

CS4185: MULTIMEDIA TECHNOLOGIES AND APPLICATIONS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Multimedia Technologies and Applications

Subject Code

CS - Computer Science

Course Number

4185

Academic Unit

Computer Science (CS)

College/School

College of Computing (CC)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

(CS2310 Computer Programming or CS2311 Computer Programming or CS2313 Computer Programming) AND (CS2303 Data Structures for Media or CS3334 Data Structures)

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims at providing students with theoretical and technical understanding on multimedia components and systems. The course covers contemporary, interactive multimedia technology systems, focusing on types, applications, and theories of operation. Basic technologies such as multimedia data representation, compression, retrieval and communication will be covered in an integrated manner. On the completion of the course, students will have fundamental concepts multimedia technologies and systems, and be able to make critique to the technologies associated with various multimedia data types such as image, video, audio, graphics and animation.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain approaches for representing multimedia data in digital format and identify their properties.		x		
2	Describe the rational of the multimedia representation format and compression algorithms based on human visual and auditory perceptions.		x		
3	Understand image, video and audio in the frequency domain to identify important components to be encoded.			x	
4	Explain the major steps in some of the image, video and audio compression standards.			x	
5	Apply multimedia data and techniques on a practical application.				

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will engage in formal lectures to learn basic multimedia technologies, such as multimedia data representation, frequency domain features, human perception, lossy and lossless compression, compression standards, etc.	1, 2, 3, 4, 5	3 hours/week
2	Tutorials	Students will participate in some class exercises each week during the tutorial sessions. In particular, they will engage in group discussions to solve various multimedia-related problems.	1, 2, 3, 4, 5	8 hours/semester
3	Course Project	Students will engage in solving practical a problem that involves applying multimedia technologies. During the process of solving the problem, students will also engage in discovering the rational behind the particular approach and explaining their solutions.	3, 5	3 hours for 7 weeks

Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- for nil entry)	Allow Use of GenAI?
1	Quiz	1, 2, 3	20	-	No
2	Course Project	3, 5	20	-	Yes

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Rubrics (AR)

Assessment Task

Quiz

Criterion

Capacity in understanding the key concerns of multimedia data and techniques

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Note even reaching marginal levels

Assessment Task

Course Project

Criterion

Ability to apply multimedia techniques on a practical application

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Note even reaching marginal levels

Assessment Task

Examination

Criterion

Ability to analyse and evaluate multimedia data and techniques and apply multimedia techniques on applications

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Note even reaching marginal levels

Part III Other Information

Keyword Syllabus

Multimedia Data Compression, Multimedia Data Representation, Image and Video Compression, Digital Audio, Multimedia Database Systems.

Syllabus

- Image Representation
- Color Science and Color Models
- Lossless and Lossy Compression
- JPEG Image Compression Standard
- Video Representation
- Basic Video Compression Techniques
- Video Coding Standards: H.26X and MPEG
- Basics of Digital Audio
- Audio Compression

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	Ze-Nian Li and Mark Drew (2004). Fundamentals of Multimedia. Prentice Hall.
2	J. Buford (1994). Multimedia Systems. Addition Wesley.
3	P. Andleigh and K. Thakra (1996). Multimedia Systems Design. Prentice Hall.