Course Specifications

Course Title:	Multimedia Security
Course Code:	CSEC 324
Program:	Information Technology
Department:	Information and Computer Sciences
College:	Science in Zulfi
Institution:	Majmaah University

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A. Course Identification

1. Credit hours: 3 (2 Lec & 2 Lab)
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: Optional
4. Pre-requisites for this course (if any)**:** Cybersecurity Principles – ICS 323
5. Co-requisites for this course (if any)**:** NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	48	80 %
2	**Blended**	6	10 %
3	**E-learning**	6	10 %
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	20
3	**Tutorial**	10
4	**Others** (specify)	
	Total	60
Other Learning Hours*		
1	**Study**	20
2	**Assignments**	15
3	**Library**	10
4	**Projects/Research Essays/Theses**	5
5	**Others** (specify)	
	Total	50

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Multimedia is an innovation that enables us to introduce text, audio, images, animations, and video in an intelligent way, and has made an enormous effect on all parts of our everyday life. Recently, multimedia stands as one of the most demanding and exciting aspects of the information era, and every second, a lot of multimedia information are created and transmitted all around the world through different unsecured networks. The multimedia information distribution through open channel using information and communication technology (ICT) is an indispensable and cost-effective technique for dissemination and distribution of digital data/media files. However, the prevention of copyright violation, authenticity, confidentiality, ownership identification, and identity theft have been challenging issues due to attempts of malicious attacks or hacking of the open-channel information. Criminal offence ranging from identity theft to copyright violation and from personal information exposure to medical history disclosure is being made every day. This course studies the techniques and procedures that help us to be able to protect our sensitive data from these attacks.

2. Course Main Objective

Having successfully completed this course, the student will be able to:

1. Students will gain knowledge and hands-on experience about multimedia systems and security technologies. It serves as an introductory course for graduate students who are interested in the research area of multimedia technologies.
2. Gain knowledge with multimedia compression technologies and standards, such as VCD, DVD, and MPEG-1/2/4/21.
3. Survey algorithms, theories and tools developed in research and market of multimedia security issues, including digital rights management, copyright protection, authenticity verification, and mobile information assurance.
4. Learn theories, research issues and recent developments of multimedia-based security systems, such as video surveillance, biometric feature applications, and sensor networks.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	To understand different compression strategies and how they influence storage, retrieval, querying, and delivery of multimedia data.	a2
1.2	To apply techniques for copyright protection, tamper proofing, and privacy protection for different media types.	b2
1.3	To implement techniques for delivering different media types over a network to different types of client platforms.	a1, c1
1...		
2	**Skills :**	
2.1	To understand authentication of different media types.	c1
2.2	To provide Digital rights management (DRM) framework.	a1
3	**Competence:**	
3.1		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Multimedia applications and their nowadays effectives. This includes an overview of communication fundamentals in computer networks like Packet switching, packet header, error correcting code, TCP/IP protocol.	4
2	Multimedia data and its encoding Text Encoding and Graph Encoding, LZW method, GIF Format, PNG, Format, and JPEG Format.	4
3	Multimedia data and its encoding: Audio data formats and Compression, analog-to-digital conversion, uncompressed audio formats, MPEG audio coding, and streaming techniques.	4
4	Multimedia data and its encoding: Video and animation data formats and compression, digital video coding, compression of video signals, motion compensation and motion prediction, MPEG-2,4,7,21 standards.	4
5	Digital rights management (DRM) framework: Requirements of a DRM system, Architectures, Dimensions to content protection: Tracing (fingerprinting), authentication, Encryption, Key management and access control.	8
6	Multimedia fingerprinting: Fingerprinting basics, Marking assumption, Collusion attack, Frame proof and anti-collusion codes; Combining fingerprint modulation with coding: Introduction to coded fingerprint modulation, Semi-fragile fingerprinting; Multicast fingerprinting problem: Bandwidth security tradeoff; Efficient security architectures: WHIM, Watercasting, Chameleon cipher; Joint fingerprinting and decryption (JFD) framework; Fingercasting.	8
7	Multimedia encryption: Concept of layering, Multimedia compression technologies and standards; Principles for selective encryption; Image and Video encryption schemes: Chaotic maps, Transform domain encryption, Huffman tree mutation; Streaming media encryption: Scalable video protection; Key management and distribution schemes: Key management for IP Multimedia: Public key methods, Key distribution by data embedding; Key exchange in multicast groups: Key refresh problem, Logical Key Hierarchy (LKH); Key distribution for fine grained access control.	12
8	Content authentication techniques: Data authentication, One way hash functions, Message authentication codes (MACs); Multimedia authentication: Perceptual hashes; Parameterization; Watermarking based authentication: Notion of semi-fragility, Construction and design of semi-fragile watermarks; Example: Principles of video authentication: Scalability issues, packet loss, post-processing	12
Total		

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	To understand different compression strategies and how they influence storage, retrieval, querying, and delivery of multimedia data.	Lectures, Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Class & lab Activities Quizzes
1.2	To apply techniques for copyright protection, tamper proofing, and privacy protection for different media types.	Lectures, Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Class & lab Activities Quizzes
2.0	**Skills**		
2.1	To understand authentication of different media types.	Group discussions, Lab demonstrations, Brainstorming Presentations	Home works and assignments
2.2	To provide Digital rights management (DRM) framework.	Group discussions, Lab demonstrations, Brainstorming Presentations	Home works and assignments
3.0	**Competence**		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	10%
2	Second written mid-term exam	12	10%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After Every chapter	10%
5	Practical exam	15	20%
6	Final exam	16	40%
7	Total		100%
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Office hours: Sun: 1-3, Mon. 12-1, Wed. 12-1 Office call: Sun. 12-1 and Wed 9-10

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Multimedia Security: Watermarking, Steganography, and Forensics. Frank Y. Shih. CRC Press. 2017
Essential References Materials	Multimedia Security Handbook, B. Furht and D. Kirovski, CRC press, 2005
Electronic Materials	
Other Learning Materials	Video and presentations that available with the instructor

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Laboratories are available at the college of science at Al-Zulfi.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Boards, software, data shows and AV technological resources are available.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	N/A

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	