Title (Units): **COMP4036 Digital Media Computing and Communications (3,2,1)**

Course Aims: To learn the properties of digital media, the principles of digital media compression, the principles of digital media communication, and the protocols and methods for transporting digital media through the Internet.

Prerequisite: COMP3015 Data Communications and Networking

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the properties of digital media and the principles of digital media compression
2	Describe the problems involved in digital media communication and explain the solutions for solving these problems
3	Describe the constraints imposed by the Internet and explain the protocols and methods for transporting digital media through the Internet
	Professional Skill
4	Design and implement digital media communication applications

Calendar Description: Students will learn the properties of digital media, the principles of digital media compression, the principles of digital media communication, and the protocols and methods for transporting digital media through the Internet.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1, 2, 3	Students will learn the principles of digital media computing and communications via lectures. Tutorials will be conducted to guide students for in-depth discussion and reinforce learning. Real-world cases will be studied for illustration.
2, 3, 4	Students will work on a project to design and implement a digital media communication application.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	30%	2, 3, 4	A project is designed such that students apply what they have learned to design and implement a digital media communication application.
2	Examination	70%	1, 2, 3	Final examination questions are designed to assess students' understanding on the concepts and their ability in applying these concepts to solve problems.

Assessment Rubrics:

Level of Achievement	Elaboration on Course Grading Description
Excellent (A)	The student's performance is outstanding in almost all the intended course learning outcomes.
Good (B)	The student's performance is good in most of the intended course learning outcomes.
Satisfactory (C)	The student's performance is satisfactory. It largely meets the intended course learning outcomes.
Marginal Pass (D)	The student's performance is barely satisfactory. It marginally meets the intended course learning outcomes.

Fail (F)	The student's performance is inadequate. It fails to meet many of the intended course learning outcomes.

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Digital Media Computing	1, 4
II	Digital Media Communications	2, 4
III	Digital Media over the Internet	3, 4
IV	Current Topics: Cloud Computing for Multimedia Services, Multimedia over Wireless and Mobile Networks, etc.	1, 2, 3

References:

- Z. Li, M. S. Drew and J. Liu, Fundamentals of Multimedia, Springer, 2014.
- J. F. Kurose and K. W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 6th Edition, Addison Wesley, 2012.
- A. S. Tanenbaum and D. J. Wetherall, Computer Networks, 5th Edition, Pearson, 2011
- P. Havaldar and G. Medioni, Multimedia Systems: Algorithms, Standards and Industry Practices, Cengage Learning, 2009.
- Sanjoy Paul, Digital Video Distribution in Broadband, Television, Mobile and Converged Networks: Trends, Challenges and Solutions, Wiley, 2010
- K. R. Rao, Z. S. Bojkovic, and D. A. Milovanovic, Multimedia, Communication Systems, Prentice Hall, 2002.
- Selected articles from journals, magazines and conference proceedings.

Course Content:

Topic

I. Digital Media Computing
   A. Digital media: characteristics and representation
   B. Compression methods and state-of-the-art coding standards
   C. Characteristics of compressed media

II. Digital Media Communications
   A. Quality of service
   B. Error control: error correction, loss recovery, loss concealment
   C. Traffic control: admission control, traffic shaping, statistical multiplexing, scheduling, congestion control, QoS routing

III. Digital Media over the Internet
   A. Best effort service, integrated service, and differentiated service
   B. Protocols: RTP, RTCP, RTSP and RSVP
   C. Streaming stored media
   D. Streaming live media
   E. Content delivery: server farms and proxy caching, content delivery networks, peer-to-peer content delivery
   F. Internet telephony, Internet TV, Internet radio

IV. Current Topics: Cloud Computing for Multimedia Services, Multimedia over Wireless and Mobile Networks, etc.
   Cloud Computing for Multimedia Services, Multimedia over Wireless and Mobile Networks, etc.