Institute Multidisciplinary Minor –9

Theme: **Digital & Multimedia Forensics**

Total Credits: 14

Number of courses: 04

Sr. No.	Course Code	Title of the course	Total credits	Offered in semester
01	**INMDM9001**	**Introduction to Multimedia Forensics**	3 + 0 + 0 = 03	III
	INMDM9002	**Lab Multimedia Forensics**	0 + 0 + 1 = 01	III
02	**INMDM9003**	**Introduction to Digital Forensics**	3 + 0 + 0 = 03	IV
03	**INMDM9004**	**Digital Forensics and Incident Response**	3 + 0 + 0 = 03	V
	INMDM9005	**Lab Digital Forensics and Incident Response**	0 + 0 + 1 = 01	V
04	**INMDM9006**	**Forensic Identifications and Legal Framework**	3 + 0 + 0 = 03	VI

INMDM9001: Introduction to Multimedia Forensics		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs./week	**ISE I**	**15 marks**
Credits: 3	**ISE II**	**15 marks**
	ISE III	**10 marks**
	ESE	**60 marks**

Prerequisites: Knowledge of programming

Course Description

The course is designed to give the basic concepts of Multimedia Forensics. The course will make the students understand the possible ways of tampering with multimedia files, such as images, video, and audio, and a systematic approach for their detection. The course will also help students to understand the basics of CCTV.

Course Outcomes

After completing the course, students will able to:

CO1	Understand the concepts of multimedia forensics and its landscape
CO2	Develop an understanding and familiarity with various types of tampering in multimedia evidence and subsequent challenges
CO3	Apply suitable techniques for the detection of tampering in images, video, and audio
CO4	Analyze and evaluate the proper framework for the detection of alteration in images, video, and audio

Detailed Syllabus

Unit-I	**Foundation to Multimedia Forensics** • Introduction to digital signals: audio, image, and, video • Digitization process: sampling and quantization • Image Enhancement Techniques: Spatial and frequency domain • Image Compression Techniques: Introduction and techniques • Image description and representation techniques • Pattern clustering and classification
Unit-II	**Introduction to Multimedia Forensics** • Introduction and scope of Multimedia Forensics • Basics of Multimedia • Devices for capturing images and video • Devices for capturing audio • Standard and best practices in Multimedia Forensics
Unit-III	**Image Forensics** • Image Forensics: Introduction and scope • Active and passive image forensics • Blind and non-blind image forensics • Methods of source camera identification • Methods for tampering with digital images • Forensic authentication of digital image
Unit-IV	**Video Forensics** • Video forensics: Introduction and scope • Standards for video transmission • Methods of tampering with digital video

	• Forensic authentication of digital video • CCTV Forensics: Basics of CCTV, Data retrieval from CCTV/DVR, Enhancement of CCTV footage, Biometric identification from CCTV footage, other measurements from CCTV footage
Unit-V	**Audio Forensics** • Audio Forensics: Introduction and scope • Methods of tampering with digital audio • Forensic authentication of digital audio • Microphone Forensics • Enhancement of digital audio

Text and Reference Books
1. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, Prentice-Hall, Inc. Upper Saddle River, NJ, USA, 2006
2. Alan Bovik, Handbook of Image and Video Processing, Academic Press, USA, 2000
3. Husrev Taha Sencar and Nasir Memon, Digital Image Forensics: There is More to a Picture than Meets the Eye, Springer Science and Business Media, New York, 2013
4. Anthony T.S. Ho and Shujun Li, Handbook of digital forensics of multimedia data and devices, John Wiley & Sons, Ltd., UK, 2015.
5. Hany Farid, Photo Forensics, The MIT Press, Cambridge, First Edition, 2016
6. Robert C. Maher, Principles of Forensic Audio Analysis, Springer, 2018

INMDM9002: Lab Multimedia Forensics		
Teaching Scheme	**Examination Scheme**	
Practical: 02 hrs./week	**ISE III**	**25 marks**
Credits: 01		

Laboratory course outcomes

After completing the course, students will able to:

CO1	Implement the digital signal concepts
CO2	Perform experiments for multimedia data analysis
CO3	Learn how to proceed in a real forensic scenario
CO4	Use forensic tools

List of experiments

1. Reading, writing, and displaying images, video, and audio
2. Understanding the effect on image/video/audio due to various sampling and quantization level
3. Applying various enhancement methods on image/ video/ audio
4. Understanding the effect of compression on image/ video/ audio
5. Detection of tampering in images utilizing various characteristics
6. Linking images with the source camera
7. Detection of tampering in video utilizing various characteristics
8. Linking video with the source camera
9. Data retrieval from CCTV/DVR
10. Enhancement of CCTV footage
11. Detection of tampering in audio utilizing various characteristics
12. Linking audio with the source camera

INMDM9003: Introduction to Digital Forensics		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 hrs./week	ISE I	15 marks
Credits: 3	ISE II	15 marks
	ISE III	10 marks
	ESE	60 marks

Prerequisites: No prerequisite

Course Description

The course covers the basics of digital forensics. The course will introduce students to many digital forensic concepts like acquisition, data recovery, mobile forensics, registry, and logs.

Course Outcomes

After completing the course, students will able to:

CO1	Define and describe various terms related to digital forensics
CO2	Understand the various tools and techniques for digital forensics
CO3	Apply digital forensic tools for forensic analysis
CO4	Analyze forensic scenarios for data analysis and acquisition

Detailed Syllabus

Unit-I	**Introduction**
	• Introduction to Digital Forensics, Locard's Principle of exchange in Digital Forensics, Branches of Digital Forensics, Phases of digital/computer forensics investigation, Identification of digital evidence, necessary documentation, such as chain of Custody, Digital evidence handling at the crime scene as per standards, Collection/Acquisition and preservation of digital evidence, Processing & analysis, Compilation of findings & Reporting, Pre-requisite for setting up Digital Forensic lab and global standards.
Unit-II	**Acquisition and Data Recovery**
	• Acquisition of digital evidence, integrity of the evidence, Introduction to storage media, imaging software and hardware, imaging file extensions, data recovery, and carving tools
Unit-III	**Forensic Analysis**
	• Introduction to open-source analysis tools like Autopsy and DFF, commercial tools like Encase and FTK, creating and managing cases using Autopsy, working with timelines, keywords, bookmarks, and reports
Unit-IV	**Registry and Logging**
	• Understanding and analysis of registry in various operating systems, Log analysis with respect to standalone machine and server, which includes system logs, kernel logs, event logs, ftp/sftp, application Web Servers/ Proxy logs.
Unit-V	**Mobile Forensics**
	• Introduction to Mobile Forensics, the need for mc Understanding mobile forensics, Challenges in mobile forensics, Mobile operating systems overview, Mobile forensic tool leveling system, Data acquisition methods

Text and Reference Books
1. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics by Sammons
2. Digital Forensics Workbook: Hands-on Activities in Digital Forensics by Michael K Robinson
3. Computer Forensics and Cyber Crime: An Introduction by Marjie T. Britz
4. Digital Forensics with Open-Source Tools by Cory Altheide, Harlan Carvey
5. Handbook of Digital Forensics and Investigation by Eoghan Casey

MEOEC2021: Industrial Management		
Teaching Scheme	**Examination Scheme**	
Lectures: 3 Hrs. / Week	ISE I	15 Marks
Credits: 3	ISE II	15 Marks
	ISE III	10 Marks
	End Semester Examination	60 Marks

Course Objectives:
1. Understand the fundamental concepts, functions, nature and evolution of Management.
2. Understand the basic principles of management, designing organization structures, operations
3. Recognize and overcome obstacles to creative problem-solving
4. Able to improve different structures of organization and problem solving
5. Able to understand CPM and PERT

Course Outcomes:
After completing the course students will able to

	Course Outcomes	**Bloom's Taxonomy Level**	**Unit**
CO1	Explain the concepts of management and explore the management practices in their domain area within society	K1	1,2,3,4,5
CO2	Evaluate different types of organizational structures and Design them	K2	1,2,3,4,5
CO3	Understand the different structures of organization and problem solving	K2	1,2
CO4	Understand the reason for the change and how it aligns with the organization's overall goals	K2	2,3,4,5
CO5	Use the techniques of PERT/CPM in project.	K3	1,2,4,5

Detailed Syllabus:

Unit 1	**Theories of Management:** Scientific Management (Taylor and the Scientific Management Movement), Classical Theory (Fayol, Urwick, Gulick and others) Bureaucratic Theory (Weber and his critics). Ideas of Mary Parker Follett and C.I. Barnard; Human Relations School (Elton Mayo and others). Behavioral Approach, Systems approach.
Unit 2	**Administrative Behavior:** Decision making with special reference to H. Simon, communication and control, leadership theories. Theories of motivation (Maslow and Herzberg), Contemporary industrial practices
Unit 3	**Organization:** Hierarchy, Principles of organization- Unity of command, Span of control, Authority and Responsibility, Co-ordination, Centralization and Decentralization, Delegation, Supervision, Types of organizations, structures, Contemporary industrial practices
Unit 4	**Organizational Change:** Introduction, Resistance to Chang Reactions to Change, Approaches Or Models to Managing C
Unit 5	**Project Management & Network Modelling:** Critical Path Problems, Program Evaluation and Review Technique (PERT), PERT Problems.

Text and Reference Books
1. Besterfield DH, Total Quality Management, Pearson education
2. Russel, R S, Taylor BW, Operations Management, Pearson education
3. Jocobs, C A Production and operations management, TMH
4. Mitra, A, Fundamentals of Quality control and improvement, John Willey & Sons

Mapping of Course outcomes with Program outcomes and Program Specific Outcomes:

Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	1			2						2			2	
CO2		1				2					1		2	1
CO3	2		1								1	2		
CO4		1			2					2			1	1
CO5	2										2		1	

1 – Low, 2 – Medium, 3 – High

Assessment:
ISE 1: Shall be on the basis of Class Tests/ Assignments/ Quizzes/ Field visits/Presentations/ Course Projects on First and Second unit.
ISE II: Shall be based on class test on third and fourth units.
ISE III: Shall be on the basis of Class Tests/ Assignments/ Quizzes/ Field Visits/ Presentations/ Course Projects

Assessment Pattern:

Assessment Pattern level no	Knowledge Level	ISE1	ISE2	ISE3	End Semester Examination
K1	Remember	5	5		20
K2	Understand	5	5	5	20
K3	Apply	5	5	5	20
K4	Analyse				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60