



**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
(CYBER SECURITY)**

List of Courses for the Academic Year 2023-24

S.No.	Year/Sem.	Course Title
1	I/I	Matrices and Calculus
2		Engineering Chemistry
3		Programming for Problem Solving
4		Basic Electrical Engineering
5		Computer Aided Engineering Graphics
6		Elements of Computer Science & Engineering
7		Engineering Chemistry Laboratory
8		Programming for Problem Solving Laboratory
9		Basic Electrical Engineering Laboratory
10	I/II	Ordinary Differential Equations and Vector Calculus
11		Applied Physics
12		Engineering Workshop
13		English for Skill Enhancement
14		Electronic Devices and Circuits
15		Applied Physics Laboratory
16		Python Programming Laboratory
17		English Language and Communication Skills Laboratory
18		IT Workshop
19	II/I	Digital Electronics
20		Data Structures
21		Computer Oriented Statistical Methods
22		Computer Organization and Architecture
23		Object Oriented Programming through Java
24		Data Structures Lab
25		Object Oriented Programming through Java Lab
26		Skill Development Course (Data visualization- R Programming/ Power BI)
27	II/II	Discrete Mathematics
28		Business Economics & Financial Analysis
29		Operating Systems
30		Computer Networks
31		Software Engineering
32		Operating Systems Lab
33		Computer Networks Lab
34		Skill Development Course (Node JS/ React JS/ Django)
35	III/I	Design and Analysis of Algorithms
36		Cryptography and Network Security
37		Database Management System

38		Formal Languages and Automata Theory
39		Cloud Computing
40		Ethical Hacking
41		Cryptography and Network Security Lab
42		Database Management Systems Lab
43		Advanced Communication Skills Lab
44	III/II	Cyber Security
45		Cyber Crime Investigation & Digital Forensics
46		Software Engineering
47		Machine Learning
48		Fundamentals of Internet of Things
49		Cyber Security Lab
50		Cyber Crime Investigation & Digital Forensics Lab
51		Machine Learning Lab

Course Outcomes for the Academic Year 2023-24

S.NO	YEAR / SEM.	COURSE NAME	COURSE OUTCOME
1	I/I	Matrices And Calculus	1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
			2. Find the Eigen values and Eigen vectors
			3. Reduce the quadratic form to canonical form using orthogonal transformations.
			4. Solve the applications on the mean value theorems.
			5. Evaluate the improper integrals using Beta and Gamma functions
			6. Find the extreme values of functions of two variables with/ without constraints.
			7. Evaluate the multiple integrals and apply the concept to find areas, volumes
2	I/I	Engineering Chemistry	1.Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
			2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			3. They can learn the fundamentals and general properties of polymers and other engineering materials
			4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
3	I/I	Programming For Problem Solving	1. To write algorithms and to draw flowcharts for solving problems.
			2. To convert the algorithms/flowcharts to C programs.
			3. To code and test a given logic in the C programming language
			4. To decompose a problem into functions and to develop modular reusable code
			5. To use arrays, pointers, strings and structures to write C programs.
			6. Searching and sorting problems.
4	I/I	Basic Electrical Engineering	1. Understand and analyze basic Electrical circuits
			2. Study the working principles of Electrical Machines and Transformers
			3. Introduce components of Low Voltage Electrical Installations.
5	I/I	Computer Aided Engineering	1. Apply computer aided drafting tools to create 2D and 3D objects

		Graphics	<p>2. sketch conics and different types of solids</p> <p>3. Appreciate the need of Sectional views of solids and Development of surfaces of solids</p> <p>4. Read and interpret engineering drawings</p> <p>5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting</p>
6	I/I	Elements Of Computer Science And Engineering	<p>1. Know the working principles of functional units of a basic Computer</p> <p>2. Understand program development, the use of data structures and algorithms in problem solving.</p> <p>3. Know the need and types of operating system, database systems.</p> <p>4. Understand the significance of networks, internet, WWW and cyber security.</p> <p>5. Understand Autonomous systems, the application of artificial intelligence.</p>
7	I/I	Engineering Chemistry Laboratory	<p>1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.</p> <p>2. Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases</p> <p>3. Students are able to prepare polymers like bakelite and nylon-6.</p> <p>4. Estimations saponification value, surface tension and viscosity of lubricant oils.</p>
8	I/I	Programming For Problem Solving Laboratory	<p>1. formulate the algorithms for simple problems</p> <p>2. translate given algorithms to a working and correct program</p> <p>3. correct syntax errors as reported by the compilers</p> <p>4. identify and correct logical errors encountered during execution</p> <p>5. represent and manipulate data with arrays, strings and structures</p> <p>6. use pointers of different types</p> <p>7. create, read and write to and from simple text and binary files</p> <p>8. modularize the code with functions so that they can be reused</p>
9	I/I	Basic Electrical Engineering Laboratory	<p>1. Verify the basic Electrical circuits through different experiments.</p> <p>2. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.</p>

			3. Analyze the transient responses of R, L and C circuits for different input conditions.
10	I/II	Ordinary Differential Equations And Vector Calculus	1. Identify whether the given differential equation of first order is exact or not
			2. Solve higher differential equation and apply the concept of differential equation to real world problems
			3. Use the Laplace transforms techniques for solving ODE's.
			4. Evaluate the line, surface and volume integrals and converting them from one to another
11	I/II	Applied Physics	1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
			2. Identify the role of semiconductor devices in science and engineering Applications
			3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
			4. Appreciate the features and applications of Nanomaterials.
			5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
12	I/II	Engineering Workshop	1. Study and practice on machine tools and their operations
			2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
			3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
			4. Apply basic electrical engineering knowledge for house wiring practice.
13	I/II	English For Skill Enhancement	1. Understand the importance of vocabulary and sentence structures.
			2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
			3. Demonstrate their understanding of the rules of functional grammar
			4. Develop comprehension skills from the known and unknown passages.
			5. Take an active part in drafting paragraphs,

			<p>letters, essays, abstracts, précis and reports in various contexts.</p> <p>6. Acquire basic proficiency in reading and writing modules of English.</p>
14	I/II	Electronic Devices And Circuits	<p>1. Acquire the knowledge of various electronic devices and their use on real life.</p> <p>2. Know the applications of various devices.</p> <p>3. Acquire the knowledge about the role of special purpose devices and their applications.</p>
15	I/II	Applied Physics Laboratory	<p>1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment</p> <p>2. Appreciate quantum physics in semiconductor devices and optoelectronics.</p> <p>3. Gain the knowledge of applications of dielectric constant</p> <p>4. Understand the variation of magnetic field and behavior of hysteresis curve.</p> <p>5. Carried out data analysis.</p>
16	I/II	Python Programming Laboratory	<p>1. Develop the application specific codes using python.</p> <p>2. Understand Strings, Lists, Tuples and Dictionaries in Python</p> <p>3. Verify programs using modular approach, file I/O, Python standard library</p> <p>4. Implement Digital Systems using Python</p>
17	I/II	English Language And Communication Skills Laboratory	<p>1. Understand the nuances of English language through audio- visual experience and group activities</p> <p>2. Neutralise their accent for intelligibility</p> <p>3. Speak with clarity and confidence which in turn enhances their employability skills</p>
18	I/II	IT Workshop	<p>1. Perform Hardware troubleshooting</p> <p>2. Understand Hardware components and inter dependencies</p> <p>3. Safeguard computer systems from viruses/worms</p> <p>4. Document/ Presentation preparation</p> <p>5. Perform calculations using spreadsheets</p>
19	II/I	Digital Electronics	<p>1. Ability to learn Postulates of Boolean algebra and to minimize combinational functions</p> <p>2. Ability to design and analyze combinational and sequential circuits</p> <p>3. Ability to know about the logic families and realization of logic gates.</p>
20	II/I	Data Structures	<p>1. Ability to select the data structures that efficiently model the information in a</p>

			<p>problem</p> <p>2.Ability to assess efficiency trade-offs among different data structure implementations or combinations.</p> <p>3.Implement and know the application of algorithms for sorting and pattern matching</p> <p>4.Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.</p>
21	II/I	COMPUTER ORIENTED STATISTICAL METHODS	<p>1.Apply the concepts of probability and distributions to case studies.</p> <p>2.Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.</p> <p>3.Apply concept of estimation and testing of hypothesis to case studies.</p> <p>4.Correlate the concepts of one unit to the concepts in other units.</p>
22	II/I	Computer Organization and Architecture	<p>1.Understand the basics of instruction sets and their impact on processor design.</p> <p>2.Demonstrate an understanding of the design of the functional units of a digital computer system</p> <p>3.Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.</p> <p>4.Design a pipeline for consistent execution of instructions with minimum hazards</p> <p>5.Recognize and manipulate representations of numbers stored in digital computers</p>
23	II/I	Object Oriented Programming through Java	<p>1.Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection</p> <p>2.Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords</p> <p>3.Use multithreading concepts to develop inter process communication.</p> <p>4.Understand the process of graphical user interface design and implementation using AWT or swings</p> <p>5.Develop applets that interact abundantly with the client environment and deploy on the server.</p>
24	II/I	Data Structures Lab	<p>1.Data Structures Lab</p> <p>2.Ability to Implement searching and sorting</p>

			algorithm
25.	II/I	Object Oriented Programming through Java Lab	<p>1.Able to write programs for solving real world problems using the java collection framewor</p> <p>2.Able to write programs for solving real world problems using the java collection framewor</p> <p>3.Able to write programs for solving real world problems using the java collection framewor</p> <p>4.Able to write GUI programs using swing controls in Java.</p>
26.	II/I	Skill Development Course (Data visualization- R Programming/ Power BI)	<p>1.Understand How to import data into Tableau.</p> <p>2.Understand Tableau concepts of Dimensions and Measures</p> <p>3.Develop Programs and understand how to map Visual Layouts and Graphical Properties.</p> <p>4.Create a Dashboard that links multiple visualizations.</p> <p>5.Use graphical user interfaces to create Frames for providing solutions to real world problems</p>
27	II/II	Discrete Mathematics	<p>1.Understand and construct precise mathematical proofs</p> <p>2.Apply logic and set theory to formulate precise statements</p> <p>3.Analyze and solve counting problems on finite and discrete structures</p> <p>4,Describe and manipulate sequences</p> <p>5.Apply graph theory in solving computing problems</p>
28.	II/II	Business Economics & Financial Analysis	<p>1.The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.</p>
29.	II/II	Operating Systems	<p>1.Will be able to control access to a computer and the files that may be shared</p> <p>2.Demonstrate the knowledge of the components of computers and their respective roles in computing</p> <p>3.Ability to recognize and resolve user problems with standard operating environments.</p> <p>4.Ability to recognize and resolve user</p>

			problems with standard operating environments.
30	II/II	Computer Networks	1.Gain the knowledge of the basic computer network technology.
			2.Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model
			3. Obtain the skills of subnetting and routing mechanisms
			4.Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation
31	II/II	Software Engineering	1.Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			2.Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			3.Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
32	II/II	Operating Systems Lab	1.Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
			2.Able to implement C programs using Unix system calls
33	II/II	Computer Networks Lab	1.Implement data link layer framing methods
			2.Analyze error detection and error correction codes.
			3.Implement and analyze routing and congestion issues in network design.
			4.Implement Encoding and Decoding techniques used in presentation layer
			5.To be able to work with different network tools
34	II/II	Skill Development Course (Node JS/ React JS/ Django)	1.Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
			2.Demonstrate Advanced features of JavaScript and learn about JDBC
			3.Develop Server – side implementation using Java technologies like
			4.Develop the server – side implementation using Node JS
			5.Design a Single Page Application using React
35	III/I	Design and	1.Ability to analyze the performance of

		Analysis of Algorithms	<p>algorithms □</p> <p>2. Ability to choose appropriate data structures and algorithm design methods for a specified application</p> <p>3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs</p>
36	III/I	Cryptography and Network Security	<p>1. Student will be able to understand basic cryptographic algorithms, message and w</p> <p>2. Ability to identify information system requirements for both of them such as client and server.</p> <p>3. Ability to understand the current legal issues towards information security.</p>
37	III/I	Database Management System	<p>1. Gain knowledge of fundamentals of DBMS, database design and normal forms control.</p> <p>2. Master the basics of SQL for retrieval and management of data.</p> <p>3. Be acquainted with the basics of transaction processing and concurrency control.</p> <p>4. Familiarity with database storage structures and access technique</p>
38	III/I	Formal Languages and Automata Theory	<p>1. Able to understand the concept of abstract machines and their power to recognize the languages.</p> <p>2. Able to employ finite state machines for modeling and solving computing problems.</p> <p>3. Able to design context free grammars for formal languages</p> <p>4. Able to distinguish between decidability and undecidability</p> <p>5. Able to distinguish between decidability and undecidability</p>
39	III/I	Cloud Computing	<p>1. Ability to understand various service delivery models of a cloud computing architecture.</p> <p>2. Ability to understand the ways in which the cloud can be programmed and deployed.</p> <p>3. Understanding cloud service providers.</p>
40	III/I	Ethical Hacking	<p>1. Gain the knowledge of the use and availability of tools to support an ethical hack</p> <p>2. Gain the knowledge of interpreting the results of a controlled attack</p> <p>3. Understand the role of politics, inherent and imposed limitations and metrics for planning of a test</p> <p>4. Comprehend the dangers associated with penetration testing</p>

41	III/I	Cryptography and Network Security Lab	1. Understand basic cryptographic algorithms, message and web authentication and security issues.
			2. Identify information system requirements for both of them such as client and server.
			3. Understand the current legal issues towards information security
42	III/I	Database Management Systems Lab	1. Design database schema for a given application and apply normalization
			2. Acquire skills in using SQL commands for data definition and data manipulation.
			3. Develop solutions for database applications using procedures, cursors and triggers
43	III/I	Advanced Communication Skills Lab	1. Acquire vocabulary and use it contextually
			2. Listen and speak effectively
			3. Develop proficiency in academic reading and writing
			4. Increase possibilities of job prospects
			5. Communicate confidently in formal and informal contexts
44	III/II	Cyber Security	1. Analyze and evaluate the cyber security needs of an organization.
			2. Understand Cyber Security Regulations and Roles of International Law.
			3. Design and develop a security architecture for an organization.
			4. Understand fundamental concepts of data privacy attack
45	III/II	Cyber Crime Investigation & Digital Forensics	1. Understand the fundamentals of cybercrime and issues.
			2. Understand different investigation tools for cybercrime.
			3. Understand basics of Forensic Technology and Practices.
			4. Analyze different laws, ethics and evidence handling procedures.
46	III/II	Software Engineering	1. Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
47	III/II	Machine Learning	1. Understand the concepts of computational intelligence like machine learning

			<p>2. Ability to get the skill to apply machine learning techniques to address the real time problems in different areas</p> <p>3. Understand the Neural Networks and its usage in machine learning application.</p>
48	III/II	Fundamentals of Internet of Things	<p>1. Known basic protocols in sensor networks.</p> <p>2. Program and configure Arduino boards for various designs</p> <p>3. Python programming and interfacing for Raspberry Pi</p> <p>4. Design IoT applications in different domains.</p>
49	III/II	Cyber Security Lab	<p>1. Get the skill to identify cyber threats/attacks.</p> <p>2. Get the knowledge to solve security issues in day to day life.</p> <p>3. Able to use Autopsy tools</p> <p>4. Perform Memory capture and analysis</p> <p>5. Demonstrate Network analysis using Network miner tools</p>
50	III/II	Cyber Crime Investigation & Digital Forensics Lab	<p>1. Learn the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing.</p> <p>2. To Learn the file system storage mechanisms and retrieve files in hidden format.</p> <p>3. Learn the use of computer forensics tools used in data analysis.</p> <p>4. Learn how to find data that may be clear or hidden on a computer disk, find out the open ports for the attackers through network analysis, Registry analysis.</p>
51	III/II	Machine Learning Lab	<p>1. understand complexity of Machine Learning algorithms and their limitations</p> <p>2. understand modern notions in data analysis-oriented computing</p> <p>3. be capable of confidently applying common Machine Learning algorithms in practice and implementing their own</p> <p>4. Be capable of performing experiments in Machine Learning using real-world data.</p>