



MANIPAL

ACADEMY *of* HIGHER EDUCATION

(Institution of Eminence Deemed to be University)

Master of Engineering - ME (Cyber Security)

July 2022 Onwards

MANIPAL SCHOOL OF INFORMATION SCIENCES

MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL - 576104.KARNATAKA. INDIA.



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Program Structure

Semester-1	Semester-2
Data Structures and Algorithms	Ethical Hacking - II
Cryptography	Digital Forensic Sciences and Cyber Laws
Ethical Hacking - I	Secure Coding
Linux OS and Scripting	Web Application Security
Elective - I	Elective II
Mini Project - I	Mini Project - II
Professional Skill Development - I	Professional Skill Development - II
Semester III & IV	Project Work
Elective-1 courses	Elective-2 courses
Fundamentals of Machine Learning	Data Analytics
Computer Networks and Security	Cryptocurrency and Blockchain
	Cloud Security and Data Privacy
	Mobile Security and Data Privacy
	Entrepreneurship



Data Structures and Algorithms

Introduction - Algorithm Specification, Performance Analysis - Algorithm Analysis Techniques Elementary data structures - Sorting & Searching Techniques - Operations on Sets - Trees - Graphs - Algorithm Design Techniques.

Cryptology

Security Essentials - Cryptography - Asymmetric cryptography - Authentication - Classification of Cryptanalysis - Breaking Monoalphabetic and Polyalphabetic cipher.

Ethical Hacking - I

Networking Essentials - Introduction to Networking - Information Gathering - Types of Hackers - Exploitation and clear the trace - Evading Security Systems - Incident Response

Linux OS and Scripting

Introduction to OS - Linux Commands - Process Management - Process Scheduling - Process Synchronization - Automation using python Case Studies

ELECTIVES - SEMESTER I

Fundamentals of Machine Learning

Introduction - Inductive Classification - Decision Tree learning - computational complexity - Computational learning theory - Sample Complexity - Sample complexity for finite hypothesis spaces - Bayesian learning - Parameter smoothing - Instance-based learning - Case-based reasoning (CBR) learning - Continuous Latent Variables - Ensemble methods.



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Computer Networks and Security

Computer Networks - Internet Transport protocols (TCP & UDP) & Internet addresses - Email and FTP - Secure VPN solution - Anomalies in Network - Network Attack and Security - Trusted Systems - Case study.

Mini Project - I

Problem identification, literature survey, formation of detailed specifications - Design and implementation of the proposed system architecture - Demonstrate an ability to present and defend project work carried out to a panel of experts.

Professional Skill Development - I:

Report writing and Presenting.

SEMESTER II

Ethical hacking -II

Hacking Wireless Networks - Testing Hacking Mobile Platforms - Kubernetes - Kubernetes - containers - hacking containers.

Digital Forensic Sciences and Cyber Laws: Essentials - Introduction to Digital Forensics - Digital Forensics and Artifacts - Principles of Digital Evidence. Overview of types of Computer Forensics - Artifacts - Data and Evidence Recovery - Cyber Forensics Investigation - Cyber Crimes and Cyber Laws

Secure coding: Secure Coding Fundamentals - Secure Programming Techniques - Security Validation - Threat Modeling - Secure Coding and Testing - DevSecOps- Case Studies.

Web Application Security:

Hacking Web Applications - Client-side attacks and Defences - API Security - Web Application Infrastructure Security - Web Threat Modeling.



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ELECTIVES - SEMESTER II

Data Analytics:

Essentials - Machine Learning Methods - Intrusion Detection - Malware Analysis - Machine learning in the hands of Attackers

Cryptocurrency and Blockchain:

Introduction to Bitcoin - Introduction to Blockchain - Hyperledger - Dev Environment Walkthrough - Clients Node - Environment Walkthrough - Deployment options - Cloud Security and Data Privacy.

Mobile Security and Data Privacy:

Mobile Networks and Wireless Networks - Threats to Wireless networks - Wireless Security Mechanisms - 5G and 6G Networks - Data Privacy in mobile networks.

Entrepreneurship:

Introduction to Entrepreneurship - Entrepreneurial Traits - Process of Entrepreneurship - Business Start-up Process - Business Plan writing - Case studies.

Mini project - II

Problem identification, literature survey, formation of detailed specifications - Design and implementation of the proposed system architecture - Demonstrate an ability to present and defend project work carried out to a panel of experts.

Professional Skill Development - II

Peer interviews, mock interviews - Logical reasoning, mathematical aptitude, and domain specific problem-solving skills - Conduction of domain specific knowledge test.