepts related to E-mail tracking.
3. Understand Sniffing and Evasion
4. Exploit the vulnerabilities related to computer system and networks using state of the art tools and technologies.

COURSE CONTENTS:

Footprinting Methods and Tools	1. Google Search String Operators
Website Footprinting	2. Use any of web mirroring tool for footprinting. Tools: HTTrack (www.httrack.com), Black Widow (http://softbytelabs.com), The Way Back Machine www.archive.org
E-mail tracking	3. Use any of E mail tracking tool for footprinting. Tools: GetNotify, ContactMonkey, Yesware, Read Notify, WhoReadMe, MSGTAG,Trace Email, and Zendio
DNS Footprinting	4. Using Nslookup command
Scanning	5. Use CurrPorts, Zenmap tools andHping, netstat commandsport scanning
Enumeration Techniques	6. Banner Grabbing with telnet command 7. Using Nbtstat and SuperScan (www.mcafee.com) for NetBIOS enumeration 8. Using Engineer's Toolset(solarwinds.com), SNMPScanner (secure-bytes.com), OpUtils5 (www.manageengine.com), and SNScan (mcafee.com) for SNMP Enumeration
Sniffing and Evasion	9. Using Wireshark software for sniffing 10. Installing, configuring and testing Snort IDS 11. Configuring Firewall in Windows and Linux systems.

REFERENCE BOOKS/RESOURCES:

1. CEH Certified Ethical Hacker All in One Exam Guide by Matt Walker, 4TH EDITION, Mc Graw Hill.
2. CEH V10, Certified Ethical Hacker, Study Guide by Ric Messier, SYBEX, John Wiley & Sons
3. Ethical Hacking and Countermeasures v11, Professional series by EC-Council

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DIGITAL FORENSICS TOOLS LAB

Course Code	CI 60022
Course Title	Digital Forensics Tools Lab
Number of Credits	1(L: -, T: 0, P: 2)
Prerequisites	
Course Category	PE

COURSE LEARNING OBJECTIVES:

To introduce students to the domain of digital forensics tools specially open source or freeware tools. To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.To understand how to examine digital evidences such as the data acquisition, identification analysis on different tools.

COURSE OUTCOMES:

1. Know how to apply forensic analysis tools to recover Network discovery and security auditing.
2. Students will explain and properly document the process of digital forensics analysis.
3. Students will gain an understanding of the tradeoffs and differences between various forensic tools.
4. Students will be able to describe the wireshark.
5. Students will understand the inner workings of firewall systems.
6. Students will be able to create disk images, recover deleted files and extract hidden information.

COURSE CONTENTS:

1.	Network discovery and security auditing with Nmap
2.	Scan local networks as well as Internet with Angry IP Scanner freeware
3.	Configuring Windows Firewall
4.	Configuring UB Firewall in Ubuntu Linux systems
5.	Installing, Configuring and testing Snort on a Windows System
6.	Using Wireshark for Capturing Live Network Data
7.	File Input, Output, And Printing with wireshark
8.	Filtering Packets in wireshark
9.	Using Volatility tool for the extraction of digital artifacts from volatile memory (RAM)
10.	Using xplico tool for Internet Traffic Decoding

REFERENCE BOOKS:

1. How to Cheat at Configuring Open Source Security Tools, Raven Alder,Josh Burke,Chad Keefer et. al, Syngress Publishing, Inc. & Elsevier, Inc.
2. https://nmap.org/book/man.html
3. https://www.wireshark.org/docs/wsug_html_chunked/
4. Volatility | Penetration Testing Tools (kali.org)
5. https://tools.kali.org/information-gathering/xplico

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