FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

List of Courses Offered for University of Malaya
Student Exchange Programme (UMSEP) for the 2013/2014 Academic Session

Programmes: (1) Bachelor of Computer Science

(2) Bachelor of Information Technology

NO.	COURSE CODE	COURSE TITLE	PRE-REQUISITE	CREDITS	Courses Offered Please tick (√) where applicable		COURSE DESCRIPTION
					SEMESTER I	SEMESTER II	
PROGRAMME CORE COURSES							
1	WXES1109	Computer Systems & Organization	-	3	√		This course covers the introduction to computer systems & organization which includes number system, boolean algebra, basic logic gates, function simplification, combinational circuit, latches and flip-flop, sequential circuit and addressing mode. This course also gives introduction to Pentium Processor Architecture and Assembly language.
2	WXES1112	Computing Mathematics I	-	3	√	√	This course covers discrete mathematics and its applications in computer science. Topics include number theory, sets, relations and functions, logic, graphs and trees, matrices, vector and combinatorics. It also covers mathematical applications in computer science (such as applications of sets and functions in program semantics, logic in program specification, equivalence and order relations in program complexity, graphs and trees in game theory, matrices in graphics, number theory in secure communication).
3	WXES1116	Programming I	-	5	√	√	This course covers problem solving and the fundamental of programming. These include problem solving techniques, the basic structure of computer program, the fundamental concepts of object-oriented programming, data types and operations, selection control structures i.e. if and switch, repetition control structures i.e. for, while, do-while, function, array, string, text file, and programming practice.
4	WXES2113	Operating Systems	-	4	√		This course covers basic concept of operating systems which includes memory management in early and recent systems, processor and process managements, concurrent process, deadlock and starvation. This course also provides insights to device, file and system management, as well as example of operating systems.
5	WXES2114	Database	-	5	√		This course contains the following subjects: (a) File-based System. Limitation of the File-Based Approach. The Database and Database Management System. Components of the DBMS Environment. Role if the Database Environment- Data and Database Administrators, Database Designers, Application Developers and End-Users; (b) Three Level ANSI-SPARC Architecture. Database Languages- DDL, DML and Fourth-Generation Languages(4GLs). Data Models and Conceptual Modelling - Object Based Data Models, Record-Based Data Models, Physical Data Models and Conceptual Modelling. Functions of a DBMS. Data Dictionary; (c)The relational model. Relational data structure, mathematical relations, database relations, properties of relations, relational keys, representing relational database schemas. Integrity constraints, relational algebra, relational calculus; (d) Entity relationship modeling - entity types, attributes, relationship types, attributes on relationship. Structural constraints, problems with ER model. EER model - specialization or generalization, aggregation and composition; (e) Normalization - update anomalies: insertion anomalies, deletion anomalies and modification anomalies. First normal form, second normal form, third normal form, Boyce-Codd normal
6	WAES1102	Principles of Artificial Intelligence	-	3		√	This is an introductory course to the Principle of Artificial Intelligence (AI). It covers the history, the basic concepts and techniques of AI such as knowledge representation, problem solving, searching, reasoning and machine learning. It also differentiates between conventional systems and intelligent systems and introduces the various applications of AI.

No	Code	Course Name		Credit			Description
7	WAES2104	Mathematics for Intelligent Systems	-	3		√	This course covers important mathematics topics which can be applied to artificial intelligence field. The topics include calculus (differentiation and integration), functions and graphs, matrix algebra (eigen value, eigen vector, dependency, singularity), statistical methods (sampling, principle component analysis) and transformations (Fourier, Laplace, Hough, geometric and wavelet).
8	WKES1104	Software Engineering I	-	3		√	This course covers software engineering principles, concepts and system types; software engineering development process, techniques, methodologies and tools; and software engineering best practices and experience.
9	WMES1105	Principles of Information Systems	-	3		√	This course covers the following topics: (a) Overview of Information System (IS) (Introduction to IS, IS in organisation); (b) Information Technology concepts in IS (Output/hardware: input devices, processing and output devices, software: system and application software, managing data and information, telecommunications and networks, internet, intranet, extranet; (c) IS for business (Electronic Commerce, Transaction Processing System and Enterprise Resource Planning, Decision Support System, Specialise Business IS: intelligent system, virtual reality and other specialised systems); (d) IS stakeholders; (e) IS in society, business and industry (security issue and privacy, ethics and IS); and (f) Case study on IS in organization.
10	WMES2112	System Analysis, Modeling and Design	-	4		√	The following topics are covered in Systems Analysis, Modelling and Design: Systems Development Roles; Systems Development Building Blocks; Systems Development Processes; Systems Development Project Management; Systems Analysis; Fact-Finding Techniques for Requirements Discovery; Modeling System Requirements with Use Cases; Data Modeling and Analysis; Process Modeling; Feasibility Analysis and the System Proposal; Object-Oriented Analysis and Modeling Using the UML; Systems Design; Application Architecture and Modeling; Database Design; Output Design and Prototyping; Input Design and Prototyping.
11	WMES3108	IT Project Management	-	3		√	The course is made up of the following elements: (a) Introduction to Project Management; (b) The Project Management and Information Technology Context; (c) The Project Management Process Groups; (d) Project Integration Management; (e) Project Scope Management; (f) Project Time Management; (g) Project Cost Management; (h) Project Quality Management; (i) Project Human Resource Management; (j) Project Communications Management; (k) Project Risk Management; (l) Project Procurement Management.
12	WRES2111	Fundamentals of Network Technology	-	5	√		This course covers the basic of computer and networking which includes transmission medium, OSI layers, LAN and WAN, IP addressing and VLSM, TCP/IP, Router setup and configurations.
13	WRET1106	Multimedia System	-	4		√	In this course, students will be taught about various technologies that support the advancement of multimedia application including techniques for digitizing and compressing each multimedia element, related hardware technologies, multimedia editing and authoring tools, and development methods commonly deployed by multimedia application.
14	WRET2110	Interaction Design	-	3		√	This course covers the main topics in interactive design such as the following: interaction concept and design; user roles in interactive design; design for combining information and communication; effective aspects of interface and interactivity; data collecting, analyzing, and presentation; interactive design process; and interactive design evaluation process.
15	WRET3105	Data Communication and Networking	-	3		√	This course covers the following topics: the basics of computer network; the Open System Interconnection (OSI) layers; high-speed networking that supports multimedia requirements; the needs of Quality of Service (QoS), advanced TCP/IP and ATM network; advantages of ATM, ATM network components; ATM network operation; traffic needs for data; audio, video, and image; ATM layers; ATM adaptability layers; ATM network management; and ATM implementation in enterprise network.
		BACHELOR OF COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE)					
		PROGRAMME ELECTIVE I COURSES					
16	WAES2103	Expert Systems	-	3		√	This course describes the knowledge engineering methodology for expert system's development. It covers the basic concepts in expert systems, knowledge representation, inference techniques, forward-chaining and backward-chaining rules and knowledge acquisition.

No	Code	Course		Credit				Description
17	WAES2106	Prolog Programming	-	3			√	This is an introductory course to Prolog programming. It describes propositional and predicate logic and covers various Prolog programming constructs such as loops, data objects such as structure and lists, text files and some common built-in predicates.
18	WAES2107	Fundamentals of Cognitive Science	-	3			√	This course covers the fundamentals on cognitive science. It covers topics on mind and machine, perception (object recognition), observation and consciousness, memory (short term memory, working memory and long term memory), learning, forgetting phenomena and knowledge retrieval, mental representation and visual perception, category and schema, language perception (verbal and non verbal), emotion and expression, reasoning, problem solving and decision making, intelligence and creativity.
19	WAES2108	Natural Language Processing and Generation	-	3			√	This is an introductory course to Natural Language Processing and Generation (NLPG). It introduces the phases of Natural Language Processing, which covers phonology, morphology, syntax, semantics, discourse and pragmatic. It also introduces the applications of the NLPG.
20	WAES3102	Fundamentals of Robot Intelligence	-	3			√	This course covers the fundamentals of robot intelligence. It covers topics on background of robotic, applications (such as military, industries, medical, search, rescue, Sony AIBO, humanoid, ASIMO, Honda vacuum), effects of robots on life, robot components, types of robots with functions and applications, senses – vision (image, pattern recognition, pixel analysis), acoustic, speech, touch, olfactory (artificial nose), robot kinematics, artificial emotions, navigation and cognitive mapping, sensors and robot problem solving. It also covers new development in robotics (such as bio-inspired robotics, evolutionary robotic and evolutionary algorithms).
21	WAES3104	Fundamentals of Artificial Neural Network	-	3			√	This course begins with the history, design, biology motivation, and characteristics of artificial neural network. It covers linear algebra and categorisation of neural networks. It also has learning rules of perceptron, hebbian, backpropagation, and competitive learning.
22	WAES3105	Machine Learning Methods	-	3			√	This course covers machine learning field. It covers topics on machine learning concepts, decision tree learning, neural network learning, Bayesian learning, rule sets learning, explanation based learning and reinforcement learning.
23	WAES3106	Image Processing	-	3			√	This course begins with major steps of computer vision. It covers pre-processing, segmentation, feature extraction, image transformations, pattern classification and recognition. It also discuss image processing applications and relate to topics beyond two dimensional processing.
PROGRAMME ELECTIVE II COURSES								
24	WAES3306	Intelligence of Information Systems	-	3	√	OR	√	This is an introductory course to Information Systems Intelligence. It covers the various Information Systems in organizations and the matrics used to measure the intelligence of the systems. It explains how AI techniques and applications such as expert systems, neural network, natural language processing, fuzzy logic, data mining and robotics can be used to make the system intelligent and advanced.
25	WAES3308	Numerical Methods	-	3	√	OR	√	This course covers numerical analysis and the computer implementation of numerical problems. Topics include, interpolation & function approximation, system of linear equations, solving algebraic equations, numerical differentiation and integration, numerical solution of ordinary and partial differential equations, mathematical modeling and computer simulation, applications of numerical method in various fields: computer graphics, robotic, neural network, machine learning, networking.
26	WAES3370	Artificial Intelligence Software Tools	-	3	√	OR	√	The course desribes the types of artificial intelligence software tools, i.e. MATLAB and WEKA. MATLAB covers the topics of computer vision, image processing, speech and visualization. While, WEKA covers the topics of machine languange applications.
BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING)								
PROGRAMME ELECTIVE I COURSES								
27	WKES2107	Human Computer Interaction	-	4			√	This course covers HCI fundamentals and user-centered approach of interaction design. HCI fundamentals include topics on human, computer and interactions; interaction styles, paradigms and devices; capabilities of human beings; usability; guidelines, principles, heuristics and patterns; visual design and interface metaphors. User-centered approach includes topics on design process, low and high fidelity, design tools and evaluations. The course also covers topic on designing for the web.

28	WKES2108	Software Project Management	-	4			√	This course introduces the fundamental of management concepts, explains topics on project planning, the various issues involved in the management of project personnel, organisational structures, and project control. This course also covers the procedures to conduct project audit and closure.
29	WKES3106	Software Quality	-	3			√	This course covers software quality and software quality assurance. It introduces the software quality assurance architecture and framework. These include the components, planning programme, techniques and CASE tools in software quality assurance activities, software inspection, software testing strategy, verification and validation, corrective and preventive action, procedures and work instructions. Software quality measurement, metrics and its implementation are also covered in this course. The later part of this course covers the Software Quality Management Standards and SQA Project Process Standards which includes ISO 9001 and ISO 9000-3, CMM and CMM-I assessment methodology, Bootstrap methodology, SPICE project and ISO/IEC 15504 software process assessment standard, IEEE software engineering standards, IEEE/EIA Std 12207-software lifecycle processes, IEEE/EIA Std 1012-verification and validation and IEEE/EIA Std 1028-reviews.
30	WKES3110	Software Verification and Validation	-	4	√			This course provides an overview of software verification and validation terminology and foundation. The course covers topics in reviews, testing, human computer interface testing and problem analysis and reporting. In particular, students will learn about desk checking, walkthroughs, inspections, unit testing, exception handling, coverage analysis, black box testing, integration testing, and regression testing, system and acceptance, developing test case, testing across quality attributes and testing tools. Problem analysis and reporting will include analyzing failure reports, debugging/fault isolation techniques, defect analysis and problem tracking.
PROGRAMME ELECTIVE II COURSES								
31	WKES3108	Software Evolution and Validation	-	3	√	OR	√	This course covers software evolution and configuration in software maintenance activities. Topics include Basic Concepts (Definitions and terminology, Need for maintenance, A software maintenance framework, Categories for maintenance); Maintenance Processes (Corrective Maintenance, Perfective Maintenance, Adaptive Maintenance, Preventive Maintenance); Key issues in software maintenance (Technical, Management, Cost and estimation); Techniques for maintenance; Program Comprehension(Strategies, Software tools for program understanding); Evolution of Legacy Systems; Configuration Management (Configuration item, Processes and activities in configuration management, Patches); and CASE Tools for configuration management.
32	WKES3204	Software Process And Metrics	-	3	√	OR	√	This course provides an overview of software process definition and process infrastructure, software development lifecycle model and the importance of a defined process and process maturity. The course covers topics in measurement of product development, software measurement framework and methods, software metrics data collection and analysis, measuring process and product attributes. In addition, IEEE software engineering standards, organization level process improvement, team level software improvement, individual software level improvement and measurement of software improvement will also be studied.
BACHELOR OF COMPUTER SCIENCE (MANAGEMENT INFORMATION SYSTEM)								
PROGRAMME ELECTIVE I COURSES								
33	WMES2107	Statistics Application for Information Technology	-	3			√	This course provides an introduction to statistics, i.e., the nature of data, the use and misuse of statistics and the design of statistical tests. It aims to further develop students' ability in explaining, exploring and comparing data in the forms of frequency table, graphical representation of data, mean, median, mode and standard deviation and *EDA,* as well as estimating and choosing sample size (big/small, determining sample size, population variation). The course also aims to consolidate students' skills in exercising basic probability and using mix method, mulitiplication rule, addition rule, combination rule and simulation. Students are expected to demonstrate problem solving and decision making techniques in this course, particularly in these following areas: (a) Variance analysis; (b) Statistical control processes; (c) Linear programming (basic, manual solutions and computerised solutions); (d) Statistical package (SAS/Minitab or SPSS for *Windows* (e) Project using statistical analysis and softwaret

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34	WMES2109	Organisational Theory	-	3			√	This course provides the introduction to effective organization and organization stakeholders, i.e., the share holders, managers and ethics and covers the following topics: (a) Managing in a globalized environment; (b) Challenges in organizing an organization; (c) Organization structure design: power and authority; (d) Organization structure design:coordination and expertise; (e) Managing the organizational culture; (f) Designing an information technology system in an organization; (g) Organizational decision making using Information Technology.
35	WMES2111	Open Source Programming	-	3			√	This course covers the following area: (a) Introduction to Free Open Source Software (FOSS); (b) Introduction to open source web-servers, open source programming language (OSPL), open source Database Management Systems (OSDBMS); (c) Web-based system development environment; (d) OSPL – Using Variables, Statements and Operators; (e) OSPL – Using Conditional Statements and Loops; (f) OSPL – Using Arrays and Custom Functions; (g) OSPL – Using Files, Sessions, Cookies and External Programs; (h) OSPL and OSDBMS - Querying a Database with OSPL; (i) OSPL and OSDBMS – Validating User Input; (j) OSPL and OSDBMS – Formatting Query Output; (k) Development of a web-based system using open source software.
36	WMES3106	Information Control and Security	-	3			√	The elements of the syllabus of the course are; (a) Information Security and Risk Management; (b) Access Control System and Methodology; (c) Cryptography; (d) Physical/Environmental Security; (e) Enterprise security system architecture and design; (f) Business Continuity and Disaster Recovery Planning; (g) Telecommunication, Networks and Internet Security; (h) Application Security; (i) Operation Security; (j) Law, Investigation, Compliance and Ethics.
37	WMES3107	Information System Auditing	-	3			√	The topics that make up the course are: (a) Auditing process; (b) Managing planning and organization of information systems; (c) Technical infrastructure and operational work procedure; (d) Control on information assets; (e) Disaster recovery and business sustainability; (f) System development of Business applications, findings, implementation and operations; (g) Evaluation of business process and risk management.
38	WMES3109	Technopreneurship	-	3	√			This course involves the following subject matters: (a) Entrepreneurial Revolution; (b) Environmental Assessment and Marketing Research for a New Venture; (c) Financial Preparation for Entrepreneurial Ventures; (d) Developing an Effective Business IT Plan; (e) Sources of Capital for Entrepreneurs; (f) Strategic Planning and Managing Emerging Ventures; (g) Seminar (Guest Speakers); (h) Business Plan drafting.
39	WMES3110	Intelligent Agent in Information System	-	3			√	This course covers the following topics: (a) Introduction : Internet and Web, Web search agent, information, intelligent information agent; (b) Basic criteria and concepts for agents and intelligent agents; (c) Classification and types of intelligent agents; (d) Intelligent agent based information retrieval concepts; (e) Role and function of intelligent agent in the context of information retrieval: searching, prioritizing, announcing, filtering, profile development, community classification and others; (f) Content based intelligent agent; (g) Collaboration agents: interaction theory for intelligent agent; (h) Agent communication language.
PROGRAMME ELECTIVE II COURSES								
40	WMES3104	Accounting Management System	-	3	√	OR	√	This course covers: (a) Introduction to Accounting Information System (AIS); (b) Documenting Accounting Information System; (c) Using Accounting Information System (AIS); (d) Accounting Information System (AIS) applications (AIS and business processes); (e) Designing an Accounting Information System application based on REA model; (f) Analyzing, developing, implementing and delivering of Accounting Information System application; (g) Accounting Information System auditing and monitoring process.
41	WMES3302	Decision Support System	-	3	√	OR	√	This course covers the paradigm of decision support system, decision making process, organizational application towards decision support system (DSS) in related fields. This course also enhance the students knowledge on the development of a DSS prototype that will show the real sense making of the whole course.

No	Course Code	Course Name		Credit		OR		Description
42	WMES3314	Electronic Commerce	-	3	√	OR	√	This course consists of the following components: (a) History of e-Commerce 1: Development of telegraph, mail orders, call centres, EDI, web businesses, network economy, real and virtual network; (b) History of e-Commerce 2: Economy scale offer vs. demand, Metcalfe's Law, dominant enterprise model and cost model; (c) Market opportunity analysis; (d) Online business models; (e) Interface design and system design; (f) Market communication and branding; (g) Implementation of resources system, website development and web architecture; (h) Electronic payment system; (i) Ecommerce issues including security and policies and cyber laws; (j) E-commerce in practice and future trend and (k) Mobile commerce.
43	WMES3318	Knowledge Management	-	3	√	OR	√	Modules for this course include (a) An introduction to the concepts of K-Economy and K-Management; (b) View and Knowledge characteristics: knowledge and its differences from data and information; (c)Technological approach towards knowledge; (d) Information Management approach towards KM; (e) Intellectual capital elements in organisation; (f) Developing knowledge system, evaluating the knowledge needs of an organisation; (g) Techniques in KM: capturing, encoding and measuring of knowledge; (h) Knowledge Management portal and (g) Case study on KM in organization.
44	WMES3320	Fundamentals Of Data Mining And Warehousing	-	3	√	OR	√	The course consists of the following components: (a) Introduction to Data Warehouse and Data Mining; (b) Data Warehouses; (c) Pre-mining; (d) Classification; (e) Association Rules; (f) Clustering Algorithms.
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BACHELOR OF COMPUTER SCIENCE (COMPUTER SYSTEM AND NETWORKING)

PROGRAMME ELECTIVE I COURSES

No	Course Code	Course Name		Credit				Description
45	WRES1103	Digital Design	-	3			√	This course consists of basic introduction to digital design, number system and Code 1, combinational logic design principle and practice, sequential logic design principle and practice, memory, CPLD and FPGA, and case studies.
46	WRES2112	Network Security	-	4			√	This course is designed to provide student knowledge of network security, types of attack towards network, security services, and security mechanism. This course also will examine the security criteria by identity the best practices for the network security. The criteria will be looking into encryption techniques, remote access, intrusion detection and prevention, Virtual Private Network, firewall, honey pots, AAA, Infrastructure security, and physical security. Finally, the course will evaluate a plan and best proposal to design a secure network topology based on security policy and legal issues. This course also emphasis on practical exercises by introducing a range of security applications used in a network.
47	WRES2109	Mathematics in Networking	-	3			√	This course consists of graph theory, applied usage of graph theory in computer networks, queue theory, applied usage of queue theory in computer networks, network calculus and applied usage of network calculus in computer networks.
48	WRES3107	Microprocessor	-	4			√	This course covers the introduction to microprocessor which includes arithmetic processor, microprocessor development, instruction in microprocessor, microprocessor connection, microcontroller, advanced microprocessor, Input / Output in microprocessor and microprocessor development based on product.
49	WRES3109	Principle in Distributed Systems	-	4			√	This course covers the introduction to distributed systems which includes foundations on system models & interprocess communication, low level network programming using socket, distributed algorithms, systems middleware, system infrastructure and distributed computing paradigms.
50	WRES3108	Enterprise Network Design and Management	-	4	√			This course consists of top-down network design model for large scale network which includes the requirements and constraints, large scale network topology design, models for addressing and naming for network devices. This course also covers switching and routing protocols, network security strategies, optimal network design, network management planning and strategy, ISO network management model, network management protocols: SNMP, RMON, NTP, network performance issues, troubleshooting mechanisms and network documentation and base lining.
51	WRES3405	Mobile Computing	-	3	√			This course covers the introduction to wireless networks and mobile computing which includes looking at examples of mobile computing applications, issues that distinguishes wireless networks from fixed networks and examples of how the issues are addressed to support mobile computing.

PROGRAMME ELECTIVE II COURSES

No	Code	Course		Credit				Description
52	WRES3104	Network Modeling And Simulation	-	3	√	OR	√	This course consists of introduction to simulation, basic concepts in discrete event simulation, statistical model in simulation, queuing network simulation, random number generation, random variate generation, input modeling and output analysis for steady-state systems. This course also covers the verification and validation of simulation, performance analysis for a simple model, simulation of computer system and network, and network simulators.
53	WRES3301	Cryptography	-	3	√	OR	√	This course consists of the introduction of cryptography, cryptographic techniques, computer-based Symmetric Key Cryptographic Algorithms, computer-based Asymmetric Key Cryptographic Algorithms, Public Key Infrastructure (PKI), Internet Security Protocols (Implementation of Cryptography), user authentication mechanisms, practical implementations of cryptography and case studies.
54	WRES3303	VLSI	-	3	√	OR	√	This course covers the fundamentals, CMOS Logic Gate Design, Silicon Semiconductor Technology, MOS Transistor, CMOS Fabrication, system design and layout, memory design, design of array structures, ALU (fast adder and fast multiplier), parallel processor, multiprocessor and design testing.
55	WRES3305	Emergence Network Technology	-	3	√	OR	√	This course covers the next generation network, IPv6, Voice Over IP, H.323 and SIP, Quality of Service, Voice Security and MPLS.
56	WRES3310	Intelligent Network Technology	-	3	√	OR	√	This course covers network and transport protocols, fundamental concepts of artificial intelligence, fundamental concepts of machine learning, dynamic characterization, learning characterization and intelligence characterization.
57	WRES3315	Embedded Programming System	-	3	√	OR	√	This course covers the embedded system overview, special variable processor design, embedded system memory, embedded system interfaces and embedded system controller.
BACHELOR OF INFORMATION TECHNOLOGY (MULTIMEDIA)								
PROGRAMME ELECTIVE I COURSES								
58	WRET1105	Multimedia Application Development	-	3			√	The course begins with an introduction to different types of multimedia application emphasizing on their usage, strengths and weaknesses. Then students will be taught about the development process of a multimedia application. Students will also learn about the process of creating and editing digital images and graphics, digital video and digital sound using related multimedia editing tools such as Adobe Photoshop, Adobe Premiere and Soundforge. This is then followed by 3D object modelling using virtual reality development tools. Finally, students will be trained to use multimedia authoring tool and related database application in order to develop an interactive multimedia application.
59	WRET2105	Audio Synthesis	-	3	√			This course starts with an introduction to the characteristics of sound in terms of physical and acoustical sounds, followed by the subsequent topics: properties of a sound wave, its relations to human perception of sound, sounds sampling and sound processing tools. Next, students will be taught about CSound programming emphasizing on the syntax of both the orchestra and score files, and how to program these files according to certain synthesis techniques in order to produce an audio file. For this purpose, students will be taught common synthesis techniques such as additive, subtractive, FM (Frequency Modulation) and AM (Amplitude Modulation). The course ends with the discussion on the characteristics of a speech synthesis and speech recognition systems and their applications.
60	WRET2112	Visual Computing and Graphics	-	4	√			In this course, student will learn about the basic concept and techniques in the 2D and 3D computer graphic creation process. Besides that, student will be exposed about steps in the development of primitive graphic together with the techniques in transformation and 3D object creation. In the middle stage of the course, main topics such as clipping, lighting and shading will be discussed. This course ends with the discussion on technologies and matters related to graphic communication, geometric modelling, and also the importance of visualization and graphic simulation in a real life.

No.	Code	Course		Credit				Description
61	WRET3106	Virtual Reality	-	4			√	This course begins with some introduction to virtual reality technology and its applications, followed by detail explanation regarding input and output devices that are being used in virtual reality application. Students will also learn about human sensory systems (visual, audio and tactile) and their relations to the development of virtual reality devices, as well as the possible effects these devices have on human health. Then students will be taught about how to model a virtual reality world and manipulate its objects using virtual reality development tools and programming languages. The course ends by providing students with fundamental knowledge regarding data visualisation, a research area that is closely related to virtual reality.
		PROGRAMME ELECTIVE II COURSES						
62	WRET3312	Multimedia in Learning	-	3	√	OR	√	This course begins with introduction to multimedia applications in education. Students will be taught several learning theories and their applications in the area of interactive multimedia learning. Student will also learn about instructional design models such as 'Phenomenological Models', 'Prescriptive Models', and 'Comparative Summary', and pedagogy issues underlying the effective usage of multimedia for learning. This course ends with issues related to human psychology in learning, and their effects onto the design of an effective multimedia learning package.
		BACHELOR OF INFORMATION TECHNOLOGY (MANAGEMENT)						
		PROGRAMME ELECTIVE I COURSES						
63	WMET1104	Service Engineering & Management	-	3			√	This course studies the following topics: (a)The Role of Service in Economy/The Nature of Service; (b) Service Strategy/ New Service development; (c) e-Services; (d) Service Quality; (e) Continuous Improvement in the Service Sector/The Service Encounter; (f) Facility Location; (g) Forecasting Demand; (h) Managing Capacity and Demand; (i) Managing Waiting Lines; (j) Capacity Planning; (k) Managing Services Supply Relationships & Facilitating Goods; and (l) Forecasting Demand for Services.
64	WMET1105	Information Technology (IT) Services Integration	-	3			√	The course introduces IT Services Concepts and covers the following topics: Organization, Planning and Control; Service Support (Configuration Management, Service Desk, Incident Management, Problem Management, Change Management, Release Management) and Service Delivery (Service Level Management, Capacity Management, IT Service Continuity Management, Financial Management for IT Services, Availability Management).
65	WMET1108	Information Technology (IT) And Service Economy	-	3			√	This course covers the following topics:(a) Introduction to IT and Service Economy ; (b) A Designer's View of SSME; (c) Economic paradigms and the ISE; (d) IT and Service Economy –Customers and Revenue (e) Challenges of Industrial Service Business Development (f) Challenges of Industrial Service Business Development (g) Technology Management (h) Network organization of production (i) Actionable Process Theories: A Unique Selling Proposition for a Science of Service (j) Quality System Measurement and Education in Service Environments; (k) Art of Science: Drawing the Arts to Inform Service Design and Specification; (l) Managing Socio-technical Systems and (m) Ethical Issues.
66	WMET2104	Stochastic Methods Of System Analysis	-	3	√			Covers the following topics: Introductory Notions (Probablity phenomenon, relationships with experiments, intuitive ideas, events, random variables, random trials, sample space, sample point, probability measurements, probability principles); Conditional probability (motivation, the law amounted to total probability, free events, Bayes theorem, application to reliability); Variables and Random transformations: (the distribution function, PMF, pdf (discrete random variable / constant), characterization, moments, random variables distributed together, covariance, free, the number of independent random variables, a circle transformation method of conditional moments, moment generating functions, the generating function of the number of independent random variables, inequality and general applications, law of large numbers); Application and Distribution of Selected Probability: (discrete, continuous; negative exponential random variables; gaussian random variables, Central Limit Theorem and application in the evaluation of performance and reliability); stochastic differential equation: (Linear systems Analysis, Differential Equations with Random Forces function; Method spectrum for a stationary system, Nonstationary Response Analysis); elements of stochastic

No	Code	Course					Description
67	WMET2111	Information Service Oriented Architecture	-	3	√		This course introduces the major concepts and technologies relating to service oriented architectures which represent a new approach for building interoperable, loosely coupled distributed systems. This includes the core architecture, overview and main principles of service orientation, web services, evolution of distributed system technologies, and standards which includes XML, **SOAP, UDDI**, and WSDL to address the basics of interoperable services.
68	WMET2112	Information Technology (IT) System Architecture	-	3		√	This course provides a systematic study of core concepts of IT system architecture design. These concepts are guided by technology advancements, and the constant designer effort to get maximum performance out of IT systems while minimizing the cost. It will also provide an overview of information technology (IT) services which covers enterprise systems and its architecture. Enterprise system is the complete and total component of a company's IT system and environment. This course also looks at the role of information technology in supporting the essential functions, business processes, and mission of an organization. Course content includes (a) Understanding of IT devices and categories awareness of networks, servers, applications, database, storage, middleware and programming components which makes up an IT system; (b) The combination of organization, labeling and navigation schemes within an IT system; (c) The structural design of an IT enabled space to facilitate task completion; (d) A discipline and community of practice focused on bringing principles of design and architecture to the digital landscape.
69	WMET3109	Autonomic Computing	-	3		√	This course covers the following topics: Autonomic Attributes and Challenge; Complexity-In All Its Forms; Autonomic Products and Applications; Industry-An Engine Of Growth and Opportunity; Fast and Faster; Human Capital; The New Agenda E-Business on Demand; Autonomic Computing Architectures; Autonomic Computing and Open Standards; Autonomic Implementation Considerations; Grid Computing-An Enabling Technology; Autonomic Development Tools.
70	WMET3110	Information Law And Policy	-	3	√		This course studies the following topics: Introduction to information ethics in relation to other areas of applied ethics, including computer ethics, cyberethics, engineering ethics, media ethics, and related areas, and current challenges; Philosophy of information and philosophy of technology as applied in contemporary life; Various models of decision making in professional practice and civic participation; The application of information ethics to professional practice and participation in public policy, including the relationship between ethics and law; Current ethical dilemmas under the broad categories of: Access, Ownership, Privacy, Security, and Community such as intellectual property rights, copyright, and copyleft , the digital divide and information democracy; and global information justice; Information collection and national security issues; Public records and the intersection between publicly and privately held information; Information as a commodity.

Note: Course offered is subject to change.