SVKM'S
NMIMS
Deemed to be UNIVERSITY

Mukesh Patel School of Technology Management and Engineering

B Tech Computer Science and Engineering (Cyber Security)

- **Program Educational Objectives (PEOs)**
- **Program Outcomes (POs)**
- **Course Outcomes (COs)**

Program Educational Objectives (PEOs):

1. **Professional Skills**
2. **Career Growth**
3. **Higher Studies**

Program Outcomes (POs):

PO-1: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO-2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO-3: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO-4: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO-5: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO-6: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO-7: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO-8: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO-9: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.

PO-10: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO-11: Recognize the need for, and have the preparation and ability for independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change.

Courses and Course Outcomes (COs):

Mobile Application Develeopment

- **CO-1:** Design user interfaces using Android Studio and Flutter
- **CO-2:** Implement file handling using text and images
- **CO-3:** Implement database connectivity and location tracking
- **CO-4:** Develop a full-fledged Android/IOS application

Application Security Testing

- **CO-1:** Describe various testing methodologies
- **CO-2:** Perform security testing of web and mobile applications
- **CO-3:** Suggest countermeasure to mitigate vulnerabilities

Web Programming

- **CO-1:** Explain the fundamentals of web programming
- **CO-2:** Design front end of a web application
- **CO-3:** Establish database connectivity between front-end and back-end

Constitution of India

- **CO-1:** Recall the historical evolution of India's democratic values, emphasizing the foundational principles of justice, equality, and liberty as enshrined in the Preamble of the Constitution.
- **CO-2:** Understand the fundamental rights enshrined in the Constitution, their permissible restrictions, and how these rights are balanced with duties, to grasp their application within societal and professional frameworks.
- **CO-3:** Apply the knowledge of the structure of India's polity and the role of the Judiciary in maintaining the basic structure of the Constitution in real-world professional contexts

Critical Thinking

- **CO-1:** solve problems or take decisions by processing information in a clear, logical, reasoned and reflective manner.
- **CO-2:** recognise, build and appraise arguments
- **CO-3:** analyse contexts effectively
- **CO-4:** recognise bias and its impact on decision making

Data Warehousing and Mining

- **CO-1:** Understand the fundamentals of Data Warehouse, Data Mining and their importance in providing solutions to real world problems
- **CO-2:** Understand ETL, analytical processing and information delivery in data warehouse
- **CO-3:** Select and implement appropriate data mining algorithms for solving practical problems

Operating Systems

- **CO-1:** Describe the fundamental concepts of Operating system
- **CO-2:** Apply process management strategies
- **CO-3:** Simulate memory management, I/O management and file management strategies.

System Administration

- **CO-1:** Demonstrate various System admin tasks
- **CO-2:** Configure various application servers.
- **CO-3:** Secure Linux system

AI-ML for Cybersecurity

- **CO-1:** Solve problems using various Artificial Intelligence and machine learning techniques

- **CO-2:** Design applications using AL and ML techniques
- **CO-3:** Describe applications of AI and ML to cybersecurity problems

Blockchain Security & Forensics

- **CO-1:** Explain blockchain technology and its various use cases
- **CO-2:** Describe security issues related to blockchain
- **CO-3:** Perform forensics operations on blockchain

Human and Legal Aspects of Cybersecurity

- **CO-1:** Design a SETA programs for improving behaviour of end users
- **CO-2:** Explain ITA 2000 and ITAA 2008
- **CO-3:** Explain various international laws related to cybersecurity and privacy

Cyber Security Risk Management

- **CO-1:** Explain various cybersecurity risk management framework and methodologies
- **CO-2:** Identify and model cybersecurity risks using various qualitative and quantitative methods
- **CO-3:** Develop risk management plan, business continuity plan and disaster recovery plan

Elements of Biology

- **CO-1:** Identify the principles of biomimicry and explain their applications in engineering and sustainable design, demonstrating an understanding of biologically inspired solutions.
- **CO-2:** Classify the fundamental building blocks of life (carbohydrates, proteins, lipids, and nucleic acids) and describe their structural and functional roles in cellular processes and metabolism.

- **CO-3:** Explain the molecular basis of genetic information transfer, including DNA replication, transcription, and translation, and interpret Mendel's laws and their significance in genetics.
- **CO-4:** Describe the mechanisms of enzyme action, enzyme-substrate interactions, and enzyme inhibition, and discuss their industrial and biological applications.
- **CO-5:** Explain the principles of metabolism and energy transactions, and categorize microorganisms based on their characteristics, growth kinetics, and applications in biotechnology and drug discovery.

Cybersecurity Fundamentals

- **CO-1:** Analyze various cybersecurity threats and countermeasures
- **CO-2:** Explain various security technologies and mechanisms
- **CO-3:** Describe various professional, ethical and legal issues related to cybersecurity

Human Centered Cybersecurity

- **CO-1:** Apply various theories from other domains to cybersecurity decision-making
- **CO-2:** Apply game theory to cybersecurity context.
- **CO-3:** Design cybersecurity awareness campaign using marketing and behavioural theories.

Vulnerability Assessment and Penetration Testing

- **CO-1:** Demonstrate hacking in a lab environment
- **CO-2:** Describe various countermeasures
- **CO-3:** Describe various professional, ethical and legal issues related to ethical hacking

Computer Organization and Architecture

- **CO-1:** Discuss the functional blocks of computers and the interconnections

- **CO-2:** Evaluate the memory system
- **CO-3:** Explain the components of the Central Processing Unit
- **CO-4:** Describe Input Output and Parallel Organization

Reverse Engineering and Malware Analysis

- **CO-1:** Perform reverse engineering using various techniques like static and dynamic analysis, etc.
- **CO-2:** Perform data flow analysis of samples.
- **CO-3:** Explain various anti-disassembly, anti-debugging, obfuscation and packing techniques.

ISA

- **CO-1:** Identify and assess vulnerabilities and report on compliance and institutional controls.
- **CO-2:** Gain a better understanding of IS audit and assurance guidelines, standards, and best practices.
- **CO-3:** Learn how to govern and control an enterprise IT environment.
- **CO-4:** Understand the acquisition, development, testing and implementation of information systems

DPR

- **CO-1:** Identify data privacy threats and suggest their countermeasures
- **CO-2:** Implement various privacy models.
- **CO-3:** Design privacy program for an organization