To: 42477-1 and 42477-2 Students of the BSc in IMT Programme
From: Programme Leader, BSc in IMT
c.c.: Interim Head, EIE
    BSc in IMT Programme Executive Group Members
Date: 23 Feb 2017

Dear Students,

Minor Changes to the BSc in IMT (42477/42477-SY) Programme

As communicated with you during our meeting on 19 January 2017, the Department has recently implemented a few minor changes to the BSc in IMT programme curriculum as a result of refocusing the programme to the studies in Information and Communication Technologies (ICT) with an emphasis on "integration". These minor changes are recaptured below for your attention. You can refer to the attached document for more details about the rationales behind these minor changes to the BSc in IMT (42477/42477-SY) programme.

1. Deleting Electives from the Curriculum

Two EIE electives, "EIE3110 Research Methodology" and "EIE4414 Computer Architecture and Systems", currently offered for the BSc in IMT programme, have been removed from the curriculum of the BSc in IMT programme as stated in Table 1 below. They either do not align closely with the new programme emphasis or are less popular among students (i.e. low subject enrolment).

Table 1: Deletion of technical electives from the BSc in IMT programme:

Subject Code	Subject Title	Credit	Category	
			Normal Year 1 Intake	Senior Year Intake
~~EIE3110~~	~~Research Methodology~~	~~3~~	~~ELE~~	~~ELE~~
~~EIE4414~~	~~Computer Architecture and Systems~~	~~3~~	~~ELE~~	~~ELE~~

The revisions will be effective from 2017/18 and onwards and applicable to all cohorts of intake to the BSc in IMT programme.

2. Replacement of Subjects

(a) Removing "EIE3345 Data Communication Technologies" from and Adding "EIE3333 Data and Computer Communications" to the BSc in IMT Curriculum

(b) Removing "EIE3342 Computer Networks" from the BSc in IMT Curriculum and Changing "EIE4102 IP Networks" from an Elective to a Compulsory Subject

(c) Removing "EIE3121 Introduction to Audio and Speech Processing" and "EIE3122 Introduction to Image and Video Processing" from the BSc in IMT Curriculum and Changing "EIE4431 Digital Video Production and Broadcasting" and "EIE4435 Image and Audio Processing" from Electives to Compulsory Subjects

(d) Changing "EIE3101 Computer Animation" from an Elective to a Compulsory Subject

By changing EIE3101 from an elective to a compulsory subject while keeping the total number of credits required for graduation unchanged, the number of technical electives required for the programme will be reduced from 4 to 3. Students are expected to take EIE3101 during Semester 2 of their 3rd year of study (or 1st year of study for senior year entry).

A table summarizing the above changes can be found below, and the resultant revised specified progression patterns for Normal Year 1 intake and Senior Year intake can be found in Appendix VI.

Table 2: Replacement of subjects for the BSc in IMT programme:

A. Subjects to be Removed from the BSc in IMT Curriculum	B. To be Replaced by
1. EIE3345 Data Communication Technologies	1. EIE3333 Data and Computer Communications (Appendix I)
2. EIE3342 Computer Networks	2. EIE4102 IP Networks (Appendix II)
3. EIE3121 Introduction to Audio and Speech Processing	3. EIE4435 Image and Audio Processing (Appendix III)
4. EIE3122 Introduction to Image and Video Processing	4. EIE4431 Digital Video Production and Broadcasting (Appendix IV)
5. Technical Elective 1	5. EIE3101 Computer Animation (Appendix V)

The minor changes stated in Section 2(a), 2(b), 2(c) and 2(d) will be effective from 2017/18 and onwards and applicable to all cohorts of Normal Year 1 intake from 2015/16 and onwards and Senior Year Intake from 2017/18 and onwards to the BSc in IMT programme.

3. Updating the List of Level 5 EIE Electives

The list of Level 5 subjects open for BSc in IMT final-year students' choosing has been updated as follows:

Table 3: Updated list of Level 5 EIE electives for the BSc in IMT programme:

Subject Code	Subject Title	Credit
EIE522	Pattern Recognition: Theory and Applications	3
EIE529	Digital Image Processing	3
EIE546	Video Technology	3
EIE553	Security in Data Communication	3
EIE557	Computational Intelligence and its Applications	3
EIE558	Speech Processing and Recognition	3
EIE563	Digital Audio Processing	3
EIE575	Vehicular Communications and Inter-Networking Technologies	3
EIE579	Advanced Telecommunication Systems	3
EIE581	Optical Wavelength Division Multiplexing Networks	3
EIE589	Wireless Data Network	3
~~EIE507~~	~~Network Design - Theory and Practice~~	~~3~~
~~EIE536~~	~~High Speed Networks~~	~~3~~
~~EIE541~~	~~Digital Signal Processing~~	~~3~~
~~EIE552~~	~~Internet Technologies for Multimedia Applications~~	~~3~~
~~EIE555~~	~~Personal Networking Technology~~	~~3~~
~~EIE556~~	~~Advanced DSP for Multimedia Communications~~	~~3~~
~~EIE565~~	~~Advanced Multimedia Technology~~	~~3~~
~~EIE576~~	~~Information Technology in Biomedicine~~	~~3~~

The revisions will take immediate effect and applicable to all cohorts of intake to the BSc in IMT programme.

The attached file contains the following information for your reference:

1. Syllabi of EIE3333, EIE4102, EIE4435, EIE4431, EIE3101
2. Progression patterns and list of subjects offered for the BSc in IMT programme
3. Rationales behind the minor changes to the BSc in IMT programme

For easy reference in the future, students are strongly advised to update your own Programme Booklet by enclosing this email and the attached documents to your own Booklet.

Should you have any question regarding the above, please feel free to talk to me.

Thank you for your attention.

Regards,
Dr Frank Leung
Programme Leader
BSc(Hons) in Internet and Multimedia Technologies

The Hong Kong Polytechnic University
Department of Electronic and Information Engineering

Minor Changes to the BSc (Hons) in Internet and Multimedia Technologies
(BSc in IMT) (42477/42477-SY) Programme

Background

Recently the Department has made a thorough discussion on the identity of the academic programmes it offers and came up with a plan to refocus its programmes to the studies in Information and Communication Technologies (ICT) with an emphasis on "integration". It follows from the rapid development in the platforms for digital entertainment in recent years. Most forms of digital entertainment, be it movies, computer games, sports, news, songs, TV programmes, etc., can now be accessed on the Internet through wired or wireless platforms. Many ICT enterprises, such as Google, Microsoft, Verizon, Sony, Amazon, etc., no longer focus on providing a specific kind of ICT services and products only, but also engage themselves in different forms of digital entertainment. To do so, they require technologies which enable these various forms of digital entertainment to integrate seamlessly with due consideration to issues such as digital content protection and intelligent advertisement. It lets us believe that there is a need to provide an integrated education to our students in line with the latest development of the industry to prepare their future ICT career. It in fact also fully meets the profile and expertise of the Department.

To cope with this emphasis, the Department has recently made a review on all higher diploma, undergraduate degree and taught postgraduate programmes to ensure they follow closely our new emphasis of "integration" in ICT. At the same time, we also try to identify rooms for streamlining and consolidation of subjects while ensuring that the programme aims, objectives and intended learning outcomes are unaffected and sufficient number of electives are provided for students' selection.

In this connection, a number of minor changes to the BSc in IMT programme curriculum have been implemented as detailed in the following.

1. Deleting Electives from the Curriculum

Two EIE electives, "EIE3110 Research Methodology" and "EIE4414 Computer Architecture and Systems", currently offered for the BSc in IMT programme, have been removed from the curriculum of the BSc in IMT programme as stated in Table 1 below. They either do not align

closely with the new programme emphasis or are less popular among students (i.e. low subject enrolment).

Table 1: <u>Deletion</u> of technical electives from the <u>BSc in IMT</u> programme:

Subject Code	Subject Title	Credit	Category	
			Normal Year 1 Intake	Senior Year Intake
~~EIE3110~~	~~Research Methodology~~	~~3~~	~~ELE~~	~~ELE~~
~~EIE4414~~	~~Computer Architecture and Systems~~	~~3~~	~~ELE~~	~~ELE~~

The revisions will be effective from 2017/18 and onwards and applicable to all cohorts of intake to the BSc in IMT programme.

2. Replacement of Subjects

(a) Removing "EIE3345 Data Communication Technologies" from and Adding "EIE3333 Data and Computer Communications" to the BSc in IMT Curriculum

The Department identifies that the content currently covered by the compulsory subject "EIE3345 Data Communication Technologies", including data transmission and channel, information theory and source coding, data encoding, data link control, error detection and correction and data communication interface, multiplexing and switching, are more theoretical in nature which many BSc in IMT students find it difficult to handle. Hence, EIE3345 has been removed from the BSc in IMT curriculum.

On the other hand, to match the curriculum with the refined programme emphasis of "integration" in ICT as well as to provide students with more relevant hands-on practice which are comparable to industry standard protocols, "EIE3333 Data and Computer Communications" (Appendix I), has been added to the BSc in IMT curriculum as a compulsory subject. EIE3333 aims to provide solid foundation to students about the architectures and operations of communication networks. It also intends to enable students to master the knowledge about computer networking in the context of real-life applications, and prepare students to learn and to critically evaluate new knowledge and emerging technology in communication networks. Students will gain the knowledge of computer networks, services, and layered architectures, digital transmission and protocols in data link layer, Local Area Networks (LANs) and wireless LANs, network layer protocols, transport layer protocols through lectures, tutorials, and hands-on practices, such as Cisco router configuration and programming.

(b) Removing "EIE3342 Computer Networks" from the BSc in IMT Curriculum and Changing "EIE4102 IP Networks" from an Elective to a Compulsory Subject

The Department is of the view that both the objectives and content of the compulsory subject "EIE3342 Computer Networks" are very similar to those of EIE3333. With EIE3333 added to the curriculum, EIE3342 will become redundant and thus could be removed. The curriculum space created as a result of the removal of EIE3342 will be filled up by "EIE4102 IP Networks" (Appendix II).

EIE4102 was originally an elective subject of the BSc in IMT programme which builds on the foundation of EIE3342/EIE3333 to give a practical treatment on the design, implementation, and management of IP networks. The subject covers basic protocol functions, protocols in TCP/IP, routing protocols, applications over TCP/IP, and other issues about IP. Its application-oriented nature aligns with the new emphasis of the programme closely. Therefore, EIE4102 has been made a compulsory subject of the programme.

(c) Removing "EIE3121 Introduction to Audio and Speech Processing" and "EIE3122 Introduction to Image and Video Processing" from the BSc in IMT Curriculum and Changing "EIE4431 Digital Video Production and Broadcasting" and "EIE4435 Image and Audio Processing" from Electives to Compulsory Subjects

The Department notices from the academic performance of BSc in IMT students that their mathematics knowledge and skills are rather weak. Some BSc in IMT students also express through various channels that they do not expect they will have to apply mathematics knowledge to other subjects in the programme so frequently. Although the Department has emphasized to the students on many occasions that applying knowledge of mathematics is essential to the IMT discipline, it has reviewed the curriculum to identify if there are room for reducing the mathematical content which many students find difficult to handle.

It is identified that the compulsory subjects "EIE3121 Introduction to Audio and Speech Processing" and "EIE3122 Introduction to Image and Video Processing", which cover audio processing, speech processing, image processing and video processing in more detail, require students to have a deep understanding of the mathematical techniques for signal processing. On the other hand, the elective subject, "EIE4435 Image and Audio Processing" (Appendix III), provides a broad treatment of the fundamentals in image and audio processing and does not require students to have strong mathematical background in order to grasp the knowledge of the subject.

The Department deems that under the refined emphasis of the programme, it is more crucial for the students to learn image, audio and video processing than speech processing. EIE4435 alone can equip students with the knowledge of image and audio processing, while the knowledge of video processing can be taught at the application level through the subject "EIE4431 Digital Video Production and Broadcasting" (Appendix IV), since it teaches fundamental of video production and digital video broadcasting, video production and recording equipment, analog video broadcasting standards, video transport layer, error control for digital video, digital video broadcasting techniques and standards.

Taking into account the students' mathematical ability as well as the refined emphasis of the programme, EIE3121 and EIE3122 have been removed from the programme, and EIE4431 and EIE4435 have been changed from elective subjects to compulsory subjects.

(d) Changing "EIE3101 Computer Animation" from an Elective to a Compulsory Subject

The Department receives feedback from students and applicants for the BSc in IMT programme on different occasions that they are interested in subjects related to Computer Animation. Currently, the BSc in IMT programme offers "EIE3101 Computer Animation" (Appendix V) as an elective subject. The subject aims at training students to master the basic principles, knowledge, and skills about computer animation. While pure theoretical discussion is avoided, it addresses practical issues and provides accessible techniques for straightforward implementations. It matches closely with the refined emphasis of the programme.

As the subject is currently offered as an elective, it may have time clash with other compulsory subjects which prevents students from taking it. To suit students' interest and to cater to the renewed emphasis of the programme, EIE3101 has been made a compulsory subject of the programme.

By changing EIE3101 from an elective to a compulsory subject while keeping the total number of credits required for graduation unchanged, the number of technical electives required for the programme will be reduced from 4 to 3. Students are expected to take EIE3101 during Semester 2 of their 3rd year of study (or 1st year of study for senior year entry).

A table summarizing the above changes can be found below, and the resultant revised specified progression patterns for Normal Year 1 intake and Senior Year intake can be found in Appendix VI.

Table 2: <u>Replacement</u> of subjects for the <u>BSc in IMT</u> programme:

A. Subjects to be Removed from the BSc in IMT Curriculum		B. To be Replaced by	
1.	EIE3345 Data Communication Technologies	1.	EIE3333 Data and Computer Communications (Appendix I)
2.	EIE3342 Computer Networks	2.	EIE4102 IP Networks (Appendix II)
3.	EIE3121 Introduction to Audio and Speech Processing	3.	EIE4435 Image and Audio Processing (Appendix III)
4.	EIE3122 Introduction to Image and Video Processing	4.	EIE4431 Digital Video Production and Broadcasting (Appendix IV)
5.	Technical Elective 1	5.	EIE3101 Computer Animation (Appendix V)

The minor changes stated in Section 2(a), 2(b), 2(c) and 2(d) will be effective from 2017/18 and onwards and applicable to all cohorts of Normal Year 1 intake from 2015/16 and onwards and Senior Year Intake from 2017/18 and onwards to the BSc in IMT programme.

3. Updating the List of Level 5 EIE Electives

According to current curriculum design of the BSc in IMT (42477/42477-SY) programme, students may take at most one Level 5 EIE subject per semester as a final-year technical elective during their final year of study subject to the approval by the Programme Leader. The total number of Level 5 EIE subjects taken by a student shall not exceed 2. Below are the Level 5 EIE subjects currently listed in the BSc in IMT programme:

Table 3: <u>Existing list</u> of Level 5 EIE electives for the <u>BSc in IMT</u> programme:

Subject Code	Subject Title	Credit
EIE507	Network Design - Theory and Practice	3
EIE522	Pattern Recognition: Theory and Applications	3
EIE529	Digital Image Processing	3
EIE536	High Speed Networks	3
EIE541	Digital Signal Processing	3
EIE546	Video Technology	3
EIE552	Internet Technologies for Multimedia Applications	3
EIE553	Security in Data Communication	3
EIE555	Personal Networking Technology	3

Subject Code	Subject Title	Credit
EIE556	Advanced DSP for Multimedia Communications	3
EIE557	Computational Intelligence and its Applications	3
EIE558	Speech Processing and Recognition	3
EIE563	Digital Audio Processing	3
EIE565	Advanced Multimedia Technology	3
EIE576	Information Technology in Biomedicine	3
EIE579	Advanced Telecommunication Systems	3

The Level 5 EIE subjects are primarily offered for MSc in Electronic and Information Engineering (MSc in EIE) programme, and the BSc in IMT programme merely adopts these subjects to broaden the students' scope of learning. With reference to the update on the list of Level 5 subjects offered for the MSc in EIE programme, the list of Level 5 subjects open for BSc in IMT final-year students' choosing has been updated as follows:

Table 4: Updated list of Level 5 EIE electives for the BSc in IMT programme:

Subject Code	Subject Title	Credit
EIE522	Pattern Recognition: Theory and Applications	3
EIE529	Digital Image Processing	3
EIE546	Video Technology	3
EIE553	Security in Data Communication	3
EIE557	Computational Intelligence and its Applications	3
EIE558	Speech Processing and Recognition	3
EIE563	Digital Audio Processing	3
EIE575	Vehicular Communications and Inter-Networking Technologies	3
EIE579	Advanced Telecommunication Systems	3
EIE581	Optical Wavelength Division Multiplexing Networks	3
EIE589	Wireless Data Network	3
~~EIE507~~	~~Network Design - Theory and Practice~~	~~3~~
~~EIE536~~	~~High Speed Networks~~	~~3~~
~~EIE541~~	~~Digital Signal Processing~~	~~3~~
~~EIE552~~	~~Internet Technologies for Multimedia Applications~~	~~3~~
~~EIE555~~	~~Personal Networking Technology~~	~~3~~
~~EIE556~~	~~Advanced DSP for Multimedia Communications~~	~~3~~
~~EIE565~~	~~Advanced Multimedia Technology~~	~~3~~
~~EIE576~~	~~Information Technology in Biomedicine~~	~~3~~

The revisions will take immediate effect and applicable to all cohorts of intake to the BSc in IMT programme.

The updated list of subjects offered to the BSc in IMT programme as a result of the above minor changes to the programme can be found in Appendix VII.

23 February 2017

Subject Description Form

Subject Code	EIE3333
Subject Title	Data and Computer Communications
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	1. To provide solid foundation to students about the architectures and operations of communication networks. 2. To enable students to master the knowledge about computer networking in the context of real-life applications. 3. To prepare students to learn and to critically evaluate new knowledge and emerging technology in communication networks.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the services, functions, and inter-relationship of different layers in communication network models 2. Describe how components in different layers inter-operate and analyze their performance. 3. Understand and apply the principles and practices of communication networks. 4. Learn new techniques and to align new technologies to existing network infrastructure. Category B: Attributes for all-roundedness 5. Present ideas and findings effectively. 6. Learn independently.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Computer Networks, Services, and Layered Architectures Evolution of networking and switching technology. Protocol and services. Layered network architectures: OSI 7-layer model, TCP/IP architecture. 2. Digital Transmission and Protocols in Data Link Layer Line coding techniques, error detection and correction. Automatic Repeat Request (ARQ) protocol and reliable data transfer service. Sliding-window flow control. Framing and point-to-point protocol, flow control and error controls. High level data link control (HDLC) protocol and point-to-point protocol (PPP). 3. Local Area Networks (LANs) and Wireless LANs Media Access Control (MAC) protocols: the IEEE802.3 Ethernet and IEEE802.11 wireless LAN standards. Interconnection of LANs: bridge, switch, and virtual LAN. 4. Network Layer Protocols Network layer operations, connection oriented and connectionless services. Internet protocol (IP): IP datagram format, IP addressing, subnetting, IP routing and router operations. Internet control message protocol (ICMP), dynamic host configuration protocol (DHCP), network address translation (NAT). 5. Transport Layer Protocols Transmission control protocol (TCP) and user datagram protocol (UDP)

	Possible Laboratory Experiments: 1. Cisco router configuration and programming. 2. Static and Dynamic routing. 3. Network monitoring and analysis 4. Address resolution, ARP, IP, and TCP.

Teaching/ Learning Methodology	

Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
Lectures	1, 2, 3, 4	Fundamental principles and key concepts of the subject are delivered to students.
Tutorials	1, 2, 3, 4, 5	Supplementary to lectures. Students will be able to clarify concepts and to have a deeper understanding of the lecture material; Problems and application examples are given and discussed.
Laboratory sessions	5, 6	Students will conduct practical exercises to reinforce concepts and techniques learned.

Alignment of Assessment and Intended Subject Learning Outcomes	

Specific Assessment Methods/ Task	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. Continuous Assessment	40%						
• Tests		✓	✓	✓	✓	✓	
• Assignments		✓	✓	✓	✓	✓	
• Laboratories				✓		✓	✓
2. Examination	60%	✓	✓	✓	✓	✓	
Total	100%						

The continuous assessment will consist of a number of assignments, laboratory reports, case study reports (administered in tutorial sessions), and two tests.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Specific Assessment Methods/ Tasks	Remark
Assignments, Tests and examination	These can measure the students' understanding of the theories and the concepts of the subject. End-of-chapter type problems used to evaluate students' ability in applying concepts and skills learnt in the classroom;
	Assignments of reading report type to assess students' ability in acquiring new knowledge related to communication networks;
	Students need to think critically and creatively in order to come with an alternate solution for an existing problem.
Laboratory sessions	Each group of students is required to complete work-sheets, to indicate their understanding and correct completion of the laboratories.
	Accuracy and the presentation of the work-sheets will be assessed;

Student Study Effort Expected	Class contact (time-tabled):	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**

Reading List and References	**Textbook :** 1. Behrouz A. Forouzan, *Data Communications & Networking,* 5th ed., McGraw-Hill, 2012. **Reference Books:** 1. Behrouz A. Forouzan, *Computer Networks: A Top-Down Approach*, McGraw-Hill, 2012. 2. William Stallings, *Data and Computer Communications*, 9th ed., Pearson/ Prentice-Hall, 2012. 3. Douglas Comer, *Computer Networks and Internets*, 5th ed., Pearson/ Prentice-Hall, 2009.
Last Updated	December 2016
Prepared by	Dr K.T. Lo

Subject Description Form

Subject Code	EIE4102
Subject Title	IP Networks
Credit Value	3
Level	4
Pre-requisite	Data and Computer Communications (EIE3333) or Computer Network (EIE3342)
Co-requisite/ Exclusion	Nil
Objectives	1. Give a practical treatment on the design, implementation, and management of IP networks. 2. Introduce the variety of facilities, technologies, and communication systems to meet future needs of network services. 3. Evaluate critically the performance of existing and emerging global communication networking technologies.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Describe the operational and functional attributes of different components of IP networks. 2. Evaluate critically the design, implementation, and performance of IP networks with regard to different criteria. Category B: Attributes for all-roundedness 3. Think and evaluate critically. 4. Take up new technology for life-long learning. 5. Work in a team, and collaborate effectively with other members.
Subject Synopsis/ Indicative Syllabus	1. <u>Basic Protocol Functions</u> IP address, IP datagram structure, basic IP operations, delivery and forwarding IP packets 2. <u>Protocols in TCP/IP</u> ARP, RARP, ICMP, IGMP, UDP, TCP 3. <u>Routing Protocols</u> RIP, OSPF, BGP, Multicast Routing 4. <u>Applications Over TCP/IP</u> DNS, TELNET, FTP, Email, HTTP 5. <u>Other Issues About IP</u> IP over ATM, Mobile IP, Multimedia, Voice over IP, SIP, H.323, IPv6, IPSec Laboratory Experiments: 1. Voice over IP Experiment 2. IP Security
Teaching/Learning Methodology	Lecture/Tutorial: 39 hours Laboratory: 2 hours (Equivalent to 6 hours spent by students in laboratory)

Assessment Methods in Alignment with Intended Subject Learning Outcomes	Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)				
			1	2	3	4	5
	1. Continuous Assessment (total: 40%)						
	• Assignments	10%	✓	✓	✓		
	• Laboratory reports	10%		✓	✓	✓	✓
	• Tests	20%	✓	✓	✓	✓	
	2. Examination	60%	✓	✓	✓	✓	
	Total	100%					

Student Study Effort Expected	Class contact (time-tabled):	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 Hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**

Reading List and References	1. Behrouz A. Forouzan, *TCP/IP Protocol Suite*, 3rd ed., McGraw-Hill, 2006.
Last Updated	June 2015
Prepared by	Dr Lawrence Cheung

Subject Description Form

Subject Code	EIE4435
Subject Title	Image and Audio Processing
Credit Value	3
Level	4
Pre-requisite	For 42470 and 42477: Linear Systems (EIE3312) or Digital Signals and Systems (EIE3103) For 42479: Nil
Co-requisite/ Exclusion	Nil
Objectives	To provide a broad treatment of the fundamentals in image and audio processing.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the fundamentals of image and audio signal processing and associated techniques. 2. Understand how to solve practical problems with some basic image and audio signal processing techniques. 3. Have the ability to design simple systems for realizing some multimedia applications with some basic image and audio signal processing techniques. Category B: Attributes for all-roundedness 4. Present ideas and findings effectively. 5. Learn independently.

Subject Synopsis/ Indicative Syllabus	**Syllabus:**
	
	1. Image processing
	   1.1 Fundamentals of digital image: Digital image representation and visual perception, image sampling and quantization.
	   1.2 Image enhancement: Histogram processing; Median filtering; Low-pass filtering; High-pass filtering; Spatial filtering; Linear interpolation, Zooming.
	   1.3 Image coding and compression techniques: Scalar and vector quantizations; Codeword assignment; Entropy coding; Transform image coding; Wavelet coding; Codec examples.
	   1.4 Image analysis and segmentation: Feature extraction; Histogram; Edge detection; Thresholding.
	   1.5 Image representation and description: Boundary descriptor; Chaincode; Fourier descriptor; Skeletonizing; Texture descriptor; Moments.
	
	2. Audio processing
	   2.1 Fundamentals of digital audio: Sampling; Dithering; Quantization; psychoacoustic model.
	   2.2 Basic digital audio processing techniques: Anti-aliasing filtering; Oversampling; Analog-to-digital conversion; Dithering; Noise shaping; Digital-to-analog Conversion; Equalisation.
	   2.3 Digital Audio compression: Critical bands; threshold of hearing; Amplitude masking; Temporal masking; Waveform coding; Perceptual coding; Coding techniques: Subband coding and Transform coding.
	   2.4 Case Study of Audio System/Codecs: MP3; MP3-Pro; CD; MD; DVD-Audio; AC-3; Dolby digital; Surround; SRS Surround system; Digital Audio

Broadcasting, etc.

Laboratory Experiments:

1. Image processing techniques
2. Image compression
3. Audio compression
4. Psychoacoustic behaviour

Teaching/ Learning Methodology			

Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
Lectures	1, 2, 3	Fundamental principles and key concepts of the subject are delivered to students.
Tutorials	2, 3, 5	These are supplementary to lectures and are conducted with smaller class sizes; students will be able to clarify concepts and to gain a deeper understanding of the lecture material; problems and application examples are given and discussed.
Laboratory sessions	4, 5	Students will make use of software to simulate the various theories and visualize the results.

Assessment Methods in Alignment with Intended Subject Learning Outcomes

Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)				
		1	2	3	4	5
1. Continuous Assessment	40%					
• Short quizzes and tests			✓	✓	✓	
• Laboratory sessions			✓			✓	✓
2. Examination	60%	✓	✓	✓	✓	✓
Total	100 %					

The continuous assessment will consist of a number of assignments, laboratory reports, and two tests.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Specific Assessment Methods/Tasks	Remark
Short quizzes	These can measure the students' understanding of the theories and concepts as well as their comprehension of subject materials.
Assignments, tests and examination	End-of chapter type problems are used to evaluate the students' ability in applying concepts and skills learnt in the classroom; students need to think critically and to learn independently in order to come up with an alternative solution to an existing problem.
Laboratory sessions	Students are required to conduct some laboratory works, and produce the written reports; The accuracy and presentation of the report will be assessed; the emphasis is on assessing the students' ability to apply knowledge and skills learned in lectures, and their ability to relate the taken data and results to the most relevant theory.

Student Study Effort Expected	Class contact (time-tabled):	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 Hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**

Reading List and References	**Textbooks:** 1. R.C. Gonzalez and R.E. Woods, *Digital Image Processing*, 2nd ed., Prentice-Hall, 2002. 2. Ken C. Pohlmann, *Principles of Digital Audio*, 4th ed., McGraw-Hill, 2000. **Reference Books:** 1. Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Pearson Prentice-Hall, 2004. 2. M. Mandal, *Multimedia Signals and Systems,* Kluwer Academic Publishers, 2003.
Last Updated	June 2015
Prepared by	Dr Chris Chan

Subject Description Form

Subject Code	EIE4431
Subject Title	Digital Video Production and Broadcasting
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject provides a broad knowledge of digital video production and broadcasting.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the fundamentals of digital video systems with emphasis on production and broadcasting. 2. Work with digital video editing tools. 3. Understand the system design principles of video broadcasting. 4. Design simple systems related to video broadcasting. 5. Facilitate for further development in advanced digital video production and broadcasting. Category B: Attributes for all-roundedness. 6. Learn independently.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Introduction to Video Production and Broadcasting Elements of a video production and broadcasting system. Video services in Hong Kong. Video production and broadcasting standards and current development. 2. Fundamental of Video Production Production process, pre-production, production and post-production. Digital video editing. 3. Video Production and Recording Equipments Digital camera and video camera, video cassette recorder (VCR), digital video recorder, storage media, VCD, DVD-video. Video player: DVD player and advanced digital video player with full VCR support. 4. Analog Video Broadcasting Standards Component video and composite video, NTSC, and PAL. 5. Fundamental of Digital Video Broadcasting Digital video coding standards, Video transport layer, and transmission layer. 6. Video Transport Layer MPEG-2 systems and multiplexing, programme specific information and service information. 7. Error Control for Digital Video Quality of service requirements for video communications. Error resilience and concealment techniques for digital video. Transport protocols for multimedia communications. Video streaming over the Internet. 8. Digital Video Broadcasting Techniques and Standards

Channel coding for error control in digital TV, Digital modulation technique and conditional access for digital TV.

Laboratory Experiments:

1. Basic video editing tools
2. Digital video editing – visual effects
3. Digital video editing – Layering and keying clips

Teaching/ Learning Methodology	Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
	Lectures	1, 3, 4, 5, 6	fundamental principles and key concepts of the subject are delivered to students
	Tutorials	1, 3, 4, 5, 6	supplementary to lectures and are conducted with smaller class size; students will be able to clarify concepts and to have a deeper understanding of the lecture material; problems and application examples are given and discussed
	Laboratory sessions	2, 6	students will make use of digital video editing tools

Assessment Methods in Alignment with Intended Subject Learning Outcomes	Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)					
			1	2	3	4	5	6
	1. Continuous Assessment (total 40%)							
	• Short quizzes/ Assignments	10%	✓		✓	✓	✓	✓
	• Tests	20%	✓		✓	✓	✓	✓
	• Laboratory sessions	10%		✓				✓
	2. Examination	60%	✓		✓	✓	✓	✓
	Total	100%						

The continuous assessment will consist of laboratory reports, a number of short quizzes, assignments, and tests.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Specific Assessment Methods/Tasks	Remark
Short quizzes	mainly objective tests (e.g., multiple-choice questions, true-false, and matching items) conducted to measure the students' ability to remember facts and figures as well as their comprehension of subject materials
Assignments, tests and examination	end-of chapter type problems used to evaluate students' ability in applying concepts and skills learnt in the classroom; students need to think critically and creatively in order to come with an alternate solution for an existing problem
Laboratory sessions	each group of students are required to produce a written report; accuracy and the presentation of the report will be assessed; oral examination based on the laboratory exercises will be conducted for each group member to evaluate his technical knowledge and communication skills

Student Study Effort Expected		
	Class contact (time-tabled):	
	• Lecture	24 Hours
	• Tutorial/Laboratory/Practice Classes	15 Hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	**105 Hours**

Reading List and References	**Reference Books:** 1. U. Reimers, *DVB: The Family of International Standards for Digital Video Broadcasting*, Springer, 2005. 2. Richard Brice, *Newnes Guide to Digital TV*, Newnes, 2003. 3. Gerald Millerson, *Television Production*, Focal Press, 2001.
Last Updated	December 2016
Prepared by	Dr Y.L. Chan

Subject Description Form

Subject Code	EIE3101
Subject Title	Computer Animation
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This course aims at training students to master the basic principles, knowledge, and skills about computer animation. While pure theoretical discussion is avoided, this subject addresses practical issues and provides accessible techniques for straightforward implementations.
Intended Subject Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. describe the animation production pipeline 2. develop all the written and visual materials necessary for the production of computer animations 3. manage files and workflow needed in the animation production pipeline 4. discuss and implement particle systems and dynamics simulations 5. discuss a variety of animation techniques and apply them to actual animation production Category B: Attributes for all-roundedness 6. understand the creative process when designing solutions to a problem
Subject Synopsis/ Indicative Syllabus	INTRODUCTION • Animation, Visual Effects, and Technology in Context • Creative Development and the Digital Process MODELING • Modeling Concepts • Modeling Techniques • Advanced Modeling and Rigging Techniques RENDERING • Rendering Concepts • The Camera • Lighting • Shading and Surface Characteristics ANIMATION AND EFFECTS • Principles of Animation • Computer Animation Techniques • Advanced Computer Animation Techniques • Visual Effects Techniques

Teaching/Learning Methodology	Lectures: The subject matters will be delivered through lectures. Students will be engaged in the lectures through Q&A, discussions and specially designed classroom activities.
	Tutorials: During tutorials, students will work on/discuss some chosen topics in small group. This will help strengthen the knowledge taught in lectures.
	Laboratory and assignments: During laboratory exercises, students will perform hands-on tasks to practice what they have learned. They will evaluate performance of systems and design solutions to problems. The assignments will help students to review the knowledge taught in class.
	While lectures and tutorials will help to achieve the professional outcomes, the open-ended questions in laboratory exercises and assignments will provide the chance to students to exercise their creativity in problem solving.

Assessment Methods in Alignment with Intended Subject Learning Outcomes

Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. Continuous Assessment (total: 60%)							
• Homework and assignments	25%	✓	✓	✓	✓	✓	✓
• Test	20%	✓	✓	✓	✓	✓	
• Laboratory exercises	15%		✓	✓	✓	✓	✓
2. Examination	40%	✓	✓	✓	✓	✓	
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assignment, homework and laboratory exercises will require students to apply what they have learnt to solve problems. There will be open-ended questions that allow students to exercise their creativity in making design.

Examination and test: They assess students' achievement of the learning outcomes in a more formal manner.

Student Study Effort Expected	Class contact (time-tabled):	
	• Lecture/Tutorial	30 Hours
	• Laboratory/Practice Classes	9 Hours
	Other student study effort:	
	• Lecture: preview/review of notes; homework/assignment; preparation for test/quizzes/examination	36 Hours
	• Tutorial/Laboratory/Practice Classes: preview of materials, revision and/or reports writing	30 Hours
	Total student study effort:	105 Hours
Reading List and References	Text Book: 1. Isaac Kerlow, *The art of 3D computer animation and effects*, 4th ed., Hoboken, N.J.: John Wiley & Sons, 2009. Reference Book: 2. Mark Simon, *Storyboards: Motion in Art*, 3rd ed., Focal Press, 2007. 3. Kelly L. Murdock*, Autodesk 3ds Max 2016 Complete Reference Guide*, SDC Publications, 2015. 4. Rick Parent, *Computer Animation – Algorithms and Techniques*, 2nd ed., Morgan Kaufmann Publishers, 2008.	
Last Updated	September 2016	
Prepared by	Dr Pauli Lai	

4.3 Specified Progression Pattern

4.3.1 Normal Year 1 Intake (Applicable to intake cohort of 2015/16 and onwards):

Year 1	
Semester 1 (12 credits)	**Semester 2 (18 credits)**
AMA1110 Basic Mathematics I – Calculus and Probability & Statistics (3 credits)	AMA1120 Basic Mathematics II –Calculus and Linear algebra (3 credits)
EIE1002 Electronics Science (3 credits)	CAR I (3 credits) Note 1
LCR I – English (3 credits)	CAR II (3 credits) Note 1
ENG1003 Freshman Seminar for Engineering (3 credits)	LCR II – English (3 credits)
	ENG2003 Information Technology (3 credits)
	Leadership and Intra-Personal Development (3 credits)
Healthy Lifestyle (0 credit) Note 1	
Semester 3 – IC2140 Practical Training (5 training credits)	

Year 2	
Semester 1 (15 credits)	**Semester 2 (14 credits)**
LCR III – Chinese (3 credits)	ELC3521 Professional Communication in English (2 credits)
EIE2106 Signal and System Analysis (3 credits)	EIE3103 Digital Signals and Systems (3 credits)
EIE2105 Digital and Computer Systems (3 credits)	EIE3343 Computer Systems Principles (3 credits)
SD2983 Design Communication and Principles (3 credits)	SD2984 3D Graphics and Animation Fundamentals (3 credits)
ENG2002 Computer Programming (3 credits)	EIE3112 Database System (3 credits)

Year 3	
Semester 1 (15 credits)	**Semester 2 (18 credits)**
EIE3109 Mobile Systems and Application Development (3 credits)	~~EIE3342 Computer Networks~~ EIE4102 IP Networks (3 credits)
EIE3320 Object-Oriented Design and Programming (3 credits)	~~EIE3122 Introduction to Image and Video Processing~~ EIE4431 Digital Video Production and Broadcasting (3 credits)
~~EIE3345 Data Communication Technologies~~ EIE3333 Data and Computer Communications (3 credits)	SD3985 Computer Game Development (3 credits)
~~EIE3121 Introduction to Audio and Speech Processing~~ EIE4435 Image and Audio Processing (3 credits)	EIE3360 Integrated Project (3 credits)
EIE4432 Web Systems and Technologies (3 credits)	Service-Learning (3 credits) Note 1
	~~Technical Elective 1 (3 credits)~~ Note 2 EIE3101 Computer Animation (3 credits)

Year 4	
Semester 1 (15 credits)	**Semester 2 (17 credits)**
SD4981 Computer Game Development Project / EIE4430 Honours Project (6 credits)	
ENG3003 Engineering Management (3 credits)	AF3625 Engineering Economics (3 credits)
Technical Elective 1 (3 credits) Note 2	CBS3241P Professional Communication in Chinese (2 credits)
Technical Elective 2 (3 credits) Note 2	COMP3512 Legal Aspects, Professionalism and Ethics of Computing (3 credits)
CAR III (3 credits) Note 1	Technical Elective 3 (3 credits) Note 2
	CAR IV (3 credits) Note 1

Total Number of Credits: 124

Note 1. The study pattern for the subjects is indicative only. Students may take these subjects according to their own schedule. They are recommended to consult their Academic Advisor for guidance and planning if necessary.

~~Note 2. At least 2 technical electives must be at level 4 or above.~~

4.3.2 Senior Year Intake (Applicable to intake cohort of 2017/18 and onwards):
- For Senior Year students with relevant Higher Diploma/Associate Degree from a recognized institution Note 2

Year 1	
Semester 1 (15 credits)	**Semester 2 (18 credits)**
EIE3109 Mobile Systems and Application Development (3 credits)	~~EIE3342 Computer Networks~~ EIE4102 IP Networks (3 credits)
EIE3320 Object-Oriented Design and Programming (3 credits)	~~EIE3122 Introduction to Image and Video Processing~~ EIE4431 Digital Video Production and Broadcasting (3 credits)
~~EIE3345 Data Communication Technologies~~ EIE3333 Data and Computer Communications (3 credits)	SD3985 Computer Game Development (3 credits)
~~EIE3121 Introduction to Audio and Speech Processing~~ EIE4435 Image and Audio Processing (3 credits)	EIE3360 Integrated Project (3 credits)
EIE4432 Web Systems and Technologies (3 credits)	Service-Learning (3 credits) Note 1
	~~Technical Elective 1 (3 credits)Note 2~~ EIE3101 Computer Animation (3 credits)
Semester 3: IC2140 Practical Training (5 training credits)	
Year 2	
Semester 1 (18 credits)	**Semester 2 (16 credits)**
SD4981 Computer Game Development Project / EIE4430 Honours Project (6 credits)	
ENG3003 Engineering Management (3 credits)	AF3625 Engineering Economics (3 credits)
Technical Elective 1 (3 credits) Note 2	CBS3241P Professional Communication in Chinese (2 credits)
Technical Elective 2 (3 credits) Note 2	ELC3521 Professional Communication in English (2 credits)
CAR I (3 credits) Note 1, 3	COMP3512 Legal Aspects, Professionalism and Ethics of Computing (3 credits)
CAR II (3 credits) Note 1,3	Technical Elective 3 (3 credits) Note 2

Total Number of Credits: 67

Note 1. The study pattern for the subjects is indicative only. Students may take these subjects according to their own schedule. They are recommended to consult their Academic Advisor for guidance and planning if necessary.

~~Note 2. At least 2 technical electives must be at level 4 or above.~~

Note 2. This is an <u>example</u> only, which shows a possible study pattern for graduates with relevant Higher Diploma/Associate Degree from a recognized institution. The exact study pattern for senior year intakes varies from student to student depending on the approved subjects transferred.

Note 3. 6 credits of Cluster Areas Requirement (CAR) from two different cluster areas. Students also need to fulfil the English and Chinese reading and writing requirements and take 3 of the 6 CAR credits designated as "China-related" (China Studies Requirement), if such requirements have not been fulfilled in previous studies.

Note 4. The credits required and progression pattern presented above are for students who have been given credit transfer of the 9 credits Undergraduate Degree LCR subjects based upon their previous studies. Students not meeting the equivalent standard of the Undergraduate Degree LCR will be required to take the required subjects. Details on the Undergraduate Degree LCR subjects are given in section 4.2 of this booklet.

6.   CURRICULUM MAP

Alignment of Subjects with Programme Intended Learning Outcomes:

	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
A. GENERAL UNIVERSITY REQUIREMENTS (GUR)										
Language and Communication Requirements (LCR)										
LCR - English - ELCXXXX (2 Subjects)								T,P		
LCR - Chinese - CBSXXXX (1 Subject)								T,P		
Cluster-Area Requirements (CAR) (4 Subjects)										
CAR - Cluster-Area Requirement Subjects+							T,P	T,P	T,P	T,P
Other Requirements										
ENG1003 Freshman Seminar for Engineering						T,P		T,P	T	T,P
LIPD - Leadership and Intra-Personal Development							T,P			
SL - Service-Learning						T,P		T,P		
B. DISCIPLINE-SPECIFIC REQUIREMENTS (DSR)										
Compulsory - Mathematics and Sciences Subjects										
AMA1110 Basic Mathematics I – Calculus and Probability & Statistics			T,P		T,P					T
AMA1120 Basic Mathematics II – Calculus and Linear Algebra			T,P		T,P					T
EIE1002 Electronics Science	T			T				P		
Compulsory - Computer Science and Engineering Subjects										
EIE2105 Digital and Computer Systems	T	P	T							
EIE2106 Signal and System Analysis				T	P			T		T
EIE3101 Computer Animation				T	T					
EIE3103 Digital Signals and Systems			T		P			T		T
EIE3109 Mobile Systems and Application Development				T	T				T,P	
EIE3112 Database System		T			T,P			T,P		
EIE3121 Introduction to Audio and Speech Processing	T,M	-	T	T	-	-	-	-	-	T
EIE3122 Introduction to Image and Video Processing	T	-	T	-		-	-	T	-	
EIE3320 Object-Oriented Design and Programming	T,M		T,P	T,P,M	P					
EIE3333 Data and Computer Communications	T	T			T,P			T		
EIE3342 Computer Networks	-	T,P	T,P	-	-	-	-	-		T
EIE3343 Computer Systems Principles		P	T							T
EIE3345 Data Communication Technologies	T	T,P,M	T	-	-	-	-	-	T	-
EIE3360 Integrated Project	T,P,M	T,P,M	T,P,M		T,P,M	P,M		P,M		T,P,M
EIE4102 IP Networks	T	-	-		T,P	-	-	-	-	T
EIE4431 Digital Video Production and Broadcasting	T,P,M	-	T	-	T,P,M	-	-	-	-	T
EIE4432 Web Systems and Technologies		T			T,P	P,M				T
EIE4435 Image and Audio Processing	-	-	T,M	T,M	-	T	-	-	-	-
ENG2002 Computer Programming	T,P		T,P		T,P					T
ENG2003 Information Technology			T,P		T,P				T,P	
SD2984 3D Graphics and Animation Fundamentals					T,P	T,P		T,P		
SD3985 Computer Game Development			T,P	T,P		T,P		T,P		

	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Compulsory - Capstone Project (Select Any 1)										
EIE4430 Honours Project	P,M	P,M	P,M	P,M	P,M			P,M	P,M	P,M
SD4981 Computer Game Development Project			T,P	T,P		T,P		T,P		
Compulsory - Industrial Centre Training and Training through Work Experience										
IC2140 Practical Training			T,P		T,P	T,P	T		T	
Work-Integrated Education (WIE)				P,M		P,M	P,M	P,M	P,M	P,M
Compulsory - Complementary Subjects										
AF3625 Engineering Economics						T,P	T,M	T,P		T,P
CBS3241P Professional Communication in Chinese								T,P, M		
COMP3512 Legal Aspects, Professionalism and Ethics of Computing							T,P, M	P,M		T,P, M
ELC3521 Professional Communication in English								T,P, M		
ENG3003 Engineering Management							T	T,M	T	T,M
SD2983 Design Communication and Principles	T,P	T,P				T,P		T,P	T,P	
Elective - Computer Science and Engineering Subjects (Select Any 3)										
COMP4342 Mobile Computing		T,P	T,P	T,P	T,P	T,P		T,P	T,P	
COMP4422 Computer Graphics		T,P	T,P	T,P	T,P			T,P		T,P
~~EIE3110 Research Methodology~~	~~T~~	~~-~~	~~T~~	~~-~~	~~-~~	~~-~~	~~-~~	~~T~~	~~-~~	~~T~~
EIE4100 Computer Vision and Pattern Recognition	T	T,P	T	T	T	T				T
EIE4103 Mobile Computer System Architecture			T		T					
EIE4104 Mobile Networking	T				T,P					T
EIE4105 Multimodal Human Computer Interaction Technology	T,P				T,P				T,P	
EIE4106 Network Management and Security	T,M	T,P, M	T,M	T	T,M			T		T
EIE4108 Distributed Systems and Cloud Computing	T,P		T	T,P	P			T,P	T,P	
~~EIE4414 Computer Architecture and Systems~~	~~-~~	~~-~~	~~T,M~~	~~-~~	~~T,M~~	~~-~~	~~-~~	~~T~~	~~-~~	~~T~~
EIE4428 Multimedia Communications	T	T	T,P, M							T

Note:

Programme Outcomes:
1. Apply knowledge of computing and mathematics appropriate to the discipline of Internet and Multimedia Technologies;
2. Apply knowledge of Internet and Multimedia Technologies to the abstraction and conceptualisation of Information and Communications Technology (ICT) models;
3. Analyse a problem in Internet and Multimedia Technologies, and identify and define the computing requirements appropriate to its solution;
4. Design, implement, and evaluate a system, process, component, or program in Internet and Multimedia Technologies to meet desired needs with appropriate consideration for public health and safety, social and environmental considerations; and
5. Use current techniques, skills, and tools necessary for practice in Internet and Multimedia Technologies with an understanding of the limitations.
6. Function effectively on teams to accomplish a common goal;
7. Understand professional, ethical, legal, security and social issues and responsibilities;
8. Communicate effectively with a range of audiences;
9. Analyse the local and global impact of Internet and Multimedia Technologies on individuals, organisations, and society; and
10. Recognise the need for and engage in continuing professional development.

T: Teach
P: Practice
M: Measured
+: Support of outcomes depends on particular project/subject design and requirements

26. **GRADUATION REQUIREMENTS FOR BSC(HONS) IN INTERNET AND MULTIMEDIA TECHNOLOGIES PROGRAMME**

26.2   Specific Graduation Requirements for the **BSc(Hons) in Internet and Multimedia Technologies** Programme

26.2.1   Normal Year 1 Intake (Applicable to intake cohort of 2015/16 and onwards):

(i)   Complete successfully a minimum of **124** academic credits composed of the following:

(a)   30 credits of General University Requirements (GUR) as set out in Section 26.1.1(i).

(b)   94 credits of Discipline-Specific Requirements (DSR), of which 85 credits from subjects categorized as COM (compulsory) and 9 credits from subjects categorized as ELE (elective) (at least 2 of these electives must be at level 4 or above) as stated in Table 4.1.

(ii)   Obtain a total 5 credits in TRN (Training) as stated in Table 4.1.

(iii) Satisfy the residential requirement for at least 1/3 of the credits to be completed for the award the student is currently enrolled, unless the professional bodies stipulate otherwise.

26.2.2   Senior Year Intake (Applicable to intake cohort of 2017/18 and onwards):

(i)   Complete successfully a minimum of **67** academic credits composed of the following:

(a)   9 credits of General University Requirements (GUR) as set out in Section 26.1.2 (i).

(b)   58 credits of Discipline-Specific Requirements (DSR), of which 49 credits from subjects categorized as COM (compulsory) and 9 credits from subjects categorized as ELE (elective) (at least 2 of these electives must be at level 4 or above) as stated in Table 4.1.

(ii)   Obtain a total 5 credits in TRN (Training) as stated in Table 4.1.

(iii) Satisfy the residential requirement for at least 1/3 of the credits to be completed for the award the student is currently enrolled, unless the professional bodies stipulate otherwise.

4.   PROGRAMME, SUBJECTS, AND CREDITS

Table 4.1 Compulsory and Elective Subjects to be Taken by BSc in IMT Students

Subject	Subject Title	Credit	Normal Year 1 Intake	Senior Year Intake
			Category	
General University Requirements (GUR)				
-	Cluster-Area Requirement I (CAR I)	3	COM	COM
-	Cluster-Area Requirement II (CAR II)	3	COM	COM
-	Cluster-Area Requirement III (CAR III)	3	COM	-
-	Cluster-Area Requirement IV (CAR IV)	3	COM	-
-	Language and Communication Requirement I (LCR I) – English *	3	COM	-
-	Language and Communication Requirement II (LCR II) – English *	3	COM	-
-	Language and Communication Requirement III (LCR III) – Chinese*	3	COM	-
-	Leadership and Intra-Personal Development	3	COM	-
-	Service-Learning	3	COM	COM
ENG1003	Freshman Seminar for Engineering	3	COM	-
-	Healthy Lifestyle	0	COM	-
Discipline-Specific Requirement (DSR)				
AF3625	Engineering Economics	3	COM	COM
AMA1110	Basic Mathematics I – Calculus and Probability & Statistics	3	COM	-
AMA1120	Basic Mathematics II –Calculus and Linear algebra	3	COM	-
CBS3241P	Professional Communication in Chinese	2	COM	COM
COMP3512	Legal Aspects, Professionalism and Ethics of Computing	3	COM	COM
COMP4342	Mobile Computing	3	ELE	ELE
COMP4422	Computer Graphics	3	ELE	ELE
EIE1002	Electronics Science	3	COM	-
EIE2105	Digital and Computer Systems	3	COM	-
EIE2106	Signal and System Analysis	3	COM	-
EIE3101	Computer Animation	3	COM	COM
EIE3103	Digital Signals and Systems	3	COM	-
EIE3109	Mobile Systems and Application Development	3	COM	COM
~~EIE3110~~	~~Research Methodology~~	~~3~~	~~ELE~~	~~ELE~~
EIE3112	Database System	3	COM	-
~~EIE3121~~	~~Introduction to Audio and Speech Processing~~	~~3~~	~~COM~~	~~COM~~
~~EIE3122~~	~~Introduction to Image and Video Processing~~	~~3~~	~~COM~~	~~COM~~
EIE3320	Object-Oriented Design and Programming	3	COM	COM
~~EIE3333~~	~~Data and Computer Communications~~	~~3~~	~~COM~~	~~COM~~
~~EIE3342~~	~~Computer Networks~~	~~3~~	~~COM~~	~~COM~~
EIE3343	Computer Systems Principles	3	COM	-

Subject	Subject Title	Credit	Category	
			Normal Year 1 Intake	Senior Year Intake
EIE3345	Data Communication Technologies	3	COM	COM
EIE3360	Integrated Project	3	COM	COM
EIE4100	Computer Vision and Pattern Recognition	3	ELE	ELE
EIE4102	IP Networks	3	COM	COM
EIE4103	Mobile Computer System Architecture	3	ELE	ELE
EIE4104	Mobile Networking	3	ELE	ELE
EIE4105	Multimodal Human Computer Interaction Technology	3	ELE	ELE
EIE4106	Network Management and Security	3	ELE	ELE
EIE4108	Distributed Systems and Cloud Computing	3	ELE	ELE
EIE4414	Computer Architecture and Systems	3	ELE	ELE
EIE4428	Multimedia Communications	3	ELE	ELE
EIE4430	Honours Project	6	COM (Select any 1 subject out of these 2 subjects)	COM (Select any 1 subject out of these 2 subjects)
SD4981	Computer Game Development Project	6		
EIE4431	Digital Video Production and Broadcasting	3	COM	COM
EIE4432	Web Systems and Technologies	3	COM	COM
EIE4435	Image and Audio Processing	3	COM	COM
ELC3521	Professional Communication in English	2	COM	COM
ENG2002	Computer Programming	3	COM	-
ENG2003	Information Technology	3	COM	-
ENG3003	Engineering Management	3	COM	COM
IC2140	Practical Training	5	TRN	TRN
SD2983	Design Communication and Principles	3	COM	-
SD2984	3D Graphics and Animation Fundamentals	3	COM	-
SD3985	Computer Game Development	3	COM	COM

Note:

AF	School of Accounting and Finance
AMA	Department of Applied Mathematics
CBS	Department of Chinese and Bilingual Studies
COM	Compulsory
COMP	Department of Computing
EIE	Department of Electronic and Information Engineering
ELC	English Language Centre
ELE	Elective
ENG	Faculty of Engineering
IC	Industrial Centre
SD	School of Design
TRN	Training

* Details of the Language and Communication Requirement (LCR) are set out in Section 4.2.

Subject to the approval by the Programme Leader, students may take at most one Level 5 subject per semester to replace a final-year technical elective during their final year of study. The total number of Level 5 subjects taken shall not exceed 2. The following is the list of Level 5 subjects currently available.

Subject Code	Subject Title	Credit	Category
EIE522	Pattern Recognition: Theory and Applications	3	ELE
EIE529	Digital Image Processing	3	ELE
EIE546	Video Technology	3	ELE
EIE553	Security in Data Communication	3	ELE
EIE557	Computational Intelligence and its Applications	3	ELE
EIE558	Speech Processing and Recognition	3	ELE
EIE563	Digital Audio Processing	3	ELE
EIE575	Vehicular Communications and Inter-Networking Technologies	3	ELE
EIE579	Advanced Telecommunication Systems	3	ELE
EIE581	Optical Wavelength Division Multiplexing Networks	3	ELE
EIE589	Wireless Data Network	3	ELE
EIE507	Network Design - Theory and Practice	3	ELE
EIE536	High Speed Networks	3	ELE
EIE541	Digital Signal Processing	3	ELE
EIE552	Internet Technologies for Multimedia Applications	3	ELE
EIE555	Personal Networking Technology	3	ELE
EIE556	Advanced DSP for Multimedia Communications	3	ELE
EIE565	Advanced Multimedia Technology	3	ELE
EIE576	Information Technology in Biomedicine	3	ELE