Subject Description Form

Subject Code	COMP 5422
Subject Title	Multimedia Computing, Systems and Applications
Credit Value	3
Level	5
Pre-requisite/Exclusion	Nil
Objectives	The objectives of this subject are to: 1. provide students with knowledge in fundamentals of multimedia, e.g. compression standards, data formats, media characteristics, storage and transmission requirements; 2. provide students with knowledge of a wide spectrum of multimedia information processing techniques; 3. train students with the ability to apply the knowledge in multimedia system and application development; 4. equip students with the ability to appreciate new and innovative solutions of multimedia systems and applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. have a good understanding on various characteristics of different media; 2. have a deep understanding of the techniques and requirements for processing multimedia; 3. grasp and consolidate the skills for problem solving involving multimedia databases; and 4. conduct real-world case study in multimedia applications.
Subject Synopsis/ Indicative Syllabus	• **Multimedia System Primer**: Introduction to different multimedia platforms, systems, tools and applications; characteristics of different media and current trend • **Data Representation, Coding and Compression**: Data representation, processing and analysis for Sound/Audio, Image and Graphics, Video and Animation; Coding requirements, Entropy and Hybrid Coding, Compression techniques and standards: JPEG, MPEG, DVI, ASF, etc. • **Multimedia Content Analysis and Information Retrieval**: Multimedia contents: Color, shape, texture, motion, etc. Content analysis techniques: Color histogram, shape analysis, motion analysis, etc. Retrieval techniques: video segmentation, key frame selection, etc. • **Multimedia Security and Forensics**: Digital watermarking, spatial and frequency domain techniques, livebitstream watermarking and content protection. • **Multimedia Information Networking**: Video streaming, color models and motion estimation techniques, protocol support for multimedia networkings. • **Selected Topics in Multimedia Computing, Systems and Applications**: e.g., New MPEG standards, Multimedia Information Hiding and Watermarking, VoiceXML.

<table>
<tr><td>Teaching/Learning Methodology</td><td>39 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Assignments, Tests & Projects</td><td>55</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>2. Final Examination</td><td>45</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td colspan="4"></td></tr>
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<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>Class activities (lecture, tutorial, lab)</td><td>39 hours</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>Assignments, Quizzes, Projects, Exams</td><td>66 hours</td></tr>
<tr><td>Total student study effort</td><td>105 hours</td></tr>
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<tr><td>Reading List and References</td><td>Books
1. Z.-N. Li, M.S. Drew, J. Liu, Fundamentals of Multimedia, Springer, 2014
2. Lewis, Richard, 2005, Digital media: An introduction, Prentice Hall.
3. Borko Furht (ed), 1999, Handbook of Multimedia Computing. CRC Press.
R. C. Gonzalez, Digital Image Processing, 4th ed., 2017 G. Friedland and R. Jain, Multimedia Computing, Cambridge University Press, 2014
Journals
1. IEEE Multimedia
2. IEEE Trans. on Multimedia
3. ACM SIG Multimedia</td></tr>
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