

Programme Educational Objectives

Within 3-5 years of education, graduates of MCA programme of CSIBER institute will be able to:

- **PEO 1:** Design and develop quality software using emerging technologies as per industry standards
- **PEO 2:** Exhibit life long learning capabilities with concern to drastic changes in emerging technologies.
- **PEO 3:** Exhibit successful professional career by providing software solutions for complex problems in a time-bound manner.
- **PEO 4:** Adopt themselves to the constantly evolving technology by peer reviewing, by working collaboratively and developing expertise in emerging fields.

MSc (CS) (Cyber Security) Programme Outcomes (PO)

- **PO 1:** Apply the knowledge of computing, mathematics, and security fundamentals appropriate to the discipline.
- **PO 2:** Analyze a problem, and identify and formulate the security requirements appropriate to its solution.
- **PO 3:** Design, implement, and evaluate a computer-based solution to meet desired needs with appropriate consideration for society.
- **PO 4:** Design and conduct experiments, as well as to analyze and interpret results.
- **PO 5:** Use current techniques, skills, and modern tools necessary for computing and security practice.
- **PO 6:** Understanding professional, ethical, legal, security and social issues and responsibilities.
- **PO 7:** Function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal.
- **PO 8:** Communicate effectively, comprehend and write effective reports and make effective presentations.

Semester	I	Total Credit	4
Course Code	CC-101	Credit Pattern	L-48, T-10, P-2
Course Title	Operating System		
Course Objectives			
1	To familiarize the student to the operating system fundamentals		
2	To impart in-depth knowledge of process management and inter-process communication		
3	To study the different memory management techniques and File systems		
4	To provide a student with the solid foundation of operating system security and protection		
Course Outcomes: After successful completion of the course, the students would be able to			
1	Illustrate fundamental operating system concepts such as processes, threads, files, semaphores, IPC , shared memory regions, etc.		
2	Analyse important algorithms eg. Process scheduling, Deadlock avoidance and memory management algorithms		
3	Compare different memory management techniques and file Systems		
4	Apply theories of secure operating system in resolving security and access control related real time problems		

Semester	I	Total Credit	4
Course Code	CC-102	Credit Pattern	L-48, T-10, P-2
Course Title	DATABASE MANAGEMENT SYSTEM		
Course Objectives			
1	Understanding the database concept and structure, data modeling and development process.		
2	Construct and normalize conceptual data models.		
3	Implement a relational database into a database management system		
4	To understand Database Security strategies		
Course Outcomes: After successful completion of the course, the students would be able to			
1	To make a study of SQL and relational database design		
2	To know about data storage techniques and query processing		
3	To impart knowledge in transaction processing, concurrency control techniques and recovery procedures		
4	Learner will study Database Security aspects		

Semester	I	Total Credit	4
Course Code	CC-103	Credit Pattern	L-48, T-10, P-2
Course Title	Mathematical Foundation For Security		
Course Objectives			
1	The course is designed to provide a basic understanding and knowledge of Mathematics, Probability and Statistics for Computing.		
2	Students will be able to apply Mathematics and Statistics to solve problems related to Cyber Security		
3	Students will be able to generate pseudo random no.s for block ciphers.		
4	Students will be able to apply coding theory to cyber security problems		
Course Outcomes: After successful completion of the course, the students would be able to			
1	To learn about Number theory including Divisibility, Greatest common divisor and Prime numbers.		
2	To understand and apply Euclidean algorithm, Fermat's theorem and Euler's theorem.		
3	To understand the concept of Algebraic structure including Groups, Rings, Fields and Classifications and to calculate probability based on Baye's theorem.		
4	To calculate probability for discrete random variables and continuous random variables and to apply the concept of Coding.		
5	To use Pseudorandom number generation for Next Bit Predictors and Blum-Blum-Shub Generator.		

Semester	I	Total Credit	4
Course Code	CC-104	Credit Pattern	L-48, T-10, P-2
Course Title	Python Programming		
Course Objectives			
1	Introduce language constructs in Python		
2	Introduce collection classes and their salient features		
3	Familiarize the student with implementation of object-oriented concepts of Python.		
4	Introduce to security aspects of Python		
Course Outcomes: After successful completion of the course, the students would be able to			
1	Apply knowledge for using collection classes in different use cases.		
2	Implement file-handling and object-oriented programming in Python.		
3	Design patterns containing regular expressions for pattern matching		
4	Program cryptographic applications in Python.		

Semester	I	Total Credit	4
Course Code	CC-105	Credit Pattern	L-48, T-10, P-2
Course Title	Secure programming with C		
Course Objectives			
1	To teach how to write secure programs in C language		
2	To explain the data types and Vulnerabilities in it		
3	To demonstrate implementation of flat files using C language.		
4	To demonstrate code injection using C language		
Course Outcomes: After successful completion of the course, the students would be able to			
1	Able to write correct programs in C language		
2	Understand use of data types, structures and Vulnerabilities in it		
3	Able to implement flat files in C language,		

Semester	I	Total Credit	4
Course Code	DSE-101	Credit Pattern	L-48, T-12, P-0
Course Title	A. Secure Software Design		
Course Objectives			
1	Introduce software security aspects.		
2	Describe security models		
3.	Understand and analyse risks in software engineering		
4.	Design a framework for software security		
Course Outcomes: The students will able to			
1.	Understand various aspects and principles of software security.		
2.	Devise security models for implementing at the design level.		
3.	Identify and analyse the risks associated with s/w engineering and use relevant models to mitigate the risks.		
4.	Design different security strategies for different types of software systems.		

Semester	I	Total Credit	4
Course Code	DSE-I	Credit Pattern	L-48, T-12, P-0
Course Title	B. Identity Access And Management		
Course Objectives			
1	To understand the fundamentals of the identity and access management		
2	To study security techniques that identify and authenticate anything trying to gain access to any systems.		
3.	To design and implement identity access & management to control access to resources.		
4.	To implement access rights, provide single sign-on mechanism		
Course Outcomes: The students will be able to			
1.	Describe the importance of identity management		
2.	Develop mechanisms to store identity information		
3.	Describe the use of directories to manage identities and explores the methodologies for authentication and access control in depth		
4	Design mechanisms to use identity data for access control		
5	Implement access rights, provide single sign-on mechanism		
6	Describe the effective use of identity access and management		

Semester	I	Total Credit	2
Course Code	AEC- I	Credit Pattern	L-24, T-6, P-0
Course Title	b. Problem Solving and Logical Skills		
Course Objectives			
1	To provide a solid foundation in algorithm design and analysis.		
2	Become familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles.		
3	To develop problem solving abilities using mathematical theories.		
4	To study different logical strategies and techniques		
5	To study the important algorithmic design paradigms and methods of analysis.		

Course Outcomes: After successful completion of the course, the students would be able to	
1.	Reflect upon their own capacity for problem-solving.
2.	Apply algorithmic thinking to understand, define and solve problems
3.	Apply logical skills while solving problems.

4.	Demonstrate problem solving logical inference skills
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Semester	I	Total Credit	2
Course Code	AEC-I	Credit Pattern	L-30, T-00, P-00
Course Title	C. Social Ethics		
Course Objectives			
1	To study basic moral ethics of students		
2	To check out learners social ethics learnt by students		
Course Outcomes			
After completion of this course the student will be able to:			
1	Analyse basic moral and social ethics of learners		
2	Assess social, moral , ethical standards practices of learners		

Semester	I	Total Credit	2
Course Code	AEC-I	Credit Pattern	L-25, T-05
Course Title	D. Stress Management		
Course Objectives			
1	To understand the scientific foundations, nature and symptoms of stress		
2	To assess risk factors of stress		
3.	To develop resilience to stress		
4	To apply stress management techniques		

Course Outcomes: The students will able to			
1.	Comprehend the scientific foundations, nature and symptoms of stress		
2.	Discuss risk factors of stress		
3.	Develop resilience to stress		
4.	Apply stress management techniques		

SEM - II		Total Credit	4
Course Code	CC 201	Credit Pattern	L-48, T-12, P-0
Course Title		Ethical Hacking	
Course Objectives			
1	To familiarize the student with ethical hacking concepts and tools		
2	To introduce various ethical hacking skills and types of attacks		
3.	To know how protect systems from hacking threats		
Course Outcomes: The students will able to			
1.	Will be able to identify the type of hacking attack		
2.	Will be acquainted with ethical hacking skills		
3.	Will be able to use various ethical hacking tools		

Semester	II	Total Credit	4
Course Code	CC-202	Credit Pattern	L-48, T-12, P-0
Course Title		Information Security and Cryptography	
Course Objectives			
1	To understand basics of Information security and Cryptography.		
2	To be able to secure a message over insecure channel by various means.		
2	To learn about how to maintain the Confidentiality, Integrity and Availability of a data.		
Course Outcomes: After successful completion of the course, the students would be able to			
1.	Provide security of the data over the network.		
2.	Do research in the emerging areas of cryptography and Information security		

Semester	II	Total Credit	4
Course Code	CC-203	Credit Pattern	L-48, T-12, P-0
Course Title		Cloud Security	
Course Objectives			
1	To explore vital concepts in Cloud Computing		
2	To identify the technical foundations of cloud systems architectures		
3	To expose the students to frontier areas of Cloud Computing		
4	To explore Cloud Security fundamentals		
Course Outcomes: Students will be able to;			
1	Articulate various deployment models as well as service models of cloud computing.		

2	Describe cloud security architectures from the perspectives of all the stakeholders
3	Understand importance shared security responsibilities
4	Elaborate enterprise security considerations compared to on-premise

Semester	II	Total Credit	4
Course Code	CC-204	Credit Pattern	L-48, T-12, P-0
Course Title	Web Development		
Course Objectives			
1	To introduce a student to advanced trends in web technology.		
2	To enable the student to design and develop Rich Internet Applications (RIA)		
3	To understand the role of jQuery, AJAX and JSON in reducing the development time of web application.		
4	To understand the concept of responsive sites and role of Bootstrap technology in designing responsive sites.		
Course outcomes : After completion of course student will			
1	be able to use different HTML5 and CSS3 features for designing webpages with improved UI and UX.		
2	be able to use jQuery library in developing websites		
3	be able to use AJAX for improving performance and response		
4	be able to parse JSON documents and use JSON in software integration		
5	be able to develop responsive sites using mobile first approach of Bootstrap technology.		

Semester	II	Total Credit	4
Course Code	CC-205	Credit Pattern	L-48, T-12, P-0
Course Title	Communication Network and Programming		
Course Objectives			
1	To introduce the basic of computer network and Layered approach.		
2	To introduce the addressing, naming and DNS concepts.		
3.	To introduce network programming approaches.		
4.	To implement network programming using TCP and UDP.		
Course Outcomes: The students will able to			

1.	Understand basic concepts about the network and layered approach.
2.	Understand and Classify addresses and naming in network.
3.	Create TCP and UDP clients using network programming.
4.	Design and Create servers for small services

Semester	II	Total Credit	4
Course Code	DSE-II	Credit Pattern	L-48, T-12, P-0
Course Title	A. Machine Learning For Security		
Course Objectives			
1	To understand basic concepts of the machine learning		
2	To develop problem solving ability using machine learning algorithms		
3.	To detect, analyse and classify malware using machine learning algorithm		
4.	To understand personal and customer web security issues		
Course Outcomes: The students will be able to			
1.	Use of machine learning algorithms for different applications		
2.	Solve the security issues using machine learning techniques		
3.	Provide solution for real time security problems using machine learning algorithms		
4	Develop awareness of latest trends and advances in security using machine learning		
5	Protect Consumer Web problems and provide solution using machine learning		

Semester	II	Total Credit	4
Course Code	DSE-II	Credit Pattern	L-45, T-7, P-8
Course Title	B. Java Programming		
Course Objectives			
1	To provide students with the solid foundation of the syntax and semantics of java Programming, object-oriented concepts in Java.		
2	To familiarize the student to the application of Exception Handling mechanism in Java application, and development of console-based, event handling applications in Java		
3	To demonstrate use of multi-threaded application development in Java.		
4	To demonstrate interfacing Java application with various Database Management Systems.		
5	To familiarize students with Java Cryptography Architecture		
Course Outcomes: Students will be able to;			
1	To design console based application, accessing command-line arguments and parameterized applets.		
2	To design java applications employing streams and exception handling mechanism in Java.		
3	To explore different types of JDBC drivers for connecting and accessing data from different backend Database management systems.		

4	To design and develop networked applications in both connection-oriented and connectionless architecture in Java.
5	To design and implement applications with security features using Java Cryptography

Semester		Total Credit	2
Course Code		Credit Pattern	L-22, T-8
Course Title	FUNDAMENTALS OF MANAGEMENT		
Course Objectives			
1	To Understand the different concepts in Management.		
2	To understand the different Functions of Management		
Course Outcomes: Students will be able to;			
1.	Discuss management functions and how it can affect future managers		
2.	Analyze and attain elementary level of skills in management process and functions: planning, organizing, directing and controlling.		

Semester	II	Total Credit	2
Course Code	GE 201 E	Credit Pattern	L-23, T-07, P-0
Course Title	ENVIRONMENT AND DEVELOPMENT		
Course Objectives			
1	Understand the basics functional areas of Environment.		
2	Define concepts of pollution, pollutants and natural resources		
3	Explain historical development of struggle for Environmental protection		
Course Outcomes: The students will able to			
1.	Differentiate biotic and abiotic components of ecosystem & able to understand concept of habitat, interactions in between different components & their Interrelationships.		
2.	Develop ability of identification of local issues related with natural resources.		
3.	Adopt various pollution control techniques.		
4.	Able to know various environmental policies as well as National & International Organizations involved.		

Semester	II	Total Credit	2
Course Code	GE 2	Credit Pattern	L-20, T-5, P-5
Course Title	INDIAN SOCIAL PROBLEMS AND SOCIAL SERVICES		
Course Outcomes: Students will be able to			
1	Implement various social welfare services provided by GO's & NGO's		
2	Asses the socio- economic factors and their implications of beneficiaries		

Semester	II	Total Credit	4
Course Code	GE	Credit Pattern	L-44, T-08, P-08
Course Title	Principles of Economics		
Course Outcomes: Students will be able to			
1	Understand the micro variables and approach for microeconomic issues		
2	Identify the macro variables in any economy		

Semester	III	Total Credit	4
Course Code	CC- 301	Credit Pattern	L-48, T-4, P-8
Course Title	Cyber Crime and Law		
Course Objectives			
1	To introduce the cyber world and cyber law in general.		
2	To explain about the various facets of cyber crimes,		
3	To enhance the understanding of problems arising out of the online transactions and provoke them to find the solutions.		
Course Outcomes: After successful completion of the course, the students would be able to			
1.	The student is able to understand the technicalities of law in the cyber world.		
2.	The student will have extensive knowledge regarding jurisdictional issues in IT Act.		
3.	The student knows the essential legal provisions of internet governance.		

Semester	III	Total Credit	4
Course Code	CC- 302	Credit Pattern	L-48, T-4, P-8
Course Title	Mobile and Wireless Security		
Course Objectives			
1	To learn about securing wireless networks.		
2	Identify and analyze various security issues in wireless mobile communication.		
3	To learn various issues of application level security in wireless environment and its related solution.		
Course Outcomes: After successful completion of the course, the students would be able to			
1.	Familiarize with the issues and technologies involved in designing a wireless and mobile system that is robust against various attacks.		
2.	Gain knowledge and understanding of the various ways in which wireless networks can be attacked and trade-offs in protecting networks.		
3.	Have a broad knowledge of the state-of-the-art and open problems in wireless and mobile security, thus enhancing their potential to do research or pursue a career in this rapidly developing area.		

Semester	III	Total Credit	4
Course Code	CC- 302	Credit Pattern	L-48, T-4, P-8
Course Title	Mobile and Wireless Security		
Course Objectives			
1	To learn about securing wireless networks.		
2	Identify and analyze various security issues in wireless mobile communication.		
3	To learn various issues of application level security in wireless environment and its related solution.		
Course Outcomes: After successful completion of the course, the students would be able to			
1.	Familiarize with the issues and technologies involved in designing a wireless and mobile system that is robust against various attacks.		
2.	Gain knowledge and understanding of the various ways in which wireless networks can be attacked and trade-offs in protecting networks.		
3.	Have a broad knowledge of the state-of-the-art and open problems in wireless and mobile security, thus enhancing their potential to do research or pursue a career in this rapidly developing area.		

Semester	II	Total Credit	4
Course Code	CC 304	Credit Pattern	L-45, T-8, P-7
Course Title	Linux Administration		
Course Objectives			
1	To familiarize the student with Linux operating system environment and basic shell script programming..		
2	To introduce various system and user commands, Communication utilities in Linux and the Linux administration.		
Course Outcomes : The Students will able to			
1	Execute different Internal and External commands in Linux		
2	Use various Filters and editors		
3	Create and manager file access permissions		
4	Use various Communication Utilities		
5	Administration of Linux system		

Semester	III	Total Credit	4
Course Code	CC-305	Credit Pattern	L-44, T-4, P-12
Course Title	Penetration Testing		
Course Objectives			
1	To explore various principles and techniques associated with the penetration testing		
2	To introduce different types of penetration testing		
3	To introduce phases included in penetration testing		
4	To Demonstrate penetration testing tools		

Course Outcomes: Students will be able to;	
1	State entire penetration testing process
2	Prepare virtual lab for Penetration Testing
3	Utilize Metasploit framework for Investigating vulnerabilities
4	Capture and filter network traffic by using wireshark tool
5	Test Web Application security

Semester	III	Total Credit	4
Course Code	DSE-III (A)	Credit Pattern	L-48, T-10, P-2
Course Title	WEB SECURITY		
Course Objectives			
1	This course introduces you to the field of web security: that is, how to build secure web applications.		
2	The course covers fundamental concepts of web programming, web vulnerability exploitation, web browser design flaws, and a few advanced topics in web privacy.		
3	Given the pervasive insecurity of the modern web landscape, there is a pressing need for programmers and system designers to improve their understanding of web security issues.		
4	Students will be able to Develop secure web applications.		
Course Outcomes: After successful completion of the course, the students would be able to			
1	To learn about Get hands-on experience on web programming		
2	To Design and implement exploits for real security bugs.		
3	To learn cross site scripting, authentication and java Script security.		
4	Student can build and understanding of the most common web attacks and their countermeasures.		

Semester	III MSc-Cyber-Security	Total Credit	4
Course Code	DSE-3-B	Credit Pattern	L-45, T-12, A-3
Course Title	DIGITAL FORENSICS		
Course Outcomes			
1	To assess how to apply forensic analysis tools to recover important evidence for identifying computer crime.		
2	To analyze as well-trained as next-generation computer crime investigators.		

Semester		Total Credit	2
Course Code	GE-II (A)	Credit Pattern	L-22, T-4, P-4
Course Title	Entrepreneurship Development		
Course Objectives			
1	To understand the concept and importance of entrepreneurship		
2	To develop entrepreneurial skills and abilities among the students to run business efficiently and effectively		
3	To provide insights to the students on entrepreneurship opportunities		
4	To familiarize students with the support system provided by the government for entrepreneurship.		
Course Outcomes: Students will be able to			
1	Explain Basic Concept of Entrepreneurship and link the Entrepreneurship with Economic Development.		
2	Develop the Business Plan for any kind of new enterprise.		
3	Discuss Role of Central and State Government in Entrepreneurship Development.		

Semester	III	Total Credit	2
Course Code	GE-II (B)	Credit Pattern	L-23, T-07, P-0
Course Title	DISASTER MANAGEMENT		
Course Objectives			
1	Understand the concept and impact of disasters.		
2	Describe the causes, effects and control measures of disasters.		
Course Outcomes: After completion of this course students will have capacity to			
1.	Recognize the various global and regional environmental concerns/hazards due to natural causes and/or human activities, and the impact of these on various forms of life .		
2.	Obtain and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios		
3.	Describe and evaluate the environmental, social, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.		
4.	Relate theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery)		

Semester	IV	Total Credit	2
Course Code	GE	Credit Pattern	L-20, T-5, P-5
Course Title	CORPORATE SOCIAL RESPONSIBILITY		
Course Objectives			
1	To understand the scope and complexity of corporate social responsibility.		
2	To gain knowledge of the impact of CSR implementation on societies		
3	To acquire skills to frame and design CSR policies and practices appropriate to the Indian workplace.		
Course Outcomes: Students will be able to			
1	know the Corporate Social Responsibility of different sector.		
2	use the acquired skill for proper sustainable Corporate Social responsibility.		

Semester	III	Total Credit	4
Course Code	GE	Credit Pattern	L-44, T- 08, P-08
Course Title	Basics of Indian Economy		
Course Outcomes: Students will be able to			
1	Identify the main issues in Indian economic development		
2	Critically analyse the Indian economic policy environment		

SEM-III	AEC- II (A)	Deployment Skills	Credits - 2	Contact Hours - 30
COURSE OBJECTIVES				
<ol style="list-style-type: none"> 1. To introduce various technologies to manage continuous change 2. To make them aware about continuous change management process 3. To handle configuration management in effective manner. 				
COURSE OUTCOMES				
After Completion of this course students will be able to				
<ol style="list-style-type: none"> 1. Apply various technologies for software deployment. 2. Compare different technologies for change management. 3. Decide the technology to use for deployment process. 4. Prepare a strategy for project deployment. 				

Semester	III	Total Credit	2
Course Code	AEC- II (B)	Credit Pattern	L-24, T-06, P-00
Course Title	Open Source Platform		
Course Objectives			
1	Introduce open source paradigm.		
2	Comprehend the problems with traditional commercial software.		
3	Understand concepts, strategies, and methodologies related to open source software development.		
4	Understand the business, economy, societal and intellectual property issues of open source software.		
5	Be familiar with open source software products and development tools currently available on the market.		
Course Outcomes			
After completion of this course the student will be able to:			
1	Learned the need of open source technology, open source development model, application of open sources, aspects of open source movement		
2	The students will be aware about the problems with traditional commercial software.		

Semester	III	Total Credit	2
Course Code	AEC-II (C)	Credit Pattern	L-24, T-06, P-00
Course Title	Work Ethics		
Course Objectives			
1	To explain explain concept of ethics.		
2	To explain characteristics of Good Work Ethics		
3	To discuss different ethical theories		
4	To discuss OHS and related Acts		
Course Outcomes			
After completion of this course the student will be able to:			
1	Develop strong work ethics		
2	Apply critical thinking skills.		
3	Apply conflict resolution strategies and skills		
4	Follow ethical principals		
5	Follow OHS Acts		

Semester	III	Total Credit	2
Course Code	AEC- II (D)	Credit Pattern	L-30
Course Title	Organization Behavior		
Course Objectives			
1	To help the students to develop cognizance of the importance of human behaviour.		
2	To enable students to describe how people behave under different conditions and understand why people behave as they do.		
3.	To provide the students to analyse specific strategic human resources demands for future action.		
4.	To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.		
Course Outcomes: The students will able to			
1.	CO1: Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.		
2.	CO2: Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.		
3.	CO3: Analyze the complexities associated with management of the group behavior in the organization.		
4.	CO4: Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.		

Semester	III	Total Credit	2
Course Code	AECC-II	Credit Pattern	L-22, T-8
Course Title	Employability Skills		
Course Objectives			
1	Develop effective communication skills		
3	Develop broad career plans		
Course Outcomes			
After completion of this course the student will be able to:			
1	Match the job requirements and skill sets.		
3	Evaluate the employment market.		