



جمهورية مصر العربية

وزارة التعليم العالي والبحث العلمي

Ministry of Higher Education and Scientific Research



وتكنولوجيا المعلومات

المعهد العالي للحاسبات

مدينة الشروق - القاهرة  
شعبة علوم الحاسب

## Course specification

**Course Code:** CS 353

**Course Title:** Fundamentals of Multimedia

**Academic Year:** /

**Course specification**  
**(CS 353 - Fundamentals of Multimedia)**

Course Outline	
<b>Faculty:</b>	HICIT- (Higher Institute for Computers & Information Technology-El Shorouk Academy)
<b>Programme(s) on which the course is given:</b>	Undergraduate program in Computer Science
<b>Major or minor element of programme:</b>	Compulsory
<b>Department offering the program</b>	Department of Computer Science
<b>Department offering the course:</b>	Department of Computer Science
<b>Level</b>	Fourth Level - 2nd semester
<b>Date of specification approval</b>	DD/MM/YYYY

Basic Information			
<b>Code:</b>	CS 353	<b>Title:</b>	Fundamentals of Multimedia
<b>Prerequisites:</b>	CS 102 Computer Programming		
<b>Weekly Hours:</b>			
<b>Lecture:</b> 2	<b>Exercise:</b> -	<b>Practical:</b> 1	<b>Total:</b> 3 credit hours

Professional Information
<b><u>Course Aims:</u></b>
<p>The objective of CS353 is to comprehend and be able to build multimedia-based systems. The course contents includes the following. Sampling and quantization process to transfer the multimedia to the digital form. Sampling theorem, Entropy Encoding, Arithmetic Encoding, Huffman Encoding, Shannon Fanon Method, Run Length, Vector Quantization, Uniform Quantization, Fractal Encoding, JPEG, Motion Prediction Encoding (MPEG), Video Compression. Other recent related topics.</p>

### Program ILOs Covered by Course

Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
a3,a6,a13,a19,a21	B1, B3, B4, B8	C7, C8, C10	D11, D12

### Intended learning outcomes of course (ILOs)

**a. Knowledge and Under-Standing:**

- a1. Understand the basic concepts of multimedia-based systems.
- a2. Comprehend the Sampling and quantization, sampling frequency and the Nyquist theorem.
- a3. Understand the Classification of the encoding techniques and metrics for encoding techniques
- a4. Understands Lossless encoding-decoding techniques
- a5. Comprehend lossy encoding-decoding techniques
- a6. Comprehend Video encoding-decoding

**b. Intellectual Skills:**

- b1. Apply transformations.
- b2. Analyze the Problem and decompose it to a set of tasks.
- b3. Discuss complex computation problems with less computational approaches.

**c. Professional and practical skills**

- c1. Implement a multimedia-based applications.
- c2. Use multimedia algorithms to encoded data.
- c3. Design image encoding and decoding views.
- c4. Measure the sampling frequencies suitable for digitization of analog signals.
- c5. Design and implement video encoding-decoding.

**d. General and transferable skills**

- d1. Communicate with others; work in a team and involvement in group discussion and seminars.
- d2. Write Technical report.

### Contents

Topic	Contact Hours	
	lecture	Lab
Multimedia understanding and applications	2	2
Sampling and quantization	2	2
Encoding and decoding techniques metrics and classification	2	2
Lossless encoding technique's part I	2	2
Lossless encoding technique's part II	2	2
Lossy encoding technique part I	2	2
Lossy encoding technique part II	3	2
JPEG encoding	4	4

MPEG encoding	4	4
Selected advanced topics	2	2
Course project	3	4

Teaching and learning methods	
Teaching and learning methods	Used
Lectures	√
Tutorial Exercises	√
Practical Lab	√
Discussions.	√
Self-studies	-
Group work	√
Presentation	-
Problem solving/problem solving learning based	√
Case study	-
Video lectures	√

Student assessment methods & Schedule		
Methods	Used	Week#
Midterm Exam	√	8
Final Exam	√	16
Course Project	√	3-14
Course Work & Quizzes	√	2-14
Practical Exam	√	15

Assessment Weight	
Assessment	Weight %
Mid Term Exam	15%
Practical Exam and Project	15%
Final Exam	60%
Course Work & Quizzes	10%
Total	100

Course Work & Quizzes
Short Exams, Assignments, Research, Reports, Presentations
Class/Project discussion

List of references	
Essential books (textbooks)	Principles of Multimedia, Ranjan Parekh and Ranjan, McGraw-Hill Education, 2006
Course notes	E-Learning Portal

<b>Recommended books</b>	The Cambridge Handbook of Multimedia Learning, 3rd edition, Edited by Richard E. Mayer, <i>University of California, Santa Barbara</i> , Logan Fiorella, <i>University of Georgia</i> , 2021
<b>Periodicals, website</b>	
<b>Videos link</b>	School E-learning website

### Required Facilities

Tools & SW (Technology facilities):	- Visual Studio .Net	
Teaching facilities:	Whiteboard	√
	Computer Lab	√
	Data show	√
	E-Learning	√
	Videos	√
	Website	√

### Course Content/ILO Matrix

Course Contents	Knowledge & understanding						Intellectual skills			Professional and practical skills					General	
	a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	c3	c4	c5	d1	d2
Multimedia understanding and applications	x									x						
Sampling and quantization		x											x			
Encoding and decoding techniques metrics and classification	x											x				
Lossless encoding techniques part I			x	x			x	x	x							
Lossless encoding techniques part II			x	x						x	x		x			
Lossy encoding techniques part I			x		x		x									
Lossy encoding techniques part II			x		x						x					
JPEG encoding			x		x			x	x							
MPEG encoding						x	x	x	x						x	
Selected advanced topics	x		x						x		x		x	x		
Course project	x				x	x				x		x			x	x

### Learning Method /ILOs Matrix

Learning Methods	Knowledge and understanding						Intellectual skills			Professional and practical skills					General	
	a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	c3	c4	c5	d1	d2

Lectures	x	x	x	x	x	x	x	x	x	x						
Tutorial Exercises							x	x	x	x	x					
Practical Lab							x	x	x	x	x	x	x			
Discussions and project.							x	x	x	x	x	x	x	x	x	x

### Assessment Methods /ILOs Matrix

Assessment Methods	Knowledge & understanding						Intellectual skills			Professional & practical skills					General	
	a1	a2	a3	a4	a5	a6	b1	b2	b3	c1	c2	c3	c4	c5	d1	d2
Mid Term Exam	x	x	x	x			x	x	x	x	x	x	x	x		
Final Exam	x	x	x	x			x	x	x	x	x	x	x	x		
Course Project	x	x	x	x			x	x	x	x	x	x	x	x	x	x
Course Work & Quizzes	x	x	x	x			x	x	x	x	x	x	x	x	x	x
Practical Exam	x	x	x	x			x	x	x	x	x	x	x	x		

### Course ILOs Vs Program ILOs

Prog ILOs		Knowledge & understanding					Intellectual skills				Professional and practical skills			General	
		A3	A6	A13	A19	A21	B1	B3	B4	B8	C7	C8	C10	D11	D12
Knowledge and understanding	a1	√	√	√	√	√									
	a2		√		√	√									
	a3				√	√									
	a4				√	√									
	a5				√	√									
	a6				√	√									
Intellectual skills	b1						√	√		√					
	b2						√	√							
	b3							√	√						
Professional and practical skills	c1										√		√		
	c2										√		√		
	c3									√			√		
	c4									√			√		
	c5									√			√		
General skills	d1												√	√	√
	d2												√	√	√

**Course Coordinator** : Dr. Abdellatief Hussien ( )

**Head of Department** : Dr. Ahmed El-Abbassy ( )

**Date**: --/--/2023